THE DEVELOPMENT OF THE ROLE OF THE BANK OF ENGLAND AS A LENDER OF LAST RESORT, 1870-1914

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DECLARATION

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ABSTRACT

This thesis studies the role of the Bank of England as a lender of last resort (LLR) in the 1870-1914 period. It also considers how the Bank reacted to the failure, or the possibility of failure, of financial institutions. This concern with crises arises out of fractional reserve banking: banks keep only a small proportion of their deposit liabilities in the form of cash, and thus are not able to supply all depositors with cash at any one time. If a sudden demand for cash arises, institutions with no solvency problems can fail due to a lack of liquidity in the financial markets, and widespread problems of this sort may lead to a collapse in the money stock. The role of the LLR is to provide sufficient liquidity to enable institutions to overcome their liquidity problems.

The importance of the LLR in the late nineteenth century is that it was only in this period that the Bank of England started to take on the characteristics of a last resort lender. In the last thirty years of the nineteenth century there was an absence of financial crises as compared to the previous two centuries, and it is therefore possible that the Bank of England had by this time altered its behaviour so as to remove the possibility of widespread crisis occurring. It is this question which this thesis examines.

A primary objective of the analysis in this study was to identify moments of crisis or potential crisis in the London financial markets between 1870 and 1914, with a view to assessing how the Bank of England dealt with them: did it satisfy our idea of an efficient LLR? We therefore collected data from the Bank's archives which showed the exact pattern of the Bank's discount and advance activities on a daily basis. These data were subjected to a rigorous statistical examination to enable identification of moments of financial tension. The Bank's behaviour was then analysed with respect to the theoretical framework.

The results reinforce the conclusions of earlier studies, in that although there was no stated policy stance from the Bank it was prepared to act as a LLR in this period. In addition, it was prepared to "bail-out" institutions which could prove themselves to be solvent but were in need of liquidity. The study provides a great deal of detail as to how the Bank's LLR operations were carried out.

Another important factor influencing the Bank's behaviour seems to have been the personality of the Governor. Firm, interested Governors were likely to take a definite policy stance on issues relating to the financial markets whereas weak ones were not.

SYMBOLS AND ABBREVIATIONS

The following symbols and abbreviations have been used in the thesis:

Data:

TVB = Total value of bills discounted

TNT = " number of discount transactions

TVA = " value of advances on bills (=VAOB)

VAOS = " value of advances on securities

TNAT = " number of advance transactions

TNR = " number of refusals

TVR = " value of refusals

R = Interest rate for the discount and advance transactions

Statistics:

R^2 = Correlation coefficient

R^2_a = Correlation coefficient adjusted for the degrees of freedom of the regression

DW = Durbin-Watson statistic

CHAPTER ONE

INTRODUCTION

1: Introduction - Definition of a Lender of Last Resort.

This thesis sets out to throw light on the evolving role of the central bank in Britain in the late nineteenth century. This encompasses in the main a study of the Bank of England's policies towards and actions during financial crises, in addition to an analysis of its behaviour as a central bank in more "normal" times. It is in particular a study of the Bank's role as a Lender of Last Resort (LLR).

A Lender of Last Resort can be defined as an institution which stands ready to aid the financial system in times of need.[1] This aid is necessary in order to break the link which causes a loss of confidence in fractional reserve banking to lead to large falls in the money supply. These falls can occur as a result of an en masse liquidation of deposits by depositors, who are worried about contagion: the idea that the failure of one bank may lead to failures of similar institutions. If all depositors in a bank do this simultaneously, the bank itself will close, because the essence of fractional reserve banking is that banks keep reserves to cover only a small part of their liabilities.

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[1] Classical LLR theory indicates that this aid should take the form of making cash injections into the system as a whole, not to particular institutions, in order that "bail-outs" of specific banks are avoided. This is the most efficient form of intervention, since it reduces the extent of moral hazard, a concept that will be discussed in section 5.1 of Chapter Five.
"Need" in the context of this thesis refers to times when the means of payment are under threat. See Schwartz (1986) for further details and discussion of the distinction between "real" and "pseudo" financial crises.

Thus the classical rationale for central intervention in the financial system is derived from the danger of a precipitate fall in the money stock as a direct result of a financial crisis. Whilst twentieth century British economic experience is devoid of such an occurrence, the U.S. in the early 1930s suffered a severe financial crisis when over 9000 banks failed, leading to a fall in the money stock of over 30 per cent. More recently, the U.K. debate has moved away slightly from the possibility of widespread failures leading to falls in the money supply, since our banking system is highly concentrated, but in the U.S. the likelihood of bank runs, especially within States, still remains high.

Although there has been a vast quantity of work on t e history of the Bank of England and on the contemporary effects of bank failures and the role of the LLR, there has been little attempt to bring these two areas together. Both Clapham's and Sayers' histories of the Bank are full of detail about what the Bank was doing in these years, but they cover the whole range of the Bank's activities, whereas here we concentrate on only one: the role of the Bank of England as a Lender of Last Resort.

2: Contemporary Significance of the LLR

The role of the LLR has great significance for contemporary events in monetary policy and for the financial system. The importance of the LLR in the 1980s is

being widely discussed, both in a domestic and in an international setting, the latter with reference to the establishment of some sort of international LLR which it its claimed could deal with the international debt problem. The role of the domestic LLR is very pertinent, not only in academic circles, but also in the financial and non-financial press: in the U.K.: the Bank of England's rescue of **Johnson Matthey Bankers** resulted in the passing of the 1987 Banking Act, which changed the Bank's supervisory role slightly. In the United States bank failures have been extremely frequent in the last few years, and not all of these failures have involved small, uninfluential banks. In the autumn of 1984 the Federal Reserve stepped in to help **Continental Illinois**, the fifth largest bank in the States, and in 1988 what promised to be an even bigger rescue took place, when, as part of the widespread problems suffered by Texas banks as a result of the downturn in the energy sector, the **First Republic Bank Corporation** appealed to the Federal Reserve for aid.

The problem of bank failures, and the associated one of the appropriate policies a LLR should follow, cannot therefore be regarded as an irrelevancy, or as a problem resolved in 1873 when Bagehot laid down his two rules telling central bankers how to react to a financial crisis.[2] In this thesis we will consider both the

[2] Bagehot's two rules were to "**Lend freely at a high rate**" (in the case of an internal drain), and to "**Protect the reserve**" (for a drain that was external in origin). These two, and the problems associated with them, will be discussed in detail in a later chapter.

theoretical issues involved and the implications these have for the study of the late nineteenth and early twentieth century financial system in the U.K.

3: Historical Background

The question of the appropriate policies a central bank should follow in the face of a financial crisis is one which has great significance in both a historical and, as already discussed, in a current context. In the hundred years previous to 1870 financial crises occurred frequently,[3] and thus there was much discussion as to the correct solution to the problem of the lack of stability apparent in the financial system. In the course of its evolution the Bank of England had taken on many of the haracteristics associated with a LLR, although this process had been slow and uneven, and it is important to establish what the Bank, as opposed to the other institutions in the financial system, felt was the extent of its responsibilities at this point.[4]

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[3] There were ten major crises between 1770 and 1870: 1772-3, 1782-3, 1793, 1797, 1825, 1836, 1839, 1847, 1857 and 1866.

[4] A common feature of all the financial crises up to 1866 was the inconsistency apparent in the actions of the Bank of England: people were never sure how it was going react when faced with the threat of a financial crisis, since on several occasions it changed its policy in the course of the crisis itself. For example, in 1825 the Bank first refused to lend and then lent freely, and in 1836 and 1847 it refused to lend on certain types of securities, which served only to add fuel to the panic, forcing it to revert to discounting and advancing freely.

The established view in the literature[5] is that the Bank of England had accepted its role as a LLR by the early 1870s.[6] During the Overend-Gurney crisis (1866), the Bank had "lent freely" without any backsliding, and it seemed that from this point onwards there would be no doubt as to the appropriate policies for the Bank to pursue when a financial crisis threatened. However, it took the publication of Lombard Street (written by Walter Bagehot) in 1873 for this institutional practice to become an established theoretical proposition, since there was a considerable amount of dissent from the view that the Bank's duties towards the financial system were any greater than, or different from, those of other commercial banks.[7]

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[5] For example, Fetter (1965), Feaveryear (1963), Clapham (1945), *Morgan (1943)*, *Sayers (1957)*.

[6] For example, Fetter states that:

> **"The Bank of England as a lender of last resort was, like the Gold Standard and the freedom of deposit banking, accepted as the foundation of monetary and banking orthodoxy."** (pp.275)

In A Treatise on Money, Keynes discusses the role of the Bank of England and the monetary system, and states that one of the advantages of the pre-1914 monetary system was that:

> **"...everyone knew quite clearly what principles would govern the Bank of England's actions and what they would have to expect in certain circumstances."** (Vol.II,pp.232).

[7] This dissent came mostly from Thomson Hankey, supported by G.W.Norman, both influential Bank of England Directors. In 1867 Hankey published a lecture first given in 1857, to which he added a new preface. In this he referred to the idea that the Bank should stand ready to aid the financial system in times of need as being **"the most mischievous doctrine ever broached"**. See section 5.1 of Chapter Five for further discussion.

Two other aspects of Bank behaviour have to be borne in mind when considering its behaviour during this period: the fact that until 1946 it was a private, profit seeking institution, and thus had shareholders who were keen to see it return substantial dividends, and its role as manager of the international Gold Standard.

The first aspect gave rise to a conflict of interest between the Bank's aim, as a private institution, of maximising profits, and its role as a central bank. This was a consideration that must always have been of central importance to those governing the Bank, and is important in terms of this study because of the implication that the conflict of interest had for the Bank's behaviour during periods of tension. After all, any prolonged period of higher than normal levels of discounting, probably taking place at increased interest rates, was obviously beneficial to the Bank's income, however detrimental it might have been to the system as a whole.

The second aspect of the Bank's behaviour that we must bear in mind, its role as manager of the international Gold Standard, was particularly relevant for its responsibilities as a LLR. According to Bloomfield (1959), a central bank's role in playing by the **"rules of the Gold Standard game"** in this respect required that it should **"lower its Discount Rate in the face of persisting gains of gold (and other external reserves) and raise them when there were persisting losses."**[8] This had obvious

[8] Bloomfield (1959) pp.47.

implications for the Bank of England's role as a LLR, since it is easy to envisage a situation where high levels of domestic Bank Rate, implemented perhaps in an attempt to stem an internal drain, could be detrimental to the maintenance of international equilibrium. In fact, Bloomfield concluded that, on the basis of a comparison of annual data on international and domestic interest earning assets, central banks did not play by the "rules of the game".[9]

This then is a brief overview of the historical background of the period covered by this study, and of some of the important issues arising in this period, which the Bank had to consider when making policy decisions, in addition to its "normal" central banking procedures. They will be discussed in far greater detail later in the thesis.

4: Time Span of the Analysis

The starting point for this analysis is 1870. This is not an arbitrary date:[10] it could be argued that around this time there was a change from the previously rather "ad

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[9] The results for the Bank of England were slightly more ambiguous than for other central banks. See Bloomfield (1959) for further details.

[10] This does not mean however that there is no discussion of earlier events. The point the Bank had reached by 1870 with regard to its role as a LLR had been arrived at as a result of the cumulative experience gathered during previous crises, and thus it is important to consider this experience in order to fully understand later events.

hoc" behaviour of the Bank with respect to financial crises towards a full recognition of what Bagehot had to say on this subject. Policy decisions in this area had hitherto been taken somewhat arbitrarily, and any successful policy stance had been arrived at largely as a result of trial and error. The first formulation of a set of "rules" concerning what action should be taken by the central bank during a financial crisis that attracted any attention came, as previously discussed, from Bagehot, although Henry Thornton had advocated very much the same sort of policies three-quarters of a century earlier. Thornton, though, did not possess the advantage of being editor of one of the most important vehicles for the dissemination of commercial and financial information at the time, The Economist, and thus Thornton's ideas did not receive the same level of popular recognition as did Bagehot's.

The end date of the analysis here is 1914, the year Britain entered the First World War, the outbreak of which caused a massive financial crisis in London, then the centre of the international financial system which revolved around the Gold Standard. Although initially the aim was to extend the study beyond this date, it was soon realised that there was so much to cover in the 1870-1914 period that an continuation beyond this point would be impossible. 1914 is in any case a convenient and logical point at which to stop, since the Bank's actions in wartime were slightly different, at least in emphasis, and thus 1914 in many respects marks the end of an era.

5: Aims and Methodology

The underlying aim of the thesis is to determine whether the Bank of England, explicitly or implicitly, altered its behaviour with respect to the financial system in the latter part of the nineteenth century. This may have come about as a result of a general acceptance of its duty to provide the system with liquidity in the event of need. If it did change its behaviour, how and why did this arise?[11]

The main reason for postulating that the Bank of England changed its behaviour in the latter part of the nineteenth century is the absence of financial crises in these years, as compared with the earlier period. In terms of the analysis of the Bank's role, there are two possible explanations for this phenonomen: either there were no problems in the financial markets which needed the Bank of England's intervention, or the Bank's behaviour changed to allow for the implemention of policies that would either prevent crises from arising, or would mitigate the effects of them once they arose. Since, as stated above, it is unlikely that there was a complete absence of periods of tension, we can accept the second hypothesis: that the Bank's behaviour somehow altered in order to take account

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[11] One way of examining whether or not the Bank altered its behaviour is to determine whether there are any moments in this period when the Bank took actions to prevent a period of financial tension developing into a fully blown crisis. This possibility will be discussed more fully at a later point.

of what many contemporary bankers, economists and politicians felt to be its "duty": to provide an injection of liquidity into the financial system in times of financial crisis.

Once we accept the postulate that the Bank's behaviour did change we then have to consider the ways in which this is likely to have occurred. This encompasses the study of two different types of actions: those policies which were implemented in an attempt to **prevent** crises occurring, and the actions taken when a crisis was looming. These two types of policies are very different, and therefore we must examine the Bank's actions both in times of tension and at points where a crisis had become a possibility, where the Bank might be faced with having to act as a LLR.

Ideally, we would not have to surmise what policies the Bank was pursuing at certain times and for what reasons, since policy documents would be available that told us how and why the Bank was acting. These are not, unfortunately, readily available, so we have to be content with considering the options that were open to the Bank at certain times.

The first of the actions outlined above concerns, in effect, the regulatory environment in which the LLR operates. This is an issue that is always addressed when considering the LLR in a contemporary context, but is frequently overlooked by historical studies. It is currently a very important issue, and it is interesting and illuminating to examine whether **moral suasion** was exercised

in the nineteenth century. At this time, the major means that the Bank had of influencing the behaviour of the financial sector was to attempt to exert influence on the commercial banks and other institutions, in order to persuade them that their best course of action was to follow the Bank's "advice" and do as they were told. The ways in which moral suasion was implemented, together with its effectiveness in the 1870-1914 period, are issues which will be considered in one chapter of the thesis.

Apart from moral suasion, the Bank's only other method of imposing its will on the markets involved the regulation of its discount and advance operations, and it is for this reason that a major part of this thesis is spent on a consideration and analysis of the Daily Discount data.[12] These are collected from the Archives of the Bank of England, emanate from the **Daily Discount Books**, and give (daily) quantitative information on the Bank's transactions with the financial markets, encompassing discounts, advances, refusals, and the interest rate at which these transactions were carried out.

These data can be utilised in two ways. Firstly, we can look at certain components of these data, especially when it is aggregated annually, to trace how the Bank's discount and advance operations were changing gradually over the period. Secondly, it allows us to look specifically at how the Bank was injecting liquidity into

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[12] These data will be described fully in later chapters of the thesis.

the financial markets in times of stress. Although, as already mentioned, in the 1870-1914 period there were no major financial crises, this does not mean that there were no moments at which the Bank acted in order to prevent a failure, in itself possibly a relatively minor event, from developing into a fully blown financial crisis. The first step in a study of these times is to identify them. Then, individual episodes are studied in order to determine the Bank's role in each of them, since with hindsight we know that there were no major crises and therefore any minor points of tension must either have been quelled by an outside agency or have faded away of their own accord.

Answering questions about these two different aspects of policy will indicate firstly the extent to which the Bank of England was aware of the possibilities open to it in the field of the prevention of financial distress, and to what extent it made use of the options open to it. In addition, we should be in a position to know whether the Bank did actively intervene in the financial markets in order to quell any possibility of widescale financial disruption. The juxtaposition of these two aspects of the problem will enable us to answer the underlying question of whether the Bank altered its behaviour towards the financial system, and if so in what way.

6: Thesis Structure.

The thesis is divided into nine chapters, two of which are accounted for by this introduction and the thesis conclusions. The structure of the remaining chapters is as follows.

Chapter Two discusses the theory of the LLR, concentrating on examining its current state and extending it beyond its current boundaries. It outlines the way in which widespread bank failures can have a detrimental affect on the money supply, and then continues by offering various solutions to this problem, one of which is of course the LLR. It also encompasses a discussion of the current institutional setting in the U.K. and U.S. as regards deposit insurance, one alternative way of avoiding, or at least reducing the effects of, financial crises. The chapter concludes by outlining certain changes that could be made to the operation of the LLR as it currently stands, which would make it function more efficiently.

Chapters Three and Four comprise a historical narrative, tracing the development of the Bank of England and the related growth of the commercial banking system from the time of the establishment of the Bank (1694) until 1914, the end point of the analysis here.[13] The discussion in both of these chapters centres on the moments of crisis, looking in detail at how the Bank of England reacted to an

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[13] Chapter Three covers the period up to 1870, and Chapter Four 1870-1914.

increase in financial activity and tension. In the period up to 1866, the aid the Bank gave the system was piecemeal and non-previously declared, with the result that financial institutions could never be sure that the Bank was going to provide the much needed liquidity, and thus panic was not prevented. However, during the Overend-Gurney crisis in 1866 the Bank for the first time acted as a LLR in a comprehensive manner, refusing no prospective discounter as long as they could offer acceptable security.[14]

The remaining four chapters of the thesis are concerned with a discussion and analysis of the Daily Discount data, the major components of which have been previously mentioned. The primary aim of the analysis was to identify moments of increased market pressure, that is, times when the banks, discount houses, and other financial institutions were coming to the Bank of England for aid in the latter's capacity as a LLR. These periods will show up in the data as unusually large figures for discounts and advances.

Whereas Chapters Six and Seven are concerned with direct analysis carried out on these data, and the discussion of the results obtained, Chapter Eight concentrates more specifically on two related aspects of the LLR which are rather more qualitative: the existence

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[14] Both of these chapters contain a certain amount of primary evidence, but the major part of the information comes from secondary sources.

and effectiveness in this period of moral suasion,[15] and an examination of the role of the Governor of the Bank of England. Regarding the latter, the emphasis is particularly on addressing the question of whether certain Governors had a greater influence on the Bank's policy making than others. This utilises the Daily Discount data, but in a slightly different manner to the analysis contained in the previous chapters.

The last chapter of the thesis (Chapter Nine) discusses the conclusions obtained from all the analysis carried out, together with suggestions for future work.

7: Summary

The main aim of this research project is therefore to examine a historical question in the context of an explicit theoretical framework, without losing sight of the historical circumstances. It is thus necessary to first examine whether the concept of a lender of last resort is valid: whether central banks perform this function effectively or whether there could be a more efficient way of achieving its objectives. One of the most important themes of any consideration of the LLR is that of uncertainty and loss of confidence leading to a financial crisis, and it is this that lies at the heart of any analysis of the subject, since if a catastrophic fall in

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[15] That is, the Bank's regulatory activities which were based on custom rather than law.

the money supply was not the possible outcome of a financial crisis, bank failures would only attract the same sort of (academic) interest as do failures of other types of economic unit.

The great need within this subject is to specify both the optimal operating conditions and the limits of any authority acting as a LLR, since, when analysing recent cases of LLR intervention, it is all too frequently possible to criticise monetary authorities for reacting to a bank failure or financial crisis in a sub-optimal manner. Thus, the aim of this research project is to specify these "optimal conditions", both present but particularly past, in order that the theory and practice of the LLR may be more clearly understood.

CHAPTER TWO

THE THEORY OF LAST RESORT LENDING.

1: Introduction.

The aim of this chapter is to present a coherent framework in which the role of the Lender of Last Resort (LLR) can be analysed. Since in essence this is a historical study, we should address questions not just from a theoretical perspective, but also with respect to their importance in a historical context.

With this in mind the structure of the chapter is as follows. Firstly, there is a discussion of the reasons why we treat bank failures differentially from the failures of other institutions. Then, following directly from this we outline a framework for the analysis of the effects bank failures have on the money supply: the base/multiplier framework. This section concludes with some objections to the hypothesis that bank failures can ultimately lead to large falls in the money supply.

Once we have established why bank failures are important, we can then discuss appropriate policies to prevent bank failures becoming bank runs: how to avoid contagion. This is undertaken in the next section of the chapter, when deposit insurance, more information and the LLR are considered. The last two sections deal respectively with the question of illiquidity versus insolvency and problems with the LLR. We conclude with a discussion of measures intended to improve the functioning of the LLR.

2: Why do Bank Failures Matter?

On first consideration it seems slightly odd that failures of banks and financial institutions are studied in so much depth and are regarded as being so important, whilst failures of other types of economic units are frequently accepted as a necessary, although sometimes unpleasant, fact of life. In fact, optimal resource allocation theory suggests that banks should certainly fail in order that the financial system becomes more efficient. However, although the optimal allocation of resources is one of society's primary goals, another is that of stabilisation, and unfortunately these two are sometimes in conflict. Both economic theory and history suggest that allowing banks to fail, particularly if they are large and important, may lead to bank runs and perhaps to a collapse in the money stock.

It has been argued (Benston, 1983) that in some ways failures of enterprises other than banks are less socially desirable than bank failures, since banks are not unique institutions and the gap left by the failure of one bank would quickly be filled by another. The only people directly concerned with a failed bank who suffer as a result of the failure are its senior officers, since they will to a certain extent be held responsible for the failure. Bank employees should find work with other similar institutions since their skills are generally applicable within the field. However, Benston goes on to argue that in

one important area banks are very different from other enterprises: they have creditors who are able to withdraw their funds **on demand**. If a large number of depositors (creditors) withdraw large sums simultaneously, the bank concerned may be forced to sell assets at loss making prices, perhaps engendering a suspension of payments. Therefore, if depositors fear for the solvency of their bank they are acting entirely rationally when they decide to remove their funds, since otherwise they may be faced with a loss. Benston finally concludes that bank failures must be treated differently from other types of business failure, especially since in the case of financial institutions the emphasis is on fear and loss of confidence, which can in itself promote failures.

However, others (for example Beenstock, 1987) argue that financial institutions should not be treated as a special case when discussing business failure, since one of the characteristics of a rational society is the complete disclosure of information. In such a society bank runs would be extremely rare, occurring only in the event of world war or other catastrophes affecting the whole financial system. The reason for this is that the "domino" aspect of financial crises is removed once completeness of information exists.[1] Whilst depositors with a failed bank

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[1] However, the extent to which the domino analogy in terms of asset prices may apply to today's financial markets was well illustrated by the October 1987 collapse in world stock market prices when, although firms were not failing, price falls were quickly, and sometimes irrationally, transmitted from one market to another.

are affected by its failure, other depositors realise that the problem is local to the failed institution, and thus they do not withdraw their deposits and contagion does not result. This assumption of perfect information is a very powerful one however, and its implications will be discussed more fully at a later stage.

The classical rationale for central (government or bank) intervention in the banking system is therefore the serious consequences that can arise as a result of a financial crisis. In recent years various objections to this prevailing orthodoxy have been raised: these will be discussed later. It is helpful however if the process of a bank run is set in a more formal structure, and in this case the most suitable tool is that of the Base-Multiplier framework.

2.1: Methods of Examining the Importance of Bank Failures: the Base Multiplier Framework.

A clear method of analysing the way in which bank failures may cause a collapse in the money stock is through the use of the base-multiplier framework. This is related to the theory of fractional reserve banking: that banks keep only a relatively small proportion of funds deposited with them as cash or near cash, lending out the remainder. The proportion retained as cash was originally determined by "good banking practice" and was established as a result of trial and error. The significance of the "liquidity ratio" historically was that it was an indicator of an institution's ability to withstand a cash drain.

The framework is best expressed as a series of identities, where:

M = money stock

m = money multiplier

B = monetary base (high powered money)

C = non-bank public's holding of notes and coins

D = (sum of) time and demand deposits

R = banker's balances at the Bank of England

Therefore by definition

$$M = C + D \quad (1)$$

That is, the money stock is the sum of the public's cash and their bank deposits. The money supply however is determined not only by the commercial banks and by the public but also by the monetary authorities. This can be expressed by the following identity:

$$M = m\,B \qquad (2)$$

The monetary base (B) itself is defined as being not just actual reserves (R) but also potential reserves, that is, currency in the hands of the public:

$$B = R + C \qquad (3)$$

Dividing identity (1) by identity (3) and dividing through by D gives the result:

$$M = \frac{C/D + 1}{R/D + C/D}\,B \qquad (4)$$

The money multiplier, m, is the first component of the above, and it is the value of this multiplier that we wish to consider when examining the effect that a financial crisis has on the money supply.

The most important feature of a financial crisis is the massive reduction in the public's confidence in the financial system. After the failure of one or several banks, depositors in other banks seek to cash their deposits, believing cash to be a safer form in which to hold their wealth. This leads to an increase in the cash:deposit ratio, C/D. The banks themselves will try to increase their ratio of reserves to deposits, R/D, in order to try to meet the extra demand for cash.

If both these ratios are increasing the money multiplier will fall, as can be seen from equation (4).[2]

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[2] Obviously, the extent of the fall in the money multiplier is dependent on the relative fall in the two (continued...)

The effect of this can be seen from identity 2: with a constant monetary base and a falling money multiplier, the money supply inevitably falls. The extent of the fall in the money supply will be dependent on the magnitude of the increase in the two ratios: the higher the proportion of wealth held in cash and the higher bank reserves, the smaller will be the money multiplier.[3]

This analysis shows how changes in the volume of cash held by the public, or in the extent of reserves held by banks, can affect the money multiplier and thus the money supply. As stated at the beginning of the chapter, it is this fear of significant falls in the money supply as a direct result of the failure of financial institutions which has resulted in attempts being made to prevent the aforementioned failures. In the next section we will discuss possible objections to this analysis before going on to detail ways to prevent financial failures engendering falls in the money supply.

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[2](...continued)
ratios: if banks are unable to increase R/D to cope with the drain, the fall in the multiplier will be greater.

[3] It should be noted that it is always possible for changes in the ratios to offset one another. Examples of this for the U.K. are described in Capie & Rodrick-Bali (1983), and for the U.S. in Friedman & Schwartz (1963) and Cagan (1965) among others. In a study of the U.S. banking crises of the 1930s Laidler (1971) found that both the reserve and deposit ratios rose significantly, so that even though the monetary base also rose, there was a fall in the money stock of approximately 35 per cent.

2.2: Objections to this Analysis.

The above analysis explains why bank failures have always been regarded as being far more serious than failures of other economic units: the necessity of taking preventive measures to avoid financial crises that may cause a collapse in the money stock is generally agreed upon. Before discussing ways in which the problem can be avoided, it is first necessary to outline two instances when the above process (bank failures/financial crisis leading to a reduction in the stock of money) may not occur.

Firstly, the position of the failed bank/banks within the banking system will have some bearing on the outcome of the failure. If the concerned banks are small and thus relatively unimportant, their failure will probably cause little panic.[4] However, if the banks are large,[5] the resulting panic will be on a large scale with an en masse withdrawal of deposits.[6]

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[4] Although of course the size of the failed bank will also affect the authorities' reaction to the failure.

[5] For example any of the London Clearing Banks in the U.K.

[6] A point that should be made here however is that whereas individual depositors may keep their withdrawn deposits at home or in a safe deposit box, large companies and corporations, where massive sums of money are involved, are faced with a problem as to what to do with their now liquid funds. It could be surmised that they are faced with no other choice than to re-deposit the funds in the bank they judge to be least affected by the crisis. In this case there would be no overall change in the level of bank deposits, and thus no fall in the money supply; the only change would be a re-distribution in the destination of deposits.

Secondly, the validity of the loss in confidence/ increasing ratios/fall in money supply process has lately been questioned (**Beenstock, 1987**) as previously mentioned. This criticism hinges on the assumption of perfect information, which, if it is applicable, makes the domino analogy of bank failures false: there will be no widespread collapse in confidence since individual depositors realise that the failure of one bank does not necessarily imply the collapse of the banking system. With complete information, the only way a real financial crisis can be triggered off is by a worldwide catastrophe of some sort.[7]

However, it is questionable whether such a strong assumption holds, since historical evidence suggests that bank failures did produce a flight into currency,[8] although it could be argued that the present day knowledge of individuals as to the strength of banks and financial institutions is greater than at any time in the past, implying that people would be able to ascertain the real extent of the problem.[9]

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[7] For example, the severe financial crisis that erupted on the outbreak of the First World War in August 1914.

[8] See, for example, Friedman & Schwartz (1963) and Schwartz (1986).

[9] The "perfect information" argument does not deny the possibility of bank failures occurring however, since they are likely to occur simply as a consequence of both changes in the level of business activity and of inefficiencies in financial management. What the argument does not allow for however is that these failures will be followed by contagion.

3: How to prevent bank runs from occurring.

The crux of the problem of bank failures is not the failure of the institution in itself but the problem of contagion: the failure of one bank leading to the failure of others, some of which will have no insolvency problems but are simply affected by the loss of confidence in the financial system. Thus, the solution to the problem of bank runs is to avoid the possibility of contagion occurring. In this section we will consider three possible methods of avoiding contagion: deposit insurance, increasing the information available about financial institutions, and the role of the LLR.

3.1: Deposit Insurance to Prevent Panic.

An oft-cited mechanism to prevent the occurrence of bank runs is the implementation of a system of deposit insurance. This takes the form of a premium paid into a central fund by commercial banks and financial institutions,[10] the fund then being administered by a central body, which has the task of settling claims made against it in the case of a bank failure.

The main theoretical argument providing a rationale for deposit insurance is that it increases the degree of stability in the financial system. If complete deposit

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[10] The scope of the schemes can vary: some include only commercial banks, others a wider range of financial institutions.

insurance exists then there is no reason for a flight from deposits into currency, since people know that their deposits are protected. However, this rationale has several problems associated with it which will be developed at a later point.

It has been argued (McCarthy,1980) that deposit insurance increases competition between banks. If the danger of loss to depositors is removed, then, according to this argument, the monetary authorities can afford to reduce regulations intended to safeguard the system, permitting easier admittance of new entrants and a greater undertaking of risk by the participating banks. Deposit insurance could also go some way towards suppressing the belief that large banks are inherently more stable than smaller ones.[11] However, the opposing argument asserts that deposit insurance could be said to decrease competition. Smaller banks gain from deposit insurance because it enables them to compete on a more equal footing, the public viewing them to be as "safe" as larger banks, since all deposits are protected.[12]

One of the original reasons for instigating deposit insurance schemes, in addition to that of increasing financial stability, was to introduce some notion of equity into the banking system (McCarthy, 1980). This has obvious political aspects: the introduction of a scheme of deposit

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[11] This idea will only be eliminated completely if 100 per cent coverage of deposits exists.

[12] However, the extent to which they gain is obviously dependent on the terms of the insurance.

insurance can be expressed as an instance of the government championing the needs of small savers who have little access to the sort of information needed on which to base a rational assessment of the financial position of a particular bank. This consideration explains why many deposit insurance schemes have relatively low cut-off points, enabling small depositors to be refunded while those with larger deposits, who, according to this view, should be able to construct a more informed opinion about a bank's position, are not covered to the same extent.[13]

Opinion as to the merits of deposit insurance is, as on most economic questions, divided. **Milton Friedman** is of the opinion that its existence brings about substantial benefit to society, as voiced in the following quote:

> **"Federal Deposit Insurance has performed a signal service in rendering the banking system panic proof....."[14]**

For him, the introduction of Federal deposit insurance was:

> **"the most important structural change in our monetary system in the direction of greater stability since the post-Civil War tax on**

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[13] There are always instances that confuse this point however: **Kareken(1983)** reports an instance during the aftermath of the Penn Square Bank failure when the Chairman of the Federal Deposit Insurance Corporation (FDIC) was told of a Methodist Congregation who over many years had accumulated a building fund of $150,000 and had kept it on deposit at the bank (the cut-off point for deposit insurance was $100,000). Obviously, this situation could be avoided if depositors split their funds into separate accounts kept at different banks, but this demands a level of financial sophistication not possessed by many small depositors.

[14] Friedman (1959), pp.38. The context in which these remarks were made should be noted however; Friedman was commenting on the failure of the Federal Reserve to act as a LLR during the 1930s financial crisis.

State bank notes."[15]

In his view, the implication of the introduction of Deposit insurance is that the lender of last resort is no longer necessary. This over-simplifies the issue however: although individual deposits may be insured, a run on the system as a whole would induce a move en masse to convert deposits into currency and thus would imply the bankruptcy of the underwriters.[16] In this situation, the only possible underwriters are the government/central bank, since the latter is endowed with the ability to create currency and thus satisfy a (temporary) increased demand.

One of the major criticisms of banking systems covered by deposit insurance is that the existence of insurance increases the likelihood of moral hazard. This argument is eloquently proposed by, among others, **Flannery (1982)**. He asserts that the existence of deposit insurance gives participating bankers:

> **"..an artificial incentive to undertake more risk than they would do in an unregulated and uninsured free market. Bankers insured by FDIC can benefit privately by undertaking risks that**

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[15] Op cit, pp.21.

[16] Of course, the incentive to cash in deposits exists only if coverage of deposits is not 100 per cent, or if the cut-off point is sufficiently low such that it is in the interest of large numbers of people to liquidate their deposits. Otherwise, in a rational society with 100 per cent deposit insurance, bank runs should never occur. This should be so even though, it can be argued, the incidence of individual bank failures may be higher due to the moral hazard effects of deposit insurance. Thus, the trade-off is between preventing bank runs occurring and increasing the incidence of moral hazard such that the number of bank failures increases.

society as a whole considers excessive."[17]

An alternative way to try and bring about the optimal allocation of resources involved in deposit insurance is to make premia dependent on portfolio risk. This has been proposed by many economists and rests on the assumption that if premiums are independent of portfolio risk then banks will hold the riskiest portfolios of assets available to them.[18] However, the problem here is how to set the insurance premiums. Kareken (1983)[19] identifies lack of knowledge of individual bank portfolios and agreement of opinion[20] as being two problems associated with calculating the risk of a particular portfolio. Up to the present time,[21] no risk-dependent deposit insurance systems have been established, even though it is widely agreed that they would be beneficial. This is mainly due to the practical

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[17] Flannery (1982), pp.18.

[18] A slight variant on this is proposed by Mayer (1975). He suggests that risk dependent deposit insurance premiums should make up only a component of total deposit insurance. This, he argues, would be sufficient to reduce moral hazard effects. For example, a bank could be required to obtain private insurance for the first $10m or 5 per cent of deposits, with the FDIC covering losses above this. Of course, in this case insurance companies would charge higher premiums on what they considered to be higher risk portfolios.

[19] This article is entitled rather aptly "Deposit Insurance Reform or Deregulation is the Cart, not the Horse."

[20] That is, the lack of independent benchmarks with which to judge banks.

[21] Summer 1988

problems involved.[22]

We will now continue by taking two examples (the U.S. and the U.K.) as an illustration of the different ways in which deposit insurance is implemented in practice, in order that its theoretical implications may be examined in the context of practical cases.

3.1.1: Deposit Insurance in the United States.

The U.S. currently has a far wider deposit insurance system in operation than exists anywhere else in the world. According to **McCarthy (1980)** the first formalised system of deposit insurance was set up in 1829 in New York State. It was inspired by a Cantonese merchant's "mutual guarantee" scheme, and it insured both notes and deposits. It was short-lived however: the panic of 1837 caused several such schemes to collapse, and by the late nineteenth century there were no schemes in existence.

The official American deposit insurance scheme was largely based on a system of credit and deposit insurance set up in Czechoslovakia in 1924, which was intended

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[22] One way in which it may be possible to implement risk dependent deposit insurance has been outlined by Ronn & Verma (1986). They outline a method for calculating risk-adjusted premia, using data on the market value of equity, and produce a table (page 882) of risk-adjusted deposit premia for forty-three U.S. banks for 1983. It is interesting to note that several banks which have had problems since 1983 would have had to pay higher than average deposit premia, had this system been in force. This method and calculation of premia has the advantage that it relies on data which is market determined, not data which are provided by bank management.

primarily to aid illiquid (but solvent) banks. When a bank failed the deposit insurance fund covered up to 80 per cent of deposits. The first move towards establishing a similar institutional framework for deposit insurance in the U.S. took place in 1932 when the **Reconstruction Finance Corporation** was set up in an attempt to combat the massive number of bank failures that had occurred in the 1920s and early 1930s.[23] This was formalised in the 1933 **Banking Act** which established a deposit insurance system under the direction of the Federal Deposit Insurance Corporation (FDIC). The aim of the FDIC was to:

> **"purchase, hold and liquidate.....the assets of banks which have been closed; and to insure the deposits of all banks."[24]**

Thus it was hoped that deposit insurance would go some way towards strengthening the banking system and stabilising the economy. This aim was achieved to a certain extent, since there has been no repeat of the 1930s phenomenon.[25] In its operations to sort out a bank failure the FDIC has the use of four possible procedures:

(1) The direct repayment of insured deposits.

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[23] There had been more than 11,000 bank failures between 1921 and 1933. For further details see Friedman & Schwartz (1963).

[24] See Varvel (1976).

[25] In the twelve years after the establishment of the FDIC (1934-46) there were only 497 bank failures (see Table 1, pp.590 in Horvitz, 1975). However, recent experience has substantially added to this total.
It is possible, of course, that conditions may have changed during these years, so as to make any re-occurrence of the 1930's experience unlikely, independently of any FDIC stabilisation policies.

(2) The protection of all deposits by organising a merger or takeover of the failed institution. This is known as deposit assumption.

(3) Making loans direct to the troubled institution in order that it is able to continue operating.

(4) Operating a "Deposit Insurance National Bank" for a maximum of two years in order to provide a breathing space before final arrangements are made.

The second method is that which is most frequently used, since it is often much cheaper for the FDIC to do this than to pay off depositors. In fact between 1985 and 1987, the FDIC followed this option in 80 per cent of bank insolvencies.[26]

In the post Second World War period deposit insurance has been very important in the United States. At the end of 1980, 98.2 per cent of all commercial banks were eligible for FDIC protection, and by 1982 79.8 per cent of all bank deposits were insured.[27] In addition to a deposit insurance fund, the FDIC has a "blank cheque" on the U.S. Treasury: it can draw up to $3b immediately and any additional funds needed after a short delay. The insurance fund is financed by annual contributions levied on member institutions; each institution pays 0.083 per cent of its total deposit balances, some of which may be refunded after running costs and fund-additions have been subtracted. In recent years this refund has reduced the premiums to between 0.03-0.04

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[26] International Business Week, April 4th 1988, pp.26.

[27] Flannery (1982), pp.18.

per cent of total deposits.[28] As is usual in deposit insurance systems, there is a cut-off point above which deposits are not covered. This has increased since the establishment of the FDIC: in 1933 it was $2,500, in 1976 $40,000, and at present it is $100,000. However, unlike certain other systems of deposit insurance, coverage up to this threshold is 100 per cent.

Bank failures, together with those of Savings and Loans (S & Ls)[29] have occurred frequently in the U.S. in recent years. For example, in 1987 184 American banks failed, which was the single largest number in any year since the establishment of the FDIC, and it is possible that 1988 will see an equivalent or even greater number fail, since in the first quarter there were 44 failures recorded.[30] These failures were mainly in specific sectors, such as agriculture or energy, and/or in specific geographical areas, such as Texas or the Midwest. Since the economy of these areas is so dependent on the industries concerned, it can be argued that the externalities associated with bank failures in these areas are much greater. In addition, the other major reason explaining

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[28] Op cit, pp.18.

[29] These institutions are similar in status and aims to U.K. Building Societies, and are regulated by the S & L equivalent of the FDIC: FSLIC (Federal Savings and Loan Insurance Corporation). According to a recent article in The Observer (3rd April 1988), FSLIC itself is now technically insolvent, having "rescued" 345 insolvent S & Ls in 1987.

[30] Data from International Business Week, April 4th 1988, pp.44.

both recent American bank failures and the downturn in bank profits internationally is of course the Third World debt problem.

However, many other countries are afflicted with the same economic problems as the U.S.[31] without suffering from a great spate of bank failures.[32] This can be explained by the nature and history of the American financial system. Until recently interstate banking was not possible in the U.S.,[33] with the result that hundreds of banks grew up, serving small communities, some of these banks having perhaps only one or a few branches. These banks, confined to one State, could not grow sufficiently in order to widen their asset base and escape from concentrating their activities in one economic sector. Thus as soon as there was a downturn in the property sector, or a fall in agricultural or oil prices, or whatever, banks heavily dependent on these sectors start failing, and, if contagion sets in, the financial system of the State can almost "go under".[34]

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[31] For example the falls in energy and primary product prices generally.

[32] Of course, in most countries smaller numbers of banks exist so that failures on the scale seen in the U.S. are impossible.

[33] This had been prohibited by the McFadden Act of 1927.

[34] An example of fairly widespread financial distress is occurring at the present time in Texas. In September 1987 the **First City Bancorporation** appealed to the FDIC for aid, and a plan was set into motion whereby the ailing bank was to be taken over by the **First Republic Bank of Dallas**, the thirteenth largest bank in the States. However, in mid
(continued...)

Over the last few years there has been a great debate (mainly concentrated in the U.S.) as to the relevance of deposit insurance, as discussed earlier. Many economists assert that it increases banker's risk portfolios, others that in order for it to bring some positive benefit to society at least some of the insuring of deposits should be undertaken by private companies rather than (as at present) completely by a government agency. The central point of all debate about deposit insurance however has to remain the fact that as a deterrent to bank runs it protects only the individual depositor. Once a run has gathered steam and become system wide, deposit insurance is irrelevant and only the Central Bank can intervene in its capacity as a lender of last resort to halt the run and prevent any substantial decline in the money supply. It is in this way that deposit insurance can be considered only as a prevention (and then sometimes only partial) rather than as a cure to the problem of bank runs.[35] Furthermore, as long as there is no 100 per cent coverage of deposits[36] and/or

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[34](...continued)
March 1988 it was announced that First Republic itself had appealed to the FDIC, as it had problems apparently resulting from its takeover of First City. In one week, just before the announcement of its problems, $600m was withdrawn from its major branch in Dallas.

[35] The only way deposit insurance is an alternative to the LLR is if coverage is 100 per cent and without an upper threshold, and even then there may be a delay in the repayment of funds, leaving some incentive to cash deposits. The problem here of course is that moral hazard has increased: there is no incentive for banks to operate safely.

[36] As exists in some countries, for example the U.K.: see later section.

a lag in receiving insurance claims, the initial incentive for depositors to withdraw their funds from a bank they believe to have problems still exists, thus in some cases giving rise to a run.

3.1.2: Deposit Insurance in Britain.

Deposit insurance did not exist in Britain until 1982, although the first mention of it was made at governmental level in the 1976 White Paper on **"The Licencing of Deposit Taking Institutions"**.[37] This was the precursor to the **Banking Act** (1979) which achieved two aims: licencing deposit taking institutions in Britain and providing for the introduction of a deposit protection scheme. The main intention of the latter was to protect small depositors, hence the relatively low cut-off point of £10,000,[38] and in order to try to reduce the effects of moral hazard only 75 per cent of a single deposit is protected.[39] It was not a voluntary scheme: all banks wishing to be considered as deposit taking institutions were forced to subscribe.

The first stage towards the implementation of deposit

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[37] Cmnd. 6584, August, London: HMSO.

[38] This limit was raised to £20,000 in the 1987 Banking Act.

[39] The 1979 Act was in fact repealed by a new Act, which came into force on October 1st 1987, and developed as a response to the Johnson Matthey affair. This new Act left the deposit protection element of the 1979 Act largely unchanged, except that the protection limit was increased to 75 per cent of £20,000. It also allowed for these figures to be altered by "statutory instrument".

insurance under the 1979 Act was the authorisation of deposit taking institutions which took place in the eighteen months after the passage of the Act. About six hundred institutions were authorised; certain overseas banks with U.K. branches were exempted from the scheme. The requirement for exemption was that they should be at least as well covered by deposit insurance schemes in their country of origin as they would be under the British scheme.

Contributions to the deposit insurance fund in the U.K. are levied in a slightly different way than in, for example, the U.S. Apart from an initial contribution, member institutions are not expected to make annual contributions irrespective of the size of the fund. Initial contributions when the fund was initiated in February 1982 were worked out in order that the cash fund should have a balance of between £5m and £6m. The exact amount that each institution paid varied between £2,500[40] and £300,000, and was determined by their deposit base (that amount of deposits that were eligible for protection should the institution fail), with a maximum contribution (initial plus any further contributions they may be asked to make) of 0.3 per cent of the institution's deposit base. This reveals a potential weakness in the scheme, since the present total deposit base of all member institutions is approximately £100bmn, whereas the total possible amount of

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[40] This minimum payment figure was raised to £10,000 in the 1987 Banking Act.

contributions is approximately £290m. The wide disparity between these two figures would mean that if a run on the banking system as a whole did occur, the Bank of England would have to be relied upon as a lender of last resort, since the Deposit Protection Fund would be very quickly bankrupt. This illustrates the general problem with deposit insurance: it works well at insuring against occasional bank failures but if its coverage is not complete, leaving the incentive for deposit withdrawal still in place, it is useless in protecting the system as a whole.[41] As previously stated, in the case of a system-wide run, the only possible underwriter is the government or central bank itself.[42]

Since its inauguration, the Deposit Protection Board has dealt with fourteen failures of small licenced deposit taking institutions, paying out between £7,500 and £2m. This meant that by the end of February 1988 the deposit protection fund stood at almost £4.8m.[43]

Thus the primary aim of the Deposit Protection Fund is to safeguard the interests of small depositors, whilst at the same time limiting the opportunities for moral hazard by covering only 75 per cent of deposits eligible for

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[41] The aim of the U.K. scheme was to protect deposits, not to avoid runs, which is one reason why coverage is not complete.

[42] This is particularly true in the British case, where coverage is only 75 per cent and thus there is still a significant incentive for the public to encash their deposits.

[43] Reports of the Deposit Protection Board (1985-1988), Bank of England.

insurance. It seems to have worked moderately well since its inception, although the feeling still remains that any major failures would be handled directly be the Bank of England without recourse to the Deposit Protection Fund, as was the case in autumn 1984 with **Johnson Matthey Bankers Ltd.**[44] In addition, one of the major problems with the scheme is that it is not heavily publicised: most people are unaware that it exists, and thus in the event of a major crisis it is doubtful whether it would play any major role.[45]

One final point that should be made here is that the idea of deposit insurance was strongly opposed by the London Clearing Banks,[46] who felt that such a scheme was unnecessary since a LLR already existed. What they had overlooked however was that banks did fail, with a consequent loss to depositors, and it was the prevention of these losses that the Bank of England was attempting to

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[44] In this case the Bank of England stepped in and bought, for a nominal fee of £1, an insolvent licenced bank. The justification for this action was apparently the instability that may have resulted in the London Gold Market had the bank been allowed to fail. Johnson Matthey Bankers was a subsidiary of Johnson Matthey Bullion Dealers, one of the five members of the London gold market. Another member was Samuel Montagu, a subsidiary of Midland Bank, which was itself experiencing slight difficulties at the time after its purchase of Crocker National Bank of San Francisco. It was this link that the Bank of England felt was sufficient reason to intervene and save the insolvent bank.

[45] Only if a deposit insurance scheme is known about can it have any hope of preventing a run. The U.K. situation can be contrasted with that of the U.S., where every bank insured by the FDIC displays a prominent notice giving details of the coverage provided.

[46] These banks hold 90 per cent of insurable deposits.

achieve with Deposit Protection Scheme.[47] In effect, deposit insurance was intended by the Bank to be a complement rather than a substitute to the LLR.[48] The same antipathy towards the introduction of deposit insurance was never apparent in the U.S. because of the large number of banks (ie a smaller concentration). If banks are much smaller, it is far harder to offset losses suffered by one section of a bank elsewhere in its organisation.[49]

3.2: Greater Information on Banks.

It can be argued that if information available about banks and financial institutions were more complete, bank runs would not be a problem. To a certain extent this point has been made earlier in this chapter: if sufficient information is available for people to differentiate between problem banks and ones that are under no insolvency threat, mass panic is avoidable. At present however, this sort of information is generally unavailable, both in the

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[47] As previously stated, the Bank of England dealt with fourteen failures of licenced institutions between 1982 and 1988. The real argument here is why the sort of banks which failed are protected in the first place. The institutions concerned are on the whole small and not well known, thus in order for depositors to use them in the first place deposit/borrowing conditions must be favourable. If this is so, why should depositors gain from favourable conditions without taking on any extra risk?

[48] This is, of course, not the role that deposit insurance is intended to play in theory.

[49] In contrast to the U.K. experience, the system of deposit insurance in France is run by the banks themselves, with no direct intervention from the Banque de France.

U.K and in the U.S.A., and so runs remain a possibility.

Writers proposing an increase in the information available (for example **Beenstock**, 1987) believe that the role of government in the financial system is **not** to act as a LLR but to make markets more efficient by removing inhibiting regulations and to enforce financial institutions to disclose information more fully.[50] Under these conditions the need for the LLR is redundant.

There are problems with this argument however. Even if information were available, there would undoubtedly be a time lag before its publication, thus making it out of date and possibly inaccurate, and furthermore, now that institutions can shift enormous sums of money in a matter of seconds, it is conceivable that accurate and up to date information can **never** be available to the general public.[51]

It seems therefore that a world of complete and perfect information would not only imply that a LLR is unnecessary, but also that bank runs would never occur. Although this situation would seem to be "ideal", it is hypothetical, and it must be doubtful whether such a

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[50] An interesting practical point here is how to make financial institutions disclose more information: might this not involve more legislation that would inhibit market efficiency?

[51] This situation can be contrasted with that which occurred in the nineteenth century when, although information dissemination through the press was less prevalent, the use of banks was generally confined to people who were likely to be aware of the financial situation. Now however, with the majority of the adult population possessing a bank account, the media has come to play a much more vital role in informing the public about financial affairs.

situation can exist in the foreseeable future.[52]

3.2.1: "Free Banking" as a Substitute for the LLR.

It has been argued (eg **Smith,1936, White,1984**) that free banking[53] can in itself be a substitute for the LLR. This is so, it is argued, because inherent in any free banking system is an element of self-regulation: the degree of competition in the system implies that banks do not indulge in unnecessary risk-taking.

White (1984) studies the system of free banking in existence in Scotland in the late eighteenth and early nineteenth century and found that, compared to the English system during the same period, the Scottish financial system displayed a high degree of stability. This, he concludes, was a direct result of the unregulated system in operation in Scotland, and occurred despite, or perhaps

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[52] In a study of the operation of American Nineteenth century commercial-bank clearing houses (CBCH), **Gorton and Mullineaux (1987)** look at the ability of "the market" to be self-regulating. They analyse the role of the CBCH as a regulatory institution, which it became, even though it was originally established in order to reduce the costs of cheque clearance. They conclude that, on this evidence, the existence of information asymmetries in banking make it unlikely that markets can self-regulate, and further that the development of CBCHs was an example of **"...an endogenous 'regulatory' response to the problems associated with the asymmetric distribution of information in the banking industry".**

[53] "Free" banking can be defined as a **"...system under which there are no political restrictions on the business of issuing paper currency convertible into full-bloodied coin"** (White, 1984,pp.1). It basically describes a situation where there is no government or central bank monopoly of the issue of legal tender.

because of, the fact that there was no LLR in the Scottish system: no one bank standing ready to provide liquidity in the event of need.[54] He gives two major reasons to explain the low level of failures:

(1) The competitive pressure on banks to "make themselves solid". This they achieved by a combination of establishing a corporate identity and by holding as low a level of other bank's liabilities as possible. The latter was accomplished by frequent "note exchanges" and by holding their own reserves.

(2) Unlimited liability: in the event of a failure there was no reason for depositors to rush for currency, since there was never any doubt that shareholders' personal wealth was great enough: Scottish banks had hundreds of shareholders.[55] The possibility of illiquidity whilst claims were being sorted out was negated by the competition for the customers of the failed institution, which led other banks to accept the notes since their eventual redemption was not in doubt.

In Scotland, as in England, there was a preference for locally issued notes; with these notes the issuer was frequently known by the holder of the note. In Scotland however, this preference was countered by an extensive

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[54] Eugene White (1987) finds a similar result for the brief Free Banking episode that occurred during the French Revolution.

[55] This did not apply in England where the country banks had relatively few shareholders.

branching network, whereas the problem in England was that the high risk of failure associated with country bank notes had to be traded off against the fact that Bank of England notes were subject to forgery.

It may seem at the outset therefore that one of the reasons for the relative stability of the Scottish system, as compared to the English experience in the same period, was that there was more information available on the Scottish banks, and that this may have implications for current policy. However, in the Scottish case the information was provided by the existence of a large number of branches,[56] whereas the contemporary problem of insufficient information is not tied up with a bank's lack of "brand identification", but rather with a lack of knowledge as to the real state of their balance sheet.

Bagehot of course preferred free banking as a system, but felt that the English institutional structure was too well established for it to be altered, and so sought to make the best of the existing situation.

3.3: The Lender of Last Resort.

Another method of avoiding financial crises, that which is the major subject of this study, is the lender of last resort (LLR). The term itself is a description of the

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[56] Wood (1984) makes the point that it is not only the large number of branches possessed by Scottish banks but also their local nature: it was easy to acquire information as to the banks' status.

central bank's action to preserve the liquidity of the financial system, and is first found in the early nineteenth century in France,[57] but the policy prescription itself was primarily publicised in Walter Bagehot's Lombard Street, published in 1873. In this book Bagehot argued that the Bank of England had a **duty** to act as the financial system's final source of liquidity: since it held the **"sole banking reserve of the country"** it was under an obligation to **"make unlimited advances on proper security to anyone who applies for it".**[58] However, these advances should be made at a penal rate which will:

> **"operate as a heavy fine on unreasonable timidity, and will prevent the greatest number of applications by persons who do not require it."**[59]

This rule has long been remembered in the form **"lend freely at high interest rates".**

Although Bagehot's outspokenness was criticised by some of his contemporaries,[60] his "rule" was fairly soon accepted. The idea that central banks should stand ready and willing to aid the financial system in a period of financial crisis is now part of economic orthodoxy, but the worldwide problems of the banking system, both in the

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[57] In fact, "dernier ressort" is a French legal term meaning the point beyond which it is impossible to make an appeal.

[58] Lombard Street, pp.159-160 (first appeared in The Economist of September 22nd 1866, of which Bagehot was the editor.)

[59] Op cit, pp.187.

[60] See Hankey (1867) and discussion later in this section.

1970s and presently, have led to a lively debate as to the appropriateness of Bagehot's policy prescription, together with an attempt to develop a more precise definition of what to do and when.[61]

Humphrey (1975) specified four main points that need to be addressed when considering the role that the LLR should play in the control of financial crises. Firstly, should the central bank direct its actions towards avoiding the initial bank failure, or towards containing the panic? The first of these implies that the central bank's main responsibility is to individual banks rather than to the market. This draws on the illiquidity-insolvency debate which will be discussed later in this chapter.[62]

Linked to this is the second point: what is the primary objective of the LLR? Here Humphrey identifies four possibilities:

(1) to prevent bank failures per se.

(2) to prevent financial institutions from having to sell assets at "fire sale" prices (ie the price that can be obtained immediately, normally below the equilibrium price). If this happened on a wide enough scale it would lead to a general fall in asset prices.

(3) to ensure financial institutions are able to

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[61] Another phenomenon that has increased debate is the so-called Global Debt Crisis, that is, the situation many Lesser Developed Countries are experiencing with regard to their massive foreign debts.

[62] Section 4.

cover their loan commitments.

(4) to prevent a collapse in the money stock caused by multiple bank failures and widespread panic.

This final objective is regarded by economists as being by far the most important.

Once action has been decided upon by the central bank, the next question is how to implement it. Here there are two main methods: open market operations and loans though the discount market. The latter may take place at or above market rates; as previously mentioned Bagehot favoured penal rates in order to deter borrowers who were not desperate for funds. This implies a rationing of credit by price rather than non-price methods, and might well improve the allocative efficiency of the financial system, since institutions will not be prepared to pay a penalty rate if cash is available anywhere else at a cheaper price. The former method however does not attempt to allocate cash to particular institutions; the central bank merely injects cash into the market through the purchase of government securities. It has been argued (**Barth & Keleher,1984**) that this method of implementing a policy for a financial crisis is superior to the use of the discount window since it is both consistent with and a fundamental part of long run monetary control.

Humphrey's final point with regard to the role of the LLR is whether the latter's role in averting multiple bank runs and financial crisis is in conflict with its monetary control function. Here the vital question is whether it is

possible for a central bank to act as a LLR: to increase the monetary base suddenly and quickly, whilst maintaining a long term trend of stable monetary growth. In theory this is possible, since the central bank's cash injection into the system is essentially temporary, lasting only as long as the crisis. Thus there is no real conflict between the actions of the LLR and monetary control.[63] In practice however it is debatable whether the central bank would be willing (or able) to reduce the monetary base by the relevant amount and thus return to trend growth.[64]

Bagehot's own view on some of these questions is illuminating. He did not conceive of the role of the LLR as being to bail out banks that had been mismanaged; rather, its purpose was to minimise the secondary effects of severe crises affecting the whole banking system. He gave several examples of events that could provoke such crises,[65] and concluded that:

> "...no cause is more capable of producing a panic,... as the failure of a first-rate joint stock bank in London."[66]

Bagehot's emphasis was thus on the market rather than on

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[63] See Barth & Keleher (1984).

[64] Since M = mB, all the central bank is doing is counteracting the fall in the money multiplier by increasing the monetary base, and so the only other action needed is to reduce the base by the appropriate amount once the reserve and deposit ratios, and thus the money multiplier, have recovered.

[65] "... a bad harvest, an apprehension of sudden invasion, the sudden failure of a great firm which everybody trusted...." (Lombard Street pp.118.)

[66] Op cit, pp.251.

particular institutions; he sought to generate a means by which the system as a whole could be provided with extra liquidity.[67] He also stressed the difference between the central bank giving ex-post support to the system during a crisis, and ex-ante assurance that aid would be available. The latter, he felt, would greatly increase confidence in the system, which would help to avert future panics.[68]

So far we have concentrated on the Bagehot rule of "lending freely at high interest rates". However, this is in fact the appropriate response to only an internal drain; he made a distinction between the suitable policies for internal and external drains. The respective policies are in fact totally different and to a certain extent mutually exclusive. In the face of an external drain the central bank should, he said, "protect the reserve": increase the discount rate sharply to both attract foreign capital and retain domestic funds. This move was necessary to protect the gold reserve in order that the convertibility of the paper currency into gold could be maintained. This second "Bagehot Rule" is frequently forgotten in contemporary discussion of Bagehot however, since the demise of the gold standard has meant that the distinction between internal

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[67] Another indication that, had they been developed in Bagehot's time, he might have preferred open market operations to re-discounting, since the former are intended to help the market as a whole.

[68] This idea was to cause much future controversy: see section 5.1.

and external drains does not carry the same importance.[69]

Thus it can be argued that the need for a LLR arises from the combination of two characteristics of the existing financial system: fractional reserve banking[70] and the government monopoly of the issue of legal tender.[71] As already argued however, there are alternatives to the LLR (eg deposit insurance and greater information), and there are also serious problems with the Bagehotian view of the former which we will now go on to consider. Firstly however, we will discuss how Bagehot's idea of giving aid only to the system has in practical terms come to mean only distinguishing between insolvent and illiquid institutions.

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[69] The problems raised by these two (sometimes conflicting) policy rules will be discussed in section 5.2. Currently, if a cash drain from the banking system goes overseas, there may well be pressure on the exchange rate, as well as a fall in the money supply, but under floating exchange rates this pressure does not matter in itself, unless there is an implicit floor below which the government/central bank does not want the exchange rate to fall.

[70] Under 100 per cent reserve banking bank runs would not be possible, and because no other institution can meet an abnormal demand for cash the responsibility inevitably falls on the LLR. The case for 100 per cent reserves is proposed by Friedman (1960), taken up by him after it had been originally proposed by Simons (1936).

[71] The situation under Free Banking has already been discussed. For an excellent discussion of the issues arising from an economy with private money, together with an analysis of the Scottish experience, see White (1984).

4: Insolvency Versus Illiquidity.

At the heart of any contemporary discussion of bank failures and the lender of last resort is the difference between illiquidity and insolvency. This is of vital importance when analysing the actions of a central bank or indeed when defining the role of the lender of last resort. What has come to be known as the "Bagehot" case for last resort intervention allows the granting of emergency aid by the central bank **to the system as a whole**, not to a particular institution that finds itself to be short of funds. This implies that if the financial markets find themselves to be illiquid (for whatever reason) the central bank will stand ready to make liquidity available by advancing on or discounting "good paper": securities that are regarded both by the Bank and by the market to be sound. To quote Bagehot himself:

> **"...that it (the Bank of England) must in time of panic do what all similar banks must do; ...it must advance freely and vigorously to the public out of the reserve. And with the Bank of England, as with all other Banks in the same case, these advances ,..., should be made so as if possible to obtain the object for which they are made. The end is to stay the panic; and the advances should, if possible, stay the panic... The only safe plan for the Bank is the brave plan, to lend in a panic on every kind of current security, or every sort on which money is ordinarily and usually lent. This policy may not save the Bank, but if it do not, nothing will save it."** [72]

Bagehot's preoccupation with the granting of emergency last resort aid to the system as opposed to giving it to an

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[72] Lombard Street, pp.98.

individual institution has in recent years become overshadowed by the related but more complicated debate about illiquidity versus insolvency.[73] A consistent policy towards bank failures can be regarded as one which concentrates on distinguishing whether a bank is insolvent as opposed to being merely illiquid. If the former is the case, a central bank is not theoretically justified in granting any emergency last resort aid to the institution concerned, although it may still support the system as a whole through the use of discounting or advancing on acceptable paper. The troubled institution should be allowed to fail, with consequent losses suffered by shareholders, management and perhaps by depositors.[74] If the problem institution is found to be merely illiquid however, action taken by the central bank to ease the institution's liquidity problems may in practice, although not in theory, be justified. The problem which then arises is how to distinguish between a sound and an unsound institution, since there have been many examples of cases

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[73] It can be postulated that the reason for this is the fear central banks have about the externality effects of bank failures, which are arguably sometimes over exaggerated. In addition, we have seen cases in the U.S. recently when it has been cheaper for the Federal Reserve to bail out banks, rather than let them fail and then pay out deposit insurance, due to the prohibitive costs involved in executing the latter option. However, in this case we have to think about our definition of "cheaper". Although in the short run it may cost less in monetary terms for a central bank to take over a failed institution, this policy may have long run costs associated with it that are difficult to quantify, in that bank bail outs may increase moral hazard among bank managers.

[74] Depending on the existence and coverage of deposit insurance.

where the issue has been somewhat unclear, such as the rescue of Johnson Matthey Bankers (JMB) by the Bank of England in 1984 and the Federal Reserve's actions in saving Continental Illinois also in 1984. In these two cases a clear question of insolvency was involved and thus it could be argued that the central banks concerned were wrong in their decision to intervene.[75]

In theoretical terms, distinguishing between solvent and insolvent institutions is relatively simple. An institution becomes insolvent when the current value of its net worth declines to zero. Following the analysis outlined above, it is at this point that there is no justification for the granting emergency aid to the institution concerned. In practice the exact point at which an institution's net worth reaches zero is difficult to pinpoint. In addition, a bank that is initially solvent may be rendered insolvent as a direct consequence of a run on the banking system, making clear definitions of solvency difficult.

The first of these problems, the difficulty in establishing the state of an institution's balance sheet, arises because of the difficulty in forcing institutions to reveal the necessary information. To take the case of Johnson Matthey, returns that should have been made to the Bank of England in March 1984 were delayed until June of that year. This delayed the diagnosis of the bank's

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[75] Of course, in both these cases the central banks concerned will defend their actions on externality grounds.

problems until early August, a meeting between JMB Directors and the Bank's supervisory department having been delayed from July at the request of JMB (Moran, 1986). Even at this point a complete report of the bank's balance sheet was not made available and so the full extent of its position was not realised.

Established theory implies that in the above case JMB should have been declared insolvent as soon as the Bank of England established the true position of the bank.[76] This would have limited the secondary effects on the financial community as a whole, since if complete information had been given on the nature of JMB's problems it would have been obvious that the problems were specific to JMB and thus there would have been no danger of contagion. This then would have been an alternative policy to that followed by the Bank of England (which was to step in and indemnify the bank's losses), a policy that was in fact costly to the tax payer.

Returning to the question of the determination of an institution's solvency, the difference between illiquidity and insolvency is more easily identifiable if "fire sale" definitions of asset prices are used (Benston et al, 1986), where the "fire sale" price is the price obtained for an asset if it is sold immediately, taking into account the lack of time available for search efforts and also

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[76] An indication of the scale of JMB's problems was that the Bank of England could find no single institution (or even a consortium) which was willing to take JMB aboard. (Moran, 1986).

information costs. This concept is useful when taking into account the problems of a financial institution faced with a deposit drain. The first reaction of a bank in this situation is to sell assets in order to increase their supply of cash. They may have to sell at fire sale prices however, since the over-riding objective of the operation is to obtain cash quickly, not allowing for time spent in search efforts. Thus, what started off as a liquidity problem may end up as a solvency problem if the difference between equilibrium price[77] and fire sale price is large enough to reduce the bank's net worth to zero.

In the above case, the decision as to whether an institution is solvent or not should be judged with respect to its position at the time of the initiation of the bank run rather than at the time at which it is requesting aid, to see whether it was solvent at the initial point in terms of equilibrium, not fire sale, prices. If it was solvent in terms of equilibrium values but has trouble meeting a deposit drain due to the effect of lower fire sale prices, emergency aid is justified since all the institution needs in order to recover is time.

There are other related reasons why aiding insolvent institutions is economically inefficient. One of these is that aiding insolvent institutions impairs market discipline in two ways: firstly because it makes other institutions believe that they will never be allowed to

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[77] ie the price that would be obtained if "reasonable" search time was available.(Benston, 1986,pp.43)

fail no matter what they do (an increase in moral hazard), and secondly because the granting of emergency aid to a troubled institution gives a signal to the rest of the market that the institution is fundamentally sound and is experiencing only temporary problems. Thus the market itself may be more willing to grant aid.

Given that theory clearly states that in an ideal world central banks should only grant aid to the market as a whole, but that there are certain cases whereby the provision of liquidity to an institution that is illiquid may be justified (where there is no question of insolvency), why is it that examples abound whereby banks which are widely known to be insolvent have emergency last resort aid granted to them? Several reasons explaining this phenomenon can be identified. Firstly, as already mentioned it is often very difficult to establish whether or not an institution is insolvent. Many banking regulation systems do not require financial institutions to reveal all the information necessary to determine the level of solvency, and even when they do it is often relatively simple for banks to evade information deadlines, as amply demonstrated by JMB in the U.K. Even when information is available time is often so short that a proper examination is not possible if containment of any panic is a primary aim.[78]

Another reason given for last resort aid being given

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[78] In addition, solvency information will always be difficult, if not impossible, to ascertain due to the highly flexible nature of the prices of the tradeable assets on which measures of net worth are based.

to insolvent institutions is the fear of social costs associated with the failure of banks, especially if they are large. To a certain extent this fear is mitigated by the existence of deposit insurance, since many depositors, especially those with only a small amount deposited will be covered, but in some cases coverage is only partial,[79] and so depositors still suffer.

Thus many of the reasons why central banks intervene and grant aid to even insolvent banks are the same as those describing the need for the existence of a lender of last resort in the first place. As stated elsewhere, any justification for intervention in the case of insolvent banks can be denied if enough information is released about a problematic bank to enable the market to realise that there is no danger of contagion. Until central banks are forced to make this sort of information public, even insolvent financial institutions will continue to have access to emergency funds from the lender of last resort.

However, it could be argued that it is the market that should decide whether a bank that is experiencing liquidity problems should be allowed to fail through suffering fire sale losses. In this case the central bank would support only the system as a whole, through its discount and advance operations, leaving other institutions in the financial markets to decide whether or not a problematic institution is worthy of their support. If the market as a whole decides not to shoulder the extra risk incurred in

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[79] See earlier section on deposit insurance.

aiding a troubled institution then it remains a possibility that the ailing institution will in fact fail, with consequent effects on shareholders, management and depositors. This argument carries with it the implication that everyone associated with a financial institution must be very aware of the financial position of the institution with which they are involved, even if the limit of their involvement is holding a deposit. It is thus assuming a level of knowledge not normally associated with the general public: how many people who open a bank account with a U.K. commercial bank have any idea of the true financial strength of the bank concerned? Most people are rather more concerned with the number of branches a bank has, its convenience etc, rather than with the likelihood of it failing. It is important to note however that the reason why the general public in the U.K. has not been worried about bank failures is because it has not needed to be: the U.K. high street banks are regarded to be above suspicion where matters of financial stability are concerned. Because of this it would seem to be rather unlucky if depositors of a bank are made to suffer for something that they had little control over. The other problem is of course that if depositors of a bank were once made to suffer as a result of a bank failure, the proportion of the population that used banking facilities would decline, bringing about a move back to the greater use of cash and less frequent use of cheques in the economy as a whole.

Another problem with letting the markets make a

decision on the solvency or otherwise of an institution is the fragile nature of the financial markets as a whole: it can be argued that they are very risk averse where matters of confidence are concerned.[80] This again is fundamentally caused by the lack of information available about troubled institutions. For example, it is said that in the case of the JMB failure certain portions of the Far East financial markets reacted almost immediately to the news that an important member of the London gold market was under threat and thus were refusing to deal with any British houses until they were sure of the exact situation (Moran,1986). Because of this it has been argued that to a certain extent the Bank of England 'had its hands tied' in its reactions to the JMB problem: it was forced to step in and save the bank because otherwise the situation could have deteriorated to affect other members of the London Gold market and possibly other sectors of the financial system. The alternative view however is that if the Bank of England had made public enough detail about JMB's situation to enable people to discount the fear of contagion then the Bank would not have needed to rescue JMB in the first place.

In conclusion, the whole focus of the liquidity versus solvency debate, like so much discussion about the role of the lender of last resort, seems to revolve around the question of the amount of information that is revealed about the institutions concerned. As has been stated

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[80] Hence the "domino" analogy of financial crises.

elsewhere, if enough information is available about the true financial position of a troubled institution to enable individuals and the market as a whole to dismiss the possibility of contagion, then the instances when a lender of last resort bails out an institution that is insolvent are avoided. However, the current level of information publication is not sufficient for the markets to formulate any accurate picture of an institution's real position, and thus it is at this point that the distinction between insolvency and illiquidity becomes important, if we accept the view that there should be some differential between reactions to an institution that finds itself in difficulties depending on whether it is judged to be insolvent or only illiquid. Moreover, the definitions of solvency and illiquidity used should be those based on fire sale rather than equilibrium values.

5: Problems With the LLR.

The difficulties with both the theoretical concept and the implementation of a policy involving a LLR can be divided into three main areas: moral hazard, the "Rockoff" problem and the definition of a penal rate. These will be dealt with in turn.

5.1: Moral Hazard.

Moral hazard is a problem common to all insurance systems. In short, it relates to the decrease in care taken by individuals if they know that they are covered by insurance. In a non-financial context for example, an individual whose house contents are insured may take less care in making sure it is secure.[81]

The problem of moral hazard in banking was identified by Thomson Hankey, a Director of the Bank of England, even before the publication of "Lombard Street", in response to an article in the "Economist",[82] commenting on a statement by the Governor of the Bank after the Overend Gurney crisis and calling for the Bank to be prepared to act as a LLR whenever necessary. Hankey's views appeared in his book The Principles of Banking, published in 1867. Bagehot quotes

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[81] It is obviously for this reason that insurance companies introduce "excess loadings" on policies: this shifts some of the burden of cover back onto the insured individual.

[82] Written by Bagehot.

them extensively in "Lombard Street":

> **"The Economist newspaper has put forward what is in my opinion the most mischievous doctrine ever broached in the monetary or banking world in this country..... Until such a doctrine is repudiated by the banking interest, the difficulty of pursuing any sound principle of banking in London will always be very great. But I do not believe that such a doctrine as that bankers are justified on relying on the Bank of England to assist them in time of need is generally held by the bankers in London."** [83]

Hankey's argument was that if bankers felt that they could rely on the Bank to help them in time of crisis then their behaviour would be affected, making them think "good banking practice" less important and therefore making them more liable to periods of illiquidity or even insolvency.[84] In his era Hankey lacked much support, perhaps because his views were so opposed to those of Bagehot, which were becoming the prevailing orthodoxy. However, recent analysis has put much more stress on the problem of moral hazard and it now seems that Hankey was not as backward looking as Bagehot thought.

Current research into moral hazard and the LLR has two main applications: whether the existence of the LLR makes bankers less conservative in their behaviour, and the effect that deposit insurance has on their conduct. The problem with the latter, as already mentioned in a previous section, is that in common with all types of insurance its existence can make bankers more willing to take risks,

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[83] Lombard Street, pp.162.

[84] This is a very early statement of the problem of moral hazard.

which in itself can have major consequences for the LLR.

In some ways moral hazard is an insurmountable problem, since both deposit insurance and the existence of a LLR are bound to affect bankers' behaviour. This does not imply however that both methods of preventing bank runs are redundant, merely that this important problem should not be forgotten in policy evaluation. Economic theory does not presently seem to provide any answer to the problem: it appears that there can be no steps taken towards avoiding (or at least reducing the effects of) bank runs without increasing moral hazard.

However, there are certain steps that can be taken in an attempt to "check" moral hazard.[85] One of these is the so-called "English" route, which relies on the "club spirit" of the City of London. Under this route, the Bank of England is said to possess the necessary degree of "moral suasion" to impose its will on the financial markets.[86] Thus, if a financial institution were involving itself in activities thought not to be beneficial to the system as a whole, the Bank would be able to reprimand the company concerned and prevent them from continuing with this policy.[87]

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[85] See Hirsch (1977).

[86] The extent of the Bank of England's powers in this regard in the nineteenth century will be discussed in Chapter Eight.

[87] It is often postulated that the Bank of England's powers in this regard are far more limited now that the City is increasingly international in emphasis. However, its degree of control of British institutions is not really

(continued...)

The second check to moral hazard has already been mentioned: to include a significant portion of "self-insurance" in any deposit insurance system.[88] This though means that the major reason for introducing deposit insurance in the first place, which is to eradicate the possibility of bank runs occurring, has been lost.[89]

5.2: The "Rockoff" Problem.

Another problem with the Bagehotian view of the LLR is that it was conceived under the Gold Standard. Bagehot had no experience of any other system of international payments, and thus his experience under gold was all important in his policy recommendations.

This problem was first noted by Rockoff (1986), and is based on the fact that although, as previously mentioned, Bagehot gave us two policy rules (to "protect the reserve" and to "lend freely at high interest rates"), to be used according to the state of the market, he gave us no objective criterion on which to judge the latter. The problem therefore for a central bank is that political pressure may force it to define a period of market tension

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[87](...continued)
in doubt: witness the resignations of some of Morgan Grenfell's top management when only a few of the details of the Guinness affair were made public.

[88] ie to have less than 100 per cent coverage of deposits.

[89] And of course that the problems of deposit insurance, as already discussed, still apply.

as a panic, and thus act accordingly, whereas with hindsight it may appear that the wrong decision was taken.

Rockoff argues that the main problem for the Bank of England was the Gold Standard: the world supply of gold was finite, and although the 1844 Act could be suspended, at the end of the day, if the panic continued, the only choice available to the authorities was to leave the Standard and have an inconvertible currency, as occurred from 1797-1821. To quote Rockoff:

> **"It is the finite limit to the stock of high powered money that forces the Bank of England to constantly look over its shoulder at its reserves. Under a fiat standard, it could always lend freely in a crisis."** [90]

Rockoff also argues that a similar problem to that outlined above still exists in a world without a fixed exchange standard, since a central bank's function as a LLR is likely to conflict with other policy goals, for example maintaining a trend growth of the money supply.[91]

His general conclusion is thus that Bagehot's policy prescription is not as clear as it might seem to be on first sight: it is not the all-encompassing answer to banking crises that perhaps it was once hailed to be.

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[90] Rockoff (1986), pp.174.

[91] However, in an earlier section we have seen that there is not necessarily a policy conflict here.

5.3: The Definition of a Penal Rate.

A key component of Bagehot's policy recommendations is the use of a penal interest rate to ration out central bank lending. He foresaw no problem in determining the level of this rate, since in his era inflation was low and expectations of it were fixed by the Gold Standard.[92] In recent years however neither of these has been true: although inflation is now in single figures in all major Western countries, the experience of the late 1970s and early 1980s has been such that expectations of inflation have almost certainly increased, perhaps permanently so.

The problem then in relating Bagehot's penal rate to a contemporary situation is to determine what constitutes a penal rate.[93] It is easy to envisage (and in the U.K. we have in fact experienced) a situation whereby nominal interest rates are approaching 20 per cent and yet in real terms are negative ex-post.

In a sense however this problem is fairly easily overcome through trial and error:[94] if a given "penalty rate" appears to be insufficiently high for a given crisis,

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[92] Mills & Wood (1988) argue that although the price level in the long run was fixed by the Gold Standard, there could be short run fluctuations in the level of prices.

[93] We would normally expect a penal rate to be judged in real terms, although in itself there is nothing to prevent a penal rate from being negative in a real sense. All that is required is that it is higher than rates offered elsewhere in the financial markets.

[94] And thus it is not envisaged that it will be a problem in the context of this thesis.

the central bank has only to increase the discount rate until the required differential between the discount rate and market rates is reached.[95] For this reason, this third "Bagehot problem" is perhaps the least serious of those outlined, and is certainly the easiest to deal with from a policy perspective.

6: The Time Inconsistency Policy Rule.

In recent years there has been much discussion about the optimality of economic policy and whether in fact it is possible to implement a particular policy and obtain the desired results. The origin of these discussions lies in the rational expectations and policy ineffectiveness proposition literature of the mid 1970s, and has led to the definition of two types of economic policy. It is useful here to examine these two types and to apply them to the Bagehot policy rule.

A time consistent policy can be equated to the policy ineffectiveness proposition whereby in the long run

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[95] This interest rate differential argument, mentioned implicitly but not explicitly by Bagehot, was further developed by Wicksell (1907) in his work on interest rates and prices. He argued that high interest rates were coincident with high prices, but that it was the relative level of the rate of interest that was significant rather than its absolute level. Prices were related to the difference between changes in the real ("natural") rate of interest and in the nominal rate, and since the central bank has an important influence over interest rates, through its discount rate, it also has an input into prices.

government policies have no real effect on the economy. In this situation the government has no credibility: it may say one thing in the short run and in the long run follow a completely different policy course, since at some point in the future it becomes optimal for the government to renege on its stated policy. However, if a policy is time-consistent the private sector realises that the government will renege, and thus adjusts its behaviour accordingly, including in its expectations of the future what it calculates to be the long run policy.[96] The opposite applies for a time inconsistent policy: the government has credibility, because it does not succumb to short run temptation, and thus if the private sector believes a government will not renege on a given policy the effects of this policy will be included in their expectations and will thus have real effects.

Bagehot's main criticism of the Bank of England Directors was that they showed a lack of precommitment: they were not prepared to say definitively how they would react to a financial crisis.[97] His solution was for the Bank to state that it would act as a LLR, since panics occurred because people did not know how the Bank would react. In essence this is a time inconsistent policy rule, since people know with certainty in advance what the

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[96] See Currie (1985) for examples of time consistent and inconsistent policies.

[97] This was one of the major differences between Bagehot's proclamations on the role of the LLR and those of his predecessors, for example Henry Thornton, who did not emphasise the importance of pre-committment.

central bank's reaction will be, and the latter does not change its behaviour dependent on the event's outcome. In practice however there are two ways for a central bank's reaction to a financial crisis to be time consistent:

(a) If the central bank's reaction is not known with certainty in advance.[98]

(b) If the central bank says it will do one thing and then does another, for example if it says it will not intervene and then does so. It can be argued here that the public knows that whatever the central bank says in advance it will eventually intervene, and so they include this in their present behaviour, thus increasing the possibility of moral hazard.

Another problem is that even though the Bagehot rule is initially time inconsistent, there is no way that governments or central banks can be bound to keep to the rule: governments have shown a great tendency to renege on past policy commitments. For Bagehot, the optimal policy here is time inconsistent, in that the central bank makes some pre-commitment, and he did not recognise that it may be in the bank/government's self interest to renege on their stated policy.

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[98] Meltzer (1986) makes an interesting comment on the LLR and the Lesser Developed Countries (LDCs) debt crisis. He argues that if one or more of these countries defaulted on their debts there would almost certainly be financial distress, but whether or not this would be followed by panic is unknown, due to the fact that the reaction of central banks and governments is unknown. Thus, uncertainty is greater than it has to be: the pre-Bagehot position.

7: Conclusions.

In this chapter we have sought to present a theory of the role of the LLR. Before examining how the role of the LLR evolved in the U.K., we have first to be clear about the theoretical reason why it exists in the first place: namely due to the fear of the contagion effects of bank failures leading to large falls in the money supply. Having outlined the nature of this mechanism, discussed possible solutions and problems with these, we will now conclude with a consideration of practical measures designed to improve the operation of the LLR.

An ideal financial system would be highly developed, and would include a high degree of competition between banks. These banks would also have a widespread branch network, in order to diversify their activities, that is, some combination of the current situations in the U.K. and U.S. However, in addition to this there would be complete, or as near to complete as possible, disclosure of information. On its own this would be enough to ensure a far greater level of financial stability than exists currently, and would eradicate the risk of contagion except where, as earlier cited, there was a worldwide disaster of some sort. In this case there would be a need for a LLR, but this is the only case where the function would be needed.

However, given that we do not live in an ideal world, the following are a list of proposals intended to make the

operations of the LLR more efficient.

(1) **Deposit insurance:** this should cover 100 per cent of deposits and should be risk-dependent, in an attempt to discourage moral hazard. In addition, it should be efficiently administered in order that there was no significant delay between the failure of a bank (and thus the "freezing" of deposits) and repayments to depositors from the deposit insurance fund. In this way there should be no incentive for the public to withdraw deposits from banks and runs would not therefore occur. In this situation the only function of a LLR would be to provide liquidity to the system as a whole in the event of a worldwide catastrophe of some sort. Other than this, it would be redundant. The problem here of course is the increase in moral hazard that may result, even with risk-dependent premia, if coverage is 100 per cent.

In the U.K., where deposit insurance exists already but is not publicised, attempts should be made to increase awareness of its coverage, in order that in the event of a financial crisis the public realise that at least a proportion of their deposits are covered.[99]

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[99] The publicising of the existence of deposit insurance could be achieved at a very low cost (a notice in bank branches for example), and would surely have some positive results, even though the prevention of bank runs was not one of the stated objectives when the deposit insurance system was instituted. Rather, the Bank of England wanted to protect small depositors from the costs of bank failures.

(2) **LLR:** if it is not possible for coverage of deposit insurance to be complete, or for premia to be risk-dependent, or that it is judged that the increase in moral hazard is too great, the role of the LLR becomes far more important. In this case, the latter should concentrate on giving aid to the market as a whole, rather than to particular institutions. It should thus avoid such "bail-out" operations such as have been seen occasionally in the U.K. and frequently in the U.S. in recent years. Aid should be given through a combination of re-discounting and open-market operations, in order that the liquidity injection is as large as possible without favouring particular institutions.

(3) **Precommitment:** in order to remove as much uncertainty as possible, central banks should make explicit statements about their attitude towards financial failures. In this way there would be no doubt or uncertainty about the repercussions of a bank failure, and, if sufficient information was revealed, the danger of system-wide contagion would be eradicated.

(4) **Information:** linked to the above point, as much information as possible should be revealed about individual failures, in order that it can be established that the problem is specific to the failed institution and not endemic to the financial system as a whole. Again, this will reduce the possibility of contagion.

The above measures, some of which are substitutes for one another, would contribute to the improved functioning of the financial system in times of crisis, and of course to a more efficient allocation of LLR resources. If the LLR function was executed in this manner, much of the controversy surrounding financial failures would be eradicated since central banks would have a clear and coherent policy on this subject.

In the following chapters we will examine the development of the role of the U.K. LLR both prior to and after 1870, in an attempt to establish how and why the Bank of England reached its present position with respect to its role as a LLR.

CHAPTER THREE

THE DEVELOPMENT OF THE BRITISH FINANCIAL SYSTEM, 1694-1870.

1: The Origins of Banking

The origin of banking in its modern form can be said to lie in the late seventeenth century. It was at this time that the issue of bank notes came into existence and began to be circulated, particularly in London, thus initiating the evolution of banking as we know it today.

Although very little is known about the origins of banking, it is thought that deposit banking had long preceded the issue of notes. A problem facing possessors of wealth was where to place it in order to ensure its safety. It obviously had to be kept in a safe place where risk of theft would be reduced. For this reason the places where money was minted and those State institutions which already possessed large quantities of bullion were often used. However, after Charles 1 had closed the Mint and confiscated deposited funds in 1640,[1] any implication this practice may have had for the emergence of banking went unrealised, since it was felt that the government could no longer be relied upon.

Merchants then began to keep their funds themselves, although this too was open to abuse: during the Civil War several cashiers (those to whom the cash was entrusted) deserted to Cromwell, taking the funds with them. Thus, merchants began depositing cash with goldsmiths, a practice

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[1] At this time merchants engaged in the practice of using the Mint as a depository for their funds. The money confiscated by the King was eventually returned to its owners, but the reputation of the State for trustworthiness deteriorated.

that was soon taken up by private individuals. The goldsmiths made no charge for their services as cashiers, and at first paid no interest on funds deposited with them. Later however they started to pay long-standing depositors interest at the rate of 4d per cent per day (approximately 6 per cent pa). This heralded the start of the deposit and current account system, as the goldsmiths started to relend money deposited with them, always ensuring that they had enough "running cash" to repay recalled deposits.

When the Monarchy was restored in 1660, several goldsmith-bankers were prepared to advance Charles II money against Treasury Notes. This practice was continued until January 1672, when the government, heavily in debt to the bankers,[2] stopped payment of interest on part of this debt. The main effect of the "Stop" was to reduce public confidence in the Crown and in the government, but this reduction was not long lasting. The goldsmiths worst affected by the Stop were quickly replaced by others, although for a while goldsmiths' notes were not accepted as a means of payment. What the Stop did suppress however was the idea of instituting a pure state fiduciary issue of paper money.[3] There was no possibility that, given the low state of public confidence in the Crown, anyone would accept a new type of official "promise to pay" that carried no interest. The idea of this issue was abandoned for the

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[2] To the extent of approximately £1m.

[3] That is, state money was ruled out in respect of demand notes.

next twenty years[4], only to reappear again when the government's need for a new source of revenue became pressing in order to support its efforts in the war of the Grand Alliance against France (1689-97). By now, wars were too expensive to be financed out of current taxation.

2: The Establishment of the Bank of England

The first initiative towards the formation of the Bank of England was taken in 1691, when William Paterson proposed a scheme for the establishment of a Bank, which would be privately owned but would take on certain responsibilities for state funding. This was not very favourably received by the government at the time. Subsequently however, the need for funds became ever more urgent, and at the start of 1692 Parliament appointed a Committee to examine the situation.

Another of Paterson's proposals found success in 1693, when Charles Montagu, one of the Commissioners to the Treasury, accepted in principle a scheme whereby £1.2m would be lent to the government at 8 per cent, with a sum of £4000 allowed for management. The question was debated in Parliament, and in early May 1694 the Bank of England was given its Charter under a Ways and Means Act. The 8 per cent rate of interest agreed on was very moderate with

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[4] In fact, during this time no new banking companies were formed. See Horsefield (1982) for further details.

respect to the fairly urgent position the government was in,[5] but in return the subscribers to the loan received a considerable privilege. They were to be incorporated as a joint stock banking company with the right to engage in banking business: to receive money on deposit, to deal in Bills of Exchange, etc.

The first installment of the loan was made on August 1st 1694, when £720,000 was paid in cash, including £480,000 in notes under the seal of the Bank, which were despatched to the country to purchase much needed army supplies. These notes were soon accepted as payment in all parts of England, although they did not circulate in the north of England in significant quantities until the second half of the eighteenth century.[6]

It is clear that although at the time the flotation of the Bank was successful, with widespread City support, from a governmental point of view the Act was only passed because of the desperate need for funds: money was needed immediately and there appeared to be no other way of obtaining it. The possibilities emerging from the foundation of a Bank that would be used to generate the country's credit were not generally realised: it was this that was to cause so much controversy in later years.

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[5] Although this was a loan secured on State taxes: a funded loan.

[6] An exception to this was during the 1797 crisis when some of the shortlived £1 and £2 notes appeared. This incident is explained fully in T.S. Ashton, "The Bill of Exchange and Private Banks in Lancashire, 1790-1830" in Ashton & Sayers (1953).

Although the first Royal Charter of Incorporation was originally granted to the Bank of England for a period of eleven years, in 1697 the government renewed and increased the privileges of the Bank, in return for increased advances to the government. The working capital of the Bank was increased by inviting subscriptions, the proceeds being lent to the government at 8 per cent. In return, the Bank was granted a monopoly of the possession of government balances, an assurance that no other bank would be established by way of a special Act of Parliament, and finally that the subscribers of the Bank were subject only to limited liability, a benefit other bankers were not to enjoy until the mid nineteenth century.[7]

The Bank suffered its first setback in 1697 when it was forced to suspend payments. A shortage of silver and gold meant that it was unable to honour its notes in metal, but it was decided to pay a proportion on each note and promise by endorsement to pay the rest later. This was a lesson to the Bank of the need to keep an adequate reserve, and can be said to be the origin of the bank reserve.

The process of increasing the Bank's capital[8] in return for increased privileges continued when in 1708 it was given a virtual monopoly of joint stock banking business. This was achieved through the exclusion of any bank with more than six partners from the issue of notes payable on

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[7] See Crick & Wadsworth (1936), pp.31.

[8] And thus its note issue and advances to the government.

demand or within the following six months. Hereafter, the Bank's Charter was periodically renewed in return for loans to the government, which was viewed by many as being a fair exchange between the City and the government.

3: The Development of the Country Banks [9]

From the time of the establishment of the Bank of England, the English credit system was characterised by the combination of two formerly separate transactions: the granting and receiving of credit. Bank of England notes were created on the basis of its capital, thus it was using future capital as the basis of its banking operations. This was true also for the emerging country banks: loans were made in notes and thus they too were providing future capital against future capital.

The first country banks had been set up in the early eighteenth century, largely as a by-product of the main business of merchants. When banking became more profitable than their original business, merchants began to specialise in the former. Their early growth however was slow: records show that in 1750 there were only twelve country banks in existence.[10] The period after 1750 was one of rapid growth of the banking sector, coinciding with the revolutions that were occurring in the domains of transport and industry: by

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[9] See Pressnell (1956).

[10] Powell (1915) pp. 118.

1776 approximately 150 country banks were in existence.[11]

Although the country banks first developed as banks of deposit, they did not follow the same path of development as the goldsmith-bankers. Instead, their note issue arose from the issue of promissory notes.[12] By this time the country banks could be split into two broad categories based on function. The banks found in rural areas acted mainly as banks of deposit, as large balances deriving from agriculture were placed with them, whereas banks in industrialising areas were always needing cash in order to make advances to industry. Since there was a liquidity imbalance in the system, it was essential that there should be some means of transferring cash from areas of excess supply to those of excess demand. This link was provided by the London (private) bankers. Country banks in rural areas kept accounts with the London bankers in order that they could deposit excess funds with them, which enabled the London banks to accept bills from industrialising areas. Thus a geographical division between borrowing and lending counties was established at a very early stage.

This division had important implications for the development of the Bank of England as a **Banker's bank**, and for its future role as a lender of last resort. Since note issue in London was restricted to the Bank of England, the private bankers were forced to either have an account at

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[11] Op cit, pp. 118.

[12] That is, a promise to pay the depositor a certain sum out of sums deposited.

the Bank of England or hold Bank of England notes as part of their reserve. Country bankers sent all their surplus cash to their London banker, keeping virtually no reserve of their own. Thus, if a situation arose when they faced a sudden increased demand for cash, they were obliged to rely on the London bankers to fulfil these needs. However, since the London bankers regarded themselves only as intermediaries between lenders and borrowers of funds, they kept no special reserves to supply the needs of the country bankers, and had therefore to rely on the Bank of England to supply them with the necessary funds. In contrast to all the other members of the system, the Bank of England was forced to keep a larger than usual reserve because of its note issue, extensive governmental operations and duties with regard to the exchanges. It was thus able to provide the extra liquidity the system needed, through the cashing of its notes or by allowing the London bankers to draw on their Bank of England accounts and supply specie to the country banks. This is succinctly put in the following quote:

> "...the localisation of manufacturing industry and the division of the counties into borrowers and lenders set up at a very early date the framework of the modern banking system, and placed the Bank of England, whose notes and coins formed the reserves of the London bankers, and whose stock of guineas was the final reserve against all credit issues, in a controlling position."[13]

At this time the circulation of the Bank of England was confined to London and the immediate environs, which is why

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[13] Feaveryear (1963) pp.167.

it was necessary to receive supplies of coin rather than Bank of England notes when faced with a run. It was in the interest of the country banks to exclude Bank of England notes from a countrywide circulation, since this would imply a reduction in their profits from note circulation. In this they were aided by the fact that until 1759 there w re no £15 or £10 Bank of England notes, and thus, as small notes were the ones most needed for everyday transactions, their circulation was limited. Later, in 1794, £5 notes were issued, and later still (1797) came £2 and £1 notes, but this issue was not prolonged due to the easy forgery of the notes, even though this offence was punishable by the death penalty.

Thus the origin of the English one reserve system of banking can be found in the eighteenth century country bankers' practice of relying on London as their ultimate source of liquidity. At this time, the theory of banking was lagging a long way behind banking practice, and thus the correct course of action had to be learned from experience, at the expense of many mistakes.[14] The stature of the Bank of England was growing throughout this period, even though there was no formal acknowledgement of its central position, and when it appeared that the Bank was untouched by the late eighteenth century crises, confidence in it as an institution and in its notes increased

[14] The Bullion Committee revealed that the Bank of England Directors did not have a very detailed knowledge of the principles by which an institution such as their own should operate.

enormously.

4: The Crises Of The Late Eighteenth Century

The crisis of 1763 was mainly commercial in nature and not very serious, in contrast to that of 1772-73, which has been described as "one of the fiercest financial storms of the century".[15] There had been large amounts of investment in canals and housing, without an equivalent amount of saving. Speculation was at its greatest in Scotland, where the crisis originated, before spreading to England. By the time it reached London cash was very scarce, but the Bank of England discounted liberally at the height of the crisis and confidence was maintained in it as an institution. Both these crises were followed by legislation intended to protect the public from the dangers of the abuse of the power of note issue.

The next serious financial crisis occurred in 1783. A few years before this the Bank had adopted in principle a policy of contracting its note circulation when faced with an efflux of gold, thus enforcing an inflow of specie due to the scarcity of the circulating medium. However, the note circulation can only be contracted by reducing the amount of re-discounting at the Bank of England. It was this that was to (at worst) provoke the 1783 crises or (at best) accentuate it.

In the second half of 1782 the Bank of England's

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[15] Ashton (1959) pp. 127.

reserve had fallen dramatically,[16] as a result of gold exports to finance military expenditure in the American war of Independence. The arrival of peace was followed in early 1783 by a trade boom, implying an increase in the number of country bank bills needing discounting in London. All notes issued by the Bank against these discounted bills were cashed by the London bankers in order to send coin into the country. With the reserve still falling the Bank of England began to ration its discounts through the use of discrimination. Instead of drawing gold into the Bank, this action had the opposite effect: fearing a widespread panic, bankers started to increase their cash reserves, thus demanding even more gold. By May 1783, when cash in hand at the Bank of England had fallen to £475,000, the Bank resorted to more drastic measures and refused to finance a large portion of the loan of that year.[17] Thus the remainder of the loan was put onto the open market, reducing speculation and causing a credit contraction, thus bringing about a turn in the exchanges in favour of England. Gold flowed in from abroad and the Bank of England was able to apply the reverse of its theory, to increase the note issue in proportion to the extra bullion. The crisis was averted, but not before there had been many failures.

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[16] From £4.2m in August 1780 to £2m in August 1782.

[17] The normal practice of merchants when wishing to subscribe to a loan was to draw a short term bill on their bankers and then to discount the bill at the Bank of England.

This crisis was very important for the development both of the banking system in general and of the central role of the Bank of England within that system. By 1783 the banks were heavily involved in the commercial and industrial world, thus any change in circumstances affecting either sphere was bound to influence events in the other. During the 1783 crisis it became obvious that the majority of the system looked to the Bank of England for support in times of need. The latter was well placed to fulfil the function of being the system's ultimate source of liquidity, but as yet had not accepted the fact that it was bound to act in a particular manner in order to fulfil this function.

5: The Crisis of 1793

The crisis of 1793 was of a different magnitude from those preceding it, and was to have rather more serious consequences, both for the Bank of England and for the banking system as a whole. It was triggered off by an increase in the demand for Bank of England notes by the country banks, due to widespread anxiety about the state of relations between England and France.[18] By this time the country banking sector had increased enormously: there were now approximately four hundred country banks, all of whom

[18] The crisis had been preceded by a trade boom, especially in canal building and cotton, and so it might well have taken off at some point anyway, irrespective of the uncertainty of the war.

issued notes and give credit liberally, though not always on a sound basis.[19] Their cash reserves had not risen however, thus there existed a rather unstable situation, which needed very little to bring about a financial panic on a large scale. In addition, the past decades had seen a vast increase in trade and commerce associated with the discovery of new markets, and a new period of speculation had set in.

The declaration of war by France on England in February 1793 precipitated a complete collapse of the credit of the country banks. Many firms fell very quickly, including that of one of the Bank's directors. The Bank of England gave what assistance it could,[20] but it was not really enough since the demand for gold was so great. Confidence in the country banking system was by this point at such a low level that everyone wanted to hold onto their coin and refused to discount. Industry had no cash to pay wages and so ground to a halt. It was a perfect example of a liquidity crisis: firms that were solvent were failing due to a lack of immediate cash.

By April 22nd 1793, the situation had deteriorated to such extent that City leaders appealed to the government for help, and a Select Committee was appointed to look into the problem. The outcome of this was a decision to issue

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[19] A parallel can be drawn here to present day U.S. banks, since the country banks of the late eighteenth century were normally very small and highly localised, and thus their risk burden was not widely spread.

[20] This included the rescue of Sir James Sanderson, M.P and Lord Mayor of London.

£5m of Exchequer Bills in denominations of £100, £50, and £20, bearing interest at the rate of 2d per day,[21] with the proceeds to be lent at 5d per day to suitable applicants. This plan was executed on May 8th, and was enough to ease the situation immediately. Only £202,000 worth of bills were issued, even though a figure of £3,856,000 had been applied for. As in so many later cases, the public in general did not actually need the cash, they just wanted to be assured that it was available if they wanted to draw on it.[22] The influx of bullion from France, which had started earlier in the year continued and by the end of 1783 interest rates in London had fallen as low as 4 per cent.

The effects of the crisis on the financial system were considerable and long lasting. There had been a major fall in the note circulation of the country banks from which the market never really recovered. The major problem was that there was no time for real recovery: England and France were still at war and were to be so for the next twenty years, thus large amounts of money were needed to finance this war expenditure.[23] Pitt, the Prime Minister, considered it to be in England's best possible interest to

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[21] This is approximately equal to 3.75 per cent per annum.

[22] This, of course, is the essence of the problem of fractional reserve banking: panics can be precipitated purely by a confidence crisis, not from any real need for currency.

[23] These heavy governmental demands were to cause much "crowding out" of private spending as long as convertibility was maintained, since this implied a restricted money supply. For more detail of this mechanism, see D.M Joslin's contribution to Pressnell (1960).

win the war and therefore the financing of it was of the highest priority, which put a considerable extra burden on a credit system that was already weak.

The first major governmental demands for finance from the Bank of England came at the end of 1794. This had a negative effect on the reserve, which, although it had recovered somewhat from its trough of 1793, was still below its normal level.[24] These demands increased during 1795 when Pitt augmented the number of short term bills that the Bank was expected to discount. As a consequence of the remittances abroad, the exchanges moved downwards and gold flowed out of the country - an external drain. This was intensified by two events in 1795: a bad harvest and the collapse of the French Assignats. The latter caused an increasing mount of coin to be used in France in place of the by now valueless notes, thus adding to the gold drain from England.[25]

All this resulted in the Bank starting to restrict its discounts in early 1796,[26] and in protest against the high level of borrowing the Bank Directors threatened to refuse the government's next demands. This threat was never carried out however, but eventually the government tried to finance some of its loans itself. The restriction of discounts did procure the desired results: the exchanges

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[24] The bullion reserve had been £4m in 1793 - half its normal level - but had risen to £6-7m by 1794.

[25] See Hawtrey (1919).

[26] See Clapham (1944) vol.I, pp. 269-270.

improved and gold flowed in.

Although the external drain had been halted, the Bank then had to cope with the problem of an internal drain. Because of the general lack of confidence in the country banking system, the inflow of gold went straight to the country, not into the Bank of England's reserve. Since in 1793 the mere declaration of war had been enough to bring down many country banks, and the country note issue was only two thirds of its 1793 figure, it is understandable that the public feared the worst in the event of a threatened invasion. Thus at this point the system only needed a relatively minor event to make it break down completely, and on Saturday February 18th 1797 Newcastle farmers sold their livestock and produce with no regard as to the prices they fetched, as a result of a local invasion rumour. The notes they received they converted into specie at the local banks, which was enough to cause the Newcastle banks to suspend payments on Monday 20th, an action soon followed by other banks in the north east of England.

The news of the Newcastle stoppage reached London on the following Thursday, and sent the price of consols plummeting. On Saturday 25th, reports reached London of a landing of a French force of 1200 men at Fishguard in Wales, which accentuated the drain and decreased the Bank of England's reserve still further: by the 25th February it stood at only £1,272,000. On Sunday 26th, the King met Pitt, the Governor and the Deputy Governor of the Bank, a meeting which resulted in the issue of a Declaration

forbidding the Bank from making Payments when it re-opened on Monday morning.[27]

Thus began a period of twenty-four years during which Bank of England notes were not convertible into gold on demand. What would in other situations be a temporary measure, and was in this case intended to be so, since initially arrangements were renewed regularly, became almost a permanent fixture.

It can legitimately be argued that a large proportion of the blame for the events leading up to the necessity for the Restriction can be placed on the government. Although the terms of the original Charter had specified that the officials of the Bank were to be penalised if any advances were made to the Crown on the security or anticipation of revenue without the prior agreement of Parliament, this rule was soon broken. Ministers obtained sizeable loans from the Bank without Parliamentary sanction.

By the time of the Restriction, the Bank had developed two distinct relationships with different bodies: the government and the rest of the banking system. The Bank was always the underdog in its relations with the government, a situation further intensified when it was rescued from disaster twice in the 1790s, once by an issue of Exchequer Bills and then by the suspension of convertibility. This close relationship with the government strengthened the role of the Bank of England at the centre

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[27] The meeting was initiated by the Bank, and on Sunday 26th, the King approved a "Bank Plan".

of the banking system however, and increased public confidence in it, so that when it became clear that, under a system of fractional reserve banking, some institution must assume responsibility in a crisis, the Bank seemed the obvious candidate. It is clear that the Bank itself did not recognise its this to be the case, since in fact it did not fully accept its responsibilities until well into the nineteenth century.[28] However, after the time of the Restriction the fact that other banks kept their reserve chiefly in Bank of England notes made it clear that they recognised the importance of the Bank within the system: by 1797, institutional realities were no longer compatible with legal provisions.

6: The Early Years of the Nineteenth Century

The suspension of convertibility in February 1797 marked the commencement of a new period in British monetary history. The fact that the issue of an Order in Council ordering the suspension was actually agreed to by the government, proved that when the occasion demanded it, the Bank of England would step in to help the banking system. However, the role of this central agency had not yet developed into its modern form: as at the time of its formation, the Bank saw its central role as being to supply the government with money to fight the French, this time in the Napoleonic wars. Its central position was

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[28] See later chapters.

accentuated during the twenty-four years of the Restriction however, in that Bank of England notes became far more widespread. When payments were restored in 1821, it was by far the most important note issuing bank.

Once inconvertibility had been imposed, the Bank held strictly to it, not allowing the conversion into specie of even notes of small denominations. This caused great difficulty for bankers, particularly those in London, since it became very difficult for them to accumulate enough coin to pay out even the smallest sums in specie. The situation was eased slightly by the introduction of notes of smaller denominations (£1 and £2) in 1797. However, this issue did not last long due to its susceptibility to forgery.[29]

The imposition of inconvertibility can generally be viewed as a retrogressive rather than a progressive step. Much pressure was taken off the Bank since it no longer had to maintain convertibility. Until the recommendations of the Bullion Committee came to be accepted, generally judged to be sometime in the late second or early third decade of the 1800s, its policy stance was based around a belief in the **Real Bills Doctrine.**[30] This had first been associated with John Law at the start of the Eighteenth century, and was later given rather more respectability by **Adam Smith** in

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[29] The history of the doomed £1 and £2 notes is told fully in Mackenzie (1953). In brief, there were so many engravers without work (around 9000) that it was likely that many/most would resort to forgery, even though this was an offence that was punishable by death.

[30] This was also known as the **Needs of Trade Doctrine.**

the 1770s.[31] The basic theoretical premise behind this doctrine was that there could be no overissue of money if the Bank of England limited its discounts to an amount consistent with the legitimate "needs of trade": only those representing "real" transactions. As to what determined whether a need was legitimate or not, it seems that there was a generally accepted standard by which this was judged: if good paper having less than sixty days to run was presented at the Bank of England, it would be discounted at 5 per cent.[32] The argument here was that if merchants did not need the cash, it would be irrational for them to pay a rate of interest of 5 per cent for it. It appears that the rate of interest charged was specified at 5 per cent because this was the maximum permitted by the Usury laws. The Bank tended to take this interest rate as given, and then ration out discounts accordingly.

Bank of England discount policy in these years was interesting, since it altered fairly radically around the time of the formation of the **Bullion Committee** in February 1810. Up to this point the Bank had certainly followed the orthodoxy of the Real Bills Doctrine, with the result that by 1809 the U.K. was experiencing rapid (for the time)

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[31] Smith believed in a rather tighter version of this doctrine, since he believed that prices were determined in world markets and thus were exogenous to the domestic economy.

[32] Morgan (1943) pp. 68.

inflation,[33] culminating in an economic crisis in July 1810. A report of the Discount Committee early in 1809 warned that a continuation of liberal discounting would lead to problems both for the Bank and for the financial system as a whole, and thus suggested the level of discounts should be severely restricted. However, this was not achieved: the demand for discounting facilities was so high that Bank Directors felt it was their duty to give aid to the financial community. Thus even before the Bullion Committee Report it seems that the Bank was aware of the invalidity of the Real Bills Doctrine, and efforts to change its behaviour were thwarted, not by a lack of knowledge of monetary theory, but by practical considerations.

Contemporary opposition to the Real Bills Doctrine was embodied in the report of the Bullion Committee, instigated by Francis Horner[34] in February 1810, after sharp falls in the value of sterling on the European foreign exchanges. This formed the first protracted discussion of money and monetary policy since the Restriction, and formed the basis of a debate which was to last many years.

The Bullion Committee was set up with the aim of considering two phenomena: the high price of gold bullion

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[33] Clapham (1944) vol II, pp.19, calculates that the first quarter of 1810 carried an index number for prices of 184 (1790=100), as against 136 in 1797.

[34] With contributions from William Huskisson and Henry Thornton, whose Paper Credit, published in 1802, was one of the most important expositions of monetary theory of the period.

and "the state of the circulating medium and the exchanges". Their conclusions were brief and to the point: the high price of gold had been caused by an over-issue of Bank notes, and thus the exchanges could only be brought back to "normal" if convertibility was restored as soon as possible. This would reduce the Bank of England's power to alter its note issue in a discretionary manner.

One contemporary criticism of the Bullion Report was its recommendation of an early return to convertibility,[35] since this would have meant the restoration of gold payments in a wartime situation. The problem here was that it was felt that the existence of inconvertible paper released specie for export and prevented the occurrence of panics such as had been seen in the 1790s, which would obviously have detracted from the war effort. The arguments against restoring convertibility were far more powerful from a practical viewpoint; in fact, had it been restored in 1812 it would have occurred just at the time when Napoleon was victorious over the Russians and Prussians.[36]

In retrospect it is obvious that there was to be no chance of a return to convertibility until the Napoleonic wars had ended. The Bullion Report did serve a very useful purpose however in providing a catalyst for a debate in monetary economics that was to last for most of the century. It questioned the prevailing Bank orthodoxy, including the now widely acknowledged invalidity of the

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[35] It had recommended a return in 1812.

[36] See Clapham (1944) Vol.II pp.28.

Real Bills Doctrine, and brought out into the open the rather lax attitudes of the Bank of England, which at this time was content to try to absolve itself from its responsibilities to the banking system. The question of whether or not it could be relied on to act as a lender of last resort was now a matter for debate, as was the status of Bank of England notes.

After several postponements, convertibility was finally restored in March 1821, thus allowing the Bank of England once again to repay its notes in gold.

7: The Crisis of 1825

This was one of the more serious crises of the century. The first signs of a boom had become obvious late in 1824: increased stock market speculation, price rises, and unfavourable exchanges, which implied an external bullion drain. However, since the reserve at the Bank of England was very large by contemporary standards,[37] the Bank continued to discount freely, allowing its own note issue to increase, and continued to do so even when the bullion reserve commenced its downward slide in mid 1824. The dangers of the situation were foreseen by contemporary commentators: in March 1825 **Lord Liverpool** had warned speculators that if a crisis arose they must not expect the government to give them relief.

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[37] Approximately £14.2m at the start of 1824. (Morgan, 1943).

By the autumn of 1825 the extent of the impending crisis became clearer, and the Bank of England started to restrict its discounts, and thus its note issues, since by now the reserve had fallen to a little over £3m. This action precipitated a general collapse of credit and the fall of many banks, and the crisis reached London on 7th December 1825 when the well established house of Sir Peter Pole & Co.[38] applied to the Bank of England for help. Up to now the Bank had refused to give assistance to anyone, but since this particular house was an agent for approximately forty-four country banks,[39] its collapse would have endangered a large part of the banking system, and thus the Bank lent £300,000. However, in spite of this aid, Sir Peter Pole & Co. could only continue in business until the next week when they stopped payment, marking the beginning of a major panic.

It was only at this point that the Bank of England increased Bank Rate by 1 per cent to 5 per cent, the maximum permitted at this point by the Usury laws.[40] By now however this move was useless, since even at this level Bank Rate was too low to be a deterrent to those wishing to discount bills. Thus the Bank embarked on a complete policy change and decided to discount freely to all those who presented eligible bills, in short to act as a lender of last resort. In meetings between the Bank and the

[38] This was Henry Thornton's old bank.

[39] See Bisschop (1910), pp. 196.

[40] The Bank was subject to these laws until 1832.

government the latter agreed with the policy of discounting freely but completely ruled out the possibility of a second suspension of payments. The reserve was by now almost non existent, but the Bank was saved from a temporary stop by two factors: the discovery at the Bank of a box of £1 notes that had been withdrawn from issue in 1821, and the Rothschild's efforts in securing gold from the Bank of France. The £1 notes were distributed and did much to calm the panic, as did the extra gold supplies. These had been brought from France by the Rothschilds, and were turned into coin at the Mint. The extra coin meant that the Bank could continue discounting freely: in three weeks, discounts increased from £5m to £15m, but the public's confidence was beginning to return. The demand for discounts started falling, and by February 1826 the panic had completely subsided.

In the aftermath of the crisis, it was felt by many people that a large part of the blame for the events which had occurred should be borne by the Bank of England. This was for two reasons, firstly, because it did not react quickly enough to the external gold drain, and secondly that it waited too long before acting to restrict its issues. The crisis did make the Bank aware of two factors however: firstly that it must take into account the level of the exchanges, and secondly the difference between an internal and an external drain. This was something that Thornton had remarked upon a quarter of a century earlier.

Although the Bank of England was responsible to a

certain extent for the crisis,[41] a large part of the blame must also be put on the country banks, of which there were many, all with their own independent note issues. A quote from William Cobbett illustrates the difficult position the Bank was in:

> "The Bank is blamed for putting out paper and causing high prices; and blamed at the same time for not putting out paper to accommodate merchants and keep them from breaking. It is the fellows who put out the paper and then break that do the mischief."[42]

This was the view held by Parliament in its post crisis debates, and led to legislation aimed at improving the situation. This consisted of two Acts: the first, dated 22nd March 1826 entailed the banning of all notes of less than £5, including those of the Bank of England.[43] The second allowed for the formation of joint stock banks outside a radius of sixty-five miles of London, thus ending the monopoly of the Bank of England, although the latter was encouraged to start opening provincial branches.[44] The country banks were not happy with this prospective new competition, since they foresaw a proportion of their business disappearing.[45] These fears were to a certain

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[41] If not for its causes then at least for its propagation.

[42] Cobbett (1830), Vol.II,pp. 25.

[43] This did not apply to Scottish small notes however.

[44] It opened eleven branches in the following years, the most important of which was in Liverpool.

[45] Complaints as to Bank of England competition at the branches never completely subsided. Even in the 1890s there were numerous complaints from country bankers who (continued...)

extent unfounded, since the Bank confined its discounts to bills of the highest quality. However, there were some co plaints of the Bank "poaching" the best business from the branches,[46] and thus leaving the riskiest business to the local banks. As far as the Bank was concerned, the s tting up of branches was never intended to compete with the Bank in London: their role was rather to act as a support and to provide some Bank of England presence outside London.[47]

8: The System During the late 1820s and early 1830s: Palmer's Rule

From the time of the legislation following the 1825 crisis until the Bank Charter Committee Hearings of 1832, discussions of monetary and banking matters were overtaken by other questions that were considered to be of greater importance.[48] The main feature of the period was the growth of joint stock banking: between 1826 and 1836 approximately a hundred joint stock banks were created,[49] and it was this growth, regarded by some to be excessive, that was blamed

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[45](...continued)
feared losing business to the Bank. See Chapter Eight for further details.

[46] See Clapham (1944) vol.II, pp.227.

[47] These branches were intended to function in much the same way as the American Federal Reserve Banks, established much later.

[48] Such as the Reform of Parliament.

[49] See Smith (1936) pp.16.

by many for the crises of the 1830s.

The Bank Charter Committee first sat in 1832. This was set up with the aim of examining the position of the banking system with respect to the Bank Charter Act, which was to expire in 1833. This was the first official vehicle for the statement of what came to be known as "Palmer's Rule", named after the Governor of the Bank of England at the time, John Horsley Palmer. This theory held that the volume of securities possessed by the Bank should be held constant, allowing the volume of gold and notes held to vary. It was expounded by one of the Directors of the Bank, George Warde Norman, in his evidence to the 1932 Committee,[50] and worked on the principle that when the circulation was "full", at the onset of an external drain, the Bank's reserve should be approximately one third of its note and deposit liabilities.[51] It was at this moment that its liabilities and its reserve should be at their highest level. The remaining two-thirds of deposits should be held as securities, and it was this amount which should be kept constant.

Palmer and Warde Norman believed that this would guard against the possibility of having to resort to inconvertibility, at least on most occasions, since the public would deposit or withdraw notes consequent on the state of the exchanges. In this way the exchanges would be

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[50] B.P.P. 1831-32, Vol.vi, Q.2391. Reprinted in Gregory (1929).

[51] Deposits in the widest sense.

regulated through the fluctuation of the circulation. They did not rule out the need for special action however; in response to a question as to the Bank's reaction to an external drain, Warde Norman gave the following reply:

> "... there might possibly be extraordinary circumstances, in which a forcible and more rapid contraction of liabilities would be requisite."[52]

Although this rule of "keeping the securities even" was accepted by the Bank, in practice it consistently failed to uphold the rule, since the volume of securities held fluctuated considerably. Because of the business in which the Bank was involved, in practice it was very difficult for it to hold the volume of securities constant.

Despite the fact that the evidence given to the 1832 Committee never appeared in the form of a report, the main body of it was used in the formulation of the 1833 Bank Charter Act. This Act made Bank of England notes over £5 legal tender, and contained a declaratory clause confirming the fact that non-issuing joint stock banks were legal within a radius of sixty-five miles of London. It also repealed the Usury Laws for bills payable within six months, thus allowing for the use of the Bank of England's discount rate in a positive manner when the Bank was trying to impose credit stringency.[53] The overall effect of the Act was to improve the position of the Bank of England at the centre of the banking system, and to aid it in controlling credit.

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[52] Op cit, Q.2393.

[53] The Usury Laws were completely abandoned in 1854.

9: The Crises of 1836 and 1839

The events of 1836 and early 1837 had the major hallmark of a classic example of a crisis: an external drain, which had it been neutralised at an early enough stage would probably been fairly harmless, but which provoked a domestic loss of confidence and an internal drain. In this case the external drain was caused by an export of gold to the United States: America needed to import gold to facilitate a re-arrangement of currency parities that was occurring at that time.[54]

The growing internal loss of confidence prompted the Bank of England to increase its discount rate to 4½ per cent in July, a rise of ½ per cent. This was followed by a further ½ per cent increase at the start of September. It was also accompanied by a rationing of discounts: the Bank refused to discount any bills carrying the name of a joint stock bank of issue. This move was inspired by a general distrust of the new joint stock banks as a class, but its effect was merely to add fuel to the fire, culminating in November 1836 in the failure of the **Northern and Central Bank of England**, a new joint stock bank based in Manchester. Its directors appealed to the Bank of England for help, which was given to them, but on very strict preconditions: due to irregularities in the bank's management, it was to be liquidated. The depositors were

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[54] Gold had been overvalued relative to silver, thus ensuring that gold would be drawn in.

paid in full, but shareholders suffered heavy losses.

This failure was followed soon after by that of Esdailes, a London private bank, which had been in difficulties for three months and was the London agent for over seventy country banks. This time the bank was found to be solvent but illiquid, and so was lent £150,000 on the s curity of a guarantee signed by ten of the London bankers, and a run on the country banks was avoided.

By now the Bank's bullion reserve had fallen from a level of £8m in April 1836 to approximately £4m in February 1837,[55] which was to be its lowest level. By the start of 1837 however, the worst moments of the crisis were over, although bankruptcies were still high during the first six months of the year. Even though the crisis seemed to have subsided, the Bank of England still had to help out the "Three W's" (Wildes', Wiggin's and Wilsons'), one of the largest the American houses which came to the Bank for aid in late February 1837. The Bank first refused to aid them, but succumbed as American merchants decided to appeal to the government to overrule the Bank, and eventually £200,000 of "abnormal" discounts were granted.[56] The Bank's actions in rescuing Esdaile's seemed to prevent the crisis from reaching epic proportions: at no time was it anywhere near as serious as that of 1825.

In the same way that everyone tried to blame everyone else after the 1825 crisis, in the discussion as to the

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[55] See Clapham (1944) Vol.II, pp.153.

[56] On personal and other security.

origins of the crisis of 1836-7 the Bank of England blamed the country banks and especially the new joint stock banks, who in turn put the blame onto the Bank. Although it was certainly true that the joint stock banks had over extended their note issue, the case against the Bank rested on the fact that only once since 1832 had it implemented Palmer's constant securities rule, and in general the proportion of liabilities in bullion and coin varied between a quarter and a seventh instead of the third specified by Palmer. In addition, the Bank had delayed *increasing interest rates* until it was too late, and so had effectively rationed discounts by refusing to accept certain bills, thus aggravating the general state of alarm.

Unlike the crisis that immediately preceded it, that of 1839 was characterised by two phenomena that were not typical of the financial crises previously experienced. Firstly, it was not followed by any major banking or financial failures, which were normally expected as part of a crisis and secondly, the decline in prices experienced was very gradual, in contrast to the rapid falls that had occurred after other crises. In other ways however, the crisis itself was actually more serious than that of 1836. At one point, the reserve of the Bank of England was on the point of disappearing,[57] and was only saved by the actions of a French syndicate of bankers who, together with Thomas Baring and the Banque de France, organised a £2m credit.

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[57] £10m at the start of 1838; £2.5m by August 1839. (Feaveryear 1963, pp.255.)

This transaction took the form of Barings drawing bills on the syndicat, which were then discounted by the Banque de France.

By the end of the 1830s it seems that the Bank was starting to accept the need for it to act as a Lender of Last Resort, but that it was not very skilled at executing the appropriate policies: its usual actions were late and insufficient. If the financial system had been allowed to develop after this point without any outside interference it might have arrived at its modern structure rather faster, but the orthodoxy underlying the 1844 Act led to a certain degree of retrogressive development of the banking system, and in particular of the development of the Bank of England's role as a LLR.

10: The Bank Charter Act, 1844

The Bank Charter Act of 1833 had renewed the privileges of the Bank of England for a further twenty-one years, although it included a "break clause" under which there could be a reconsideration of the position within six months of August 1844. It is possible that had the Bank managed to conduct itself successfully according to Palmer's "Rule" of 1832 no such reconsideration would have taken place, but the crises of 1836 and 1839, with associated blame attached to the Bank of England, meant that the public held the Bank in very low esteem, and it was felt that something had to be done in order to give

more stability to the banking system. The legislation that resulted from the discussions at this time was the Bank Charter Act of 1844. Debate as to the appropriateness of this Act was to last for more than thirty years: it was not until the late 1870s that it was overshadowed by the bimetallic discussions. Its influence was far-reaching and inspired a whole generation of debate of monetary and banking questions.

The discussion which preceded the passing of the Act had centred on the issues involved in the Currency and Banking School controversy. The specific points of theory associated with these two Schools are not the concern here, but the main practical points emerging from the controversy were twofold: firstly, whether there should be some control over the note issues of the joint stock banks, and secondly the extent of the Bank's control over the banking system and whether its note issue too should be fixed in some way.[58] Associated to this second point was the question of the Bank's responsibility to the system: should it be prepared to act as a "lender of last resort" and aid the financial system in times of difficulty? One of the aims of the Bank Charter Act was to eradicate the need for this function. Peel, the architect of the Act, said at the time that although he recognised that the provisions of the Act

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[58] The debate between the Currency and Banking schools can also be seen in terms of the Rules versus Discretion debate in monetary policy. The Currency School were in favour of a "rule", and it was their opinion that finally triumphed. This was not the only example of a nineteenth century monetary rule however; Palmer's Rule and the Gold Standard can also be regarded in this light.

might make it difficult for the Bank to act as a LLR, he hoped that this would be irrelevant since the need for last resort lending would be eliminated by forcing the system to change its behaviour. He did consider the question of whether to have a relaxing clause in the Act however, and decided against it, in case it encouraged what later became known as "moral hazard".[59]

The main specification of the Act was the separation of the Bank of England into an issue and a banking department, first suggested by Ricardo. The issue department was to have a fiduciary issue of £14m, which was the value of the securities it was to take over from the banking department, together with any specie not required by that department. An important point about this issue was that it could be allowed to decrease but not increase. The banking department would then be free to carry on its banking business in a similar fashion to any other commercial bank.

Discussions as to the implications of the Act were protracted and at times bitter. They revolved around four main issues: firstly, did the Act in fact enable the banking department of the Bank of England to act like that of any other bank? This was closely linked to the second issue: that of the conflict between the Bank's actions in times of prosperity and in times of crisis. Thirdly, did the existence of the Act actually accentuate panics rather than attenuate them? Finally, what would be the position of

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[59] This has been discussed in the previous chapter.

the rest of the banking system after the passage of the Act?

The Bank's main problem regarding the first issue was that its set of customers was not as well defined as those of other banks. Although there were obviously some people who did business with the Bank on a regular basis, it also had occasional customers and those who only came to it in a crisis, for although the event of a crisis had been theoretically eradicated, the possibility of one occurring was still there. In addition to this, "acting like any other bank" implied that the Bank had no greater responsibility to the system in a crisis than a bank's normal responsibility to its customers, which again precluded the possibility of the Bank acting as a LLR. It also implied the continuous search for profit maximisation, with the consequence of keeping a lower reserve, since no more cash than the necessary minimum would be left idle.

Opponents of the Act felt that instead of decreasing the chances of the occurrence of a crisis, it actually increased them. This was due to the fear that apprehension would actually be increased as the reserve was approaching the critical £14m mark, and thus the crisis of confidence would be amplified. They argued that this fiduciary level of £14m was entirely false: it was purely because it was felt that the Bank of England could not increase its discounts above this level that people panicked more.[60] The

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[60] See Footnote 22. Again, this is the very essence of a crisis of confidence: the desire that cash should be (continued...)

practical outcome of this situation was the agreement of the government in particular situations to suspend the Act, and thus to relieve the Bank's predicament and the public's confidence crisis.

The possibility of the suspension of the Bank Charter Act allowed for the continuation of what was becoming perhaps the Bank's most important function, that of being the source of the ultimate reserve of credit: the lender of last resort. Contemporary critics such as J.Horsley Palmer, John Stuart Mill and James Wilson,[61] regarded the Act as an evil that would do little else except aggravate panics. It was felt that if certain situations necessitated the suspension of the Act, the implication was that it would fail in avoiding the very situations that it was designed to control. This made the implementation of the Act seem somewhat unnecessary. Even the spokesmen of the Currency School, such as **Overstone**, agreed that the suspension of the Act must remain a possibility because of the difficulty of controlling the issues of the country banking sector.

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[60](...continued)
available, even if it is not actually needed. With hindsight, this is fairly obvious, but unfortunately it was not so obvious at the time.

[61] Wilson had just become the founding editor of The Economist.

17: 1847 Crisis [62]

No sooner had the first bout of debate as to the merits of the 1844 Act died down than it was put to the test by a serious crisis, sparking off a whole new series of discussions. This crisis had two phases, in early and late 1847. The first phase was initiated by two successive bad harvests in England, compounded by the failure of the Irish potato crop in 1845 and 1846. This meant that the price of agricultural products increased, followed by an increase in corn imports, implying both an increase in the volume of bills presented for discount at the Bank and an external gold drain. This led to a drain on the Bank's gold reserve, which had stood at £10m in August 1846 but had fallen to £7m by January 1847 and to £3m by mid April 1847.[63] Even in January 1847 the discount rate was still below market rates, implying that the discount rate could not be used as a weapon to attract funds to London.

Once the crisis had become serious, in April 1847, the Bank of England started to limit its discounts, refusing to act as a LLR. This was an example of it using direct credit rationing rather than an indirect interest rate mechanism

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[62] For a detailed explanation of the financial aspects of the 1847 crisis see Boot(1984) pp.42-57. In addition, Dornbusch & Frenkel (1984) discuss the crisis in the context of the workings of the Gold Standard as a whole, with particular reference to the question of whether the requirements of the Gold Standard mitigated or exacerbated the severity of financial crises.

[63] See Fetter (1965), pp.204.

for limiting discounts. With hindsight, the expected occurred: the only effect of credit rationing was to aggravate the panic. What the Bank physically did to limit credit was to only accept very short term bills in London, to halve the volume of discounts in the provinces and to start selling consols.

The increased interest rates did have their desired effect however, and the external gold outflow slowed down. This was the end of the first phase of the crisis, and for the next few months the markets returned to a more or less normal condition, with favourable prospects for a good autumn harvest.

The second phase of the crisis began in the late summer of 1847 when there were a spate of failures of firms involved in the corn trade. The Bank increased the discount rate to 5½ per cent, but this was not sufficient to halt the incidence of failing firms. On August 21st the Governor of the Bank of England was forced to give up his position as he had to sell his Bank stock when the failure was announced of **W.R.Robinson & Co.**, a firm of corn merchants of which he was the senior partner. The same fate was soon to befall two other Bank Directors, and the panic then spread to the bill brokers in the middle of September, with the failure of **Sanderson & Co.**, who had liabilities in excess of £750,000. At this point the Bank announced that it would no longer advance on stock or exchequer bills, and would charge a 5 per cent minimum on bills payable within one month and 6 per cent on others. This action gave rise

to a panic on the stock market, with plummeting share prices, and large falls in the Bank's reserve. Because of the precarious position of the reserve, the Bank refused to give aid to the first crop of banking failures.[64] The Royal Bank of Liverpool was the first to stop payment on October 18th, together with a smaller Liverpool bank. This was the start of the panic amongst the country banks, which soon spread to Newcastle and the rest of the country. The London banking sector however was free from failures, even though the commercial sector suffered greatly.

Throughout these weeks the government was faced with demands for the suspension of the 1844 Act so that the Bank of England would be free to extend its discounts. The Chancellor, Sir Charles Wood, resisted these demands for a few weeks, but on October 23rd a letter from the Government was sent to the Bank of England telling the Bank to discount as freely as it wished to, with the guarantee that if the fiduciary issue was exceeded an Act of Indemnity would be passed by Parliament. It was suggested that the Bank should charge at least 8 per cent on its discounts.

However, once the government's decision was made public, it seems that the panic died down almost immediately, as illustrated by this quote from Samuel Gurney:

> "The effect was immediate. Those who had sent notice for their money in the morning now sent us word that they did not want it - they had only ordered payment by way of precaution.....From that day we had a

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[64] Until this point the banks had withstood the crisis very well.

market of comparative ease."[65]

Reserves at the Bank fell for another week, but in fact the fiduciary issue was never exceeded and so the Act of Indemnity was unnecessary. This was seen by contemporary critics of the Act as proof of its invalidity: what bankers wanted to be sure of was that cash was available should they need it. It was a classic crisis of confidence since at no point in the crisis was there any significant demand for notes.

In the aftermath of the crisis the Bank was criticised on two counts: firstly for maintaining its discounts at too high a level in the early months of 1847, and secondly for not increasing the discount rate early enough in order to curb speculation. It was not possible to make any final judgement on the efficacy of the 1844 Act since legitimate arguments existed amongst both the supporters and the critics of the Act. Peel, who was by this point no longer a member of the government, was forced to admit that his theory that the Act would render action to prevent crises unnecessary was not borne out in practice, but he still believed that it was a net good: that it was up to the Bank of England to control its discounts and reserves in accordance with the provisions of the Act.

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[65] Select Committee of 1848 (reprinted in Morgan,1943, pp.151.)

12: The Crisis of 1857 [66]

In 1855 the period during which the 1844 Act was to continue unaltered expired. In evidence given to the Commission of Enquiry, Weguelin, then Governor of the Bank of England, explained the Bank's policy as being not to lead the market but to increase the discount rate whenever th reserve was threatened. This implied that there was no attempt to curb speculation before it arose. It also implied however, rather more positively, that Weguelin accepted that the Bank could not afford to take a passive view of events in the markets: it was directly affected by them and as such at times had to take direct action.

Given that during the previous crisis the Bank had managed to contain the panic, the crisis of 1857 came upon it very suddenly. The source was in the United States, where there had been enormous railway investment, and in late August 1857 the price of railway securities started falling. During September these falls were transmitted into bank failures, firstly in the South West but then further north. During October 1857 1415 banks failed throughout the U.S.A.[67]

During this period there was very heavy investment in

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[66] An excellent discussion of the monetary aspects of the 1857 crisis can be found in Hughes(1960), chapter 10 and also appendix 5.

[67] Clapham (1944), Vol.II, pp.227.

U.S. railway bonds by British investors,[68] and so news of the American panic affected the British banking sector quickly and severely. Its effects were first felt in Liverpool and Glasgow, the two cities through which most American trade passed. At the start of October (8th), the Bank of England increased the discount rate to 6 per cent, as the bill brokers tried to off-load securities and the banks call in loans. There were further increases in the discount rate on October 12th and 19th (to 7 per cent and 8 per cent respectively), and also the failure of the Liverpool Borough Bank on October 27th. This failure spread the panic to London, as most of the failed bank's rediscounted bills were held by the London bill brokers, and from then on the Bank of England was besieged from all quarters of Britain by the pleas of organisations wanting to be sure that the Bank's assistance could be relied on if needed.

By the end of October the reserve was less than £3m and the panic had become very serious, especially in Scotland. Bank Rate was increased again on November 5th (to 9 per cent), and on the 11th November news broke of the stoppage of Sanderson & Co., a firm of bill brokers which had also been involved in a temporary stop during the 1847 crisis. This time they stopped with liabilities of almost £5.3m,[69] and the reaction of the Bank was to increase Bank

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[68] More than 50 per cent of total American railway capital was held in Britain, and a fifth of Britain's exports went to the U.S. (Feaveryear,1963, pp.227.)

[69] Clapham (1944), Vol.I, pp.229.

Rate to an unprecedented level: 10 per cent. These were the worst moments of the crisis: the reserve was now less than £1.5m, and even though the Bank seemed to have been reacting correctly,[70] the drain did not cease and the reserve continued to fall. On November 10th alone the Bank a vanced £661,000, half of which went to **Overend Gurneys**, and much of the remainder to other bill brokers.

By now the centre of the banking crisis was Scotland, where the **Western Bank** had already stopped payment and there was some doubt as to the ability of the **City of Glasgow Bank** to continue operations.[71] The Governor and Deputy Governor of the Bank held discussions with the Chancellor on November 10th, and concluded that they would try to avoid the issue of a Letter of Indemnity, even though the government was quite prepared to do this. However by November 12th the situation had become untenable and a Letter was issued excluding the Bank from its responsibilities under the 1844 Act. The discount rate of 10 per cent was continued and the Bank lent a total of £2m in discounted bills.

Unlike the 1847 crisis, the issue of the Letter did not lead to an almost immediate cessation of the panic: this time events had progressed rather further. Although the Bank's discount rate policy had succeeded in halting the external drain, the panic had spread so far into the

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[70] By continuously increasing Bank Rate.

[71] This bank was to experience severe problems in later years. See Chapter Four for further details.

country that it was a while before it could be contained. £2m of notes in excess of the legal limit were transferred from the issue to the banking department (in exchange for securities), and of these £928,000 were put into circulation, a figure that was reached on November 20th. By the end of November the circulation had decreased to the legal amount and the crisis was finally officially declared to be over on December 24th, when the discount rate fell from 10 to 8 per cent.

In contrast with the 1847 crisis, that of 1857 took a far more serious toll on the commercial world, even though its monetary consequences were comparatively unimportant. Its monetary causes were considered by a Parliamentary Committee and their conclusion, on the positive side, was that the main effect of the 1844 Act had been to force the Bank to keep a larger bullion reserve than previously, as shown by the following figures:

Crisis	Bullion Reserve
1825	£ 1,261,000
1836/7	3,831,000
1839	2,406,000
1847	8,313,000
1857	6,080,000 [72]

These figures show clearly that the reserve after the passage of the 1844 Act was significantly higher than it had been previously, even though it reached its peak in 1847 and was below this figure by 1857.

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[72] Source: Feaveryear (1963), pp.296.

The Committee recommended that there should be no alteration in the Act, but that the Bank should alter its discounting practice. In recent years the Bank had extended discount facilities to the bill brokers.[73] However, in the 1857 crisis it had been the bill brokers which had imposed the greatest strain on the Bank. Thus the latter announced that it would undertake no discounting from bill brokers, although it would continue to lend to them in the quarterly periods of pressure.[74] It also accepted that it should make loans to the brokers in times of crisis. This was an attempt by the Bank to withdraw from the market: its intention was to make the bill brokers hold their own reserves and be less dependent on the Bank of England, thus decreasing the latter's responsibilities as a LLR. In Neave's words,[75] the aim was to make the Bank's reserve "more within her own compass".[76]

This showed a misunderstanding about the position of the Bank within the system, as in a period of stress the same pattern of events would occur even with the bill brokers holding a reserve: they would attempt to increase their reserve (as the banks did already) by liquidating bills and securities, and thus the Bank of England would be forced into the same position. This was basically a final

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[73] The precursors of the Discount Houses.

[74] When the gilt edged market was tight due to the closure of transfer books in order to make up dividends.

[75] The Governor of the Bank of England.

[76] Quoted in Wood (1939), pp.132.

hopeful attempt by the Bank to evade a certain part of its responsibility as a LLR. After this time the validity of this role was never really questioned by the vast majority of bankers, both inside and outside the Bank.

13: The Crisis of 1866

The events of 1866 depict a crisis very different from any other so far discussed. This time the cause of the crisis could not be found in an external drain or an ov r-export of bullion: it was purely and simply a credit pa ic, with the failure of **Overend Gurney** threatening the st bility of the whole system. Even though in reality most of the banks and other financial intermediaries were sound, this panic was the most severe of any of the nineteenth century crises.

Overend Gurney were a very well established firm of bill-brokers, set up in the late eighteenth century as the result of a linkag betwe n the **Gurney Bank** (based in Norwich) and **Richardson Overend & Co.**, a London bill-broker. The resulting firm expanded rapidly over the next fifty or so years, becoming one of the major London bill brokers, well respected throughout the City. However, during the mid-1850s the original heads of the firm, under whose direction the expansion had taken place, retired or died, and their replacements soon showed that they were lacking in some of their predecessors' business acumen. Their problems started in 1860 when they fell foul of the Bank of

England's change in discount policy with respect to the bill-brokers, and later started to get involved with the emerging finance companies, lending on extremely dubious security. An attempt to remedy their uncertain situation was made in July 1865 when a decision was made by the partners to go public, a move which was successful in attracting increased share capital.

At this point most people felt Overend Gurney to be the very model of a successful firm, but to insiders it c me as no surprise when the firm was forced to appeal to the Bank for assistance on May 10th 1866. This was the culmination of a period of very heavy trading on Overend Gurney shares in particular, but also on finance securities in general. Interest rates increased from 3 to 8 per cent during the second half of 1865, but the event that actually prompted Overend Gurney's failure was in fact unrelated to them: in January 1866 the firm of **Watson, Overend & Co.**, a Liverpool railway contractor, went down, and although there was in reality no connection between the two companies, rumours were rife as to the possible failure of Overend Gurney.

Overend Gurney's request on May 10th for an immediate loan of £400,000 was refused by the Bank of England, who judged them to be insolvent, and so they failed, with liabilities in excess of £5m. To certain Bank Directors who had inside knowledge of the deterioration of Overend Gurney's fortune, the failure of the famed bill brokers came as no real surprise; in fact, they had been expecting

it for months. With this in mind, the Bank had taken the precautionary measure of building up its reserve in the early months of 1866, and by May the bullion stock stood at approximately £12m, thus establishing a reserve that would probably have been sufficient to cope with the crises of 1847 or 1857.[77]

Overend Gurney's failure sparked off a wave of crises in other banks and finance houses in two distinct strands: firstly the country banks with direct links with Overend Gurney, and secondly these country banks then initiated a run on London banks and the Bank of England. This all occurred very quickly: the Bank's note issue fell by an amount in excess of £3m in a single day. Bank Rate was immediately increased from 8 to 9 per cent, and the Bank continued to discount freely. However, late on Friday May 11th the issue of a Letter of Indemnity was announced, after **Gladstone** (the Chancellor) had been besieged by requests for such a measure from various groups of bankers. This step was taken even though the Bank itself tried to avoid it, but its note reserve was now below £3m and so it was in effect faced with no choice. Bank Rate was increased to 10 per cent on May 12th, when the reserve stood at £1.2m, but the fiduciary limit was never broken, even though between May 10th and 14th the Bank advanced

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[77] This is an important point, since it shows that the Bank of England was taking the initiative with respect to its actions as a LLR. Had the crisis when it eventually arrived been less serious, the Bank would probably ridden the storm fairly easily.

£2,874,000 on securities and £9,350,000 in discounts.[78] The reserve was slow in returning to its previous level: Bank Rate stood at 10 per cent until August 16th, when it fell to 8 per cent, at which point the reserve was still only £4.6m.[79]

The report of the Bank of England's Special Discount Committee on the State of the Discounts for the year 1866 shows, unsurprisingly, an increase in most of the relevant discount variables over their values in the previous year. There were sixty-five more firms discounting in 1866 and an increase of over £7m in the amount discounted. The interest income received by the Bank for discounts and for advances also increased. Although the highest level reached by Bank Rate was 10 per cent, the Bank did carry out some business at rates higher than this: 1.32 per cent of its discounts for the year took place at 10.5, 11 or 12 per cent. By far the greatest proportion of its discounts (47 per cent of the annual total) were carried out at 10 per cent however. A total of thirty-six of the Bank's discounters suspended payments over the year, compared with twenty in 1864 and eighteen in 1865.[80]

The Bank of England's conduct throughout the crisis was seen from all sides as being very good, with the exception of a short period on Friday May 10th when a

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[78] Morgan (1943), pp.180.

[79] Op cit, pp.180.

[80] All the data given here comes from the Minutes of the Special Discount Committee, 13th March 1867: Bank of England Archive reference C35/5 pp 49-59.

rumour circulated that the Bank would not advance on government securities. This was subsequently denied by the Bank. In general though, even erstwhile critics of the Bank, such as The Economist magazine, felt its conduct to be satisfactory, as voiced in the following quote:

> **"....their policy has been sound, cautious and admirable. They have given mercantile and banking accommodation, as their accounts show, to an unprecedented extent, considering the shortness of the time under consideration, and the rapidity of events within it."[81]**

The Bank had discounted freely throughout the crisis, and could not be blamed, as it could on other occasions, for failing to react early enough or not following the correct course of action: in short, for not acting as a lender of last resort. As for Overend Gurney, it could be postulated that they were in some senses just unlucky: they had been badly managed and so deserved to fail, but there had been other tensions in the banking system in the early 1860s,[82] and it is possible that a serious crisis would eventually have arrived irrespective of the Overend Gurney failure.

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[81] The Economist, 19/05/1866.

[82] For example the American Civil War.

14: The Position of the Banking System by 1870

Over the period of two centuries so far discussed the British banking system progressed extensively, to the point where it demonstrated an increasingly high level of sophistication. In the area of the relationship between the Bank of England and the rest of the financial system, the situation by 1870 was very much as we know it today, with the Bank at the centre of the system, acting as a lender of last resort when necessary, having accepted, at least partially, its responsibilities in that sphere.

However, this transition was not smooth or even well established by 1870: as late as 1866, Thomson Hankey, a Director of the Bank of England, in answer to The Economist's statement that it was the duty of the Bank of England to provide liquidity o the banking system whenever it needed it, called this "the most mischievous doctrine ever broached".[83] Hankey was supported in this by G.W.Norman,[84] another influential Bank Director. Their general view was that in its management the Bank should be made to resemble as closely as possible a well run private bank. Furthermore, they felt that the system as a whole should not be allowed to be dependent on the Bank of England to rescue it in times of trouble. Although at the time these arguments were seen to be somewhat out of step

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[83] See Hankey's Principles of Banking (1857): a republished text of a lecture given in 1858.

[84] The Economist, 22/12/1866.

with contemporary thinking, since it seemed that by this point the Bank had accepted its lender of last resort role, with hindsight it could be postulated that Hankey was merely postulating the problem of moral hazard.[85]

Hankey's outburst can be regarded as the final episode in the discussion as to the relevance of the 1844 Act. After 1870 there was never again any serious proposal of the Currency School doctrine as embodied in the Act. It was generally accepted by bankers and financiers that the position of the Bank of England was quite different from that of any other bank in that it held the system's only sizeable reserve and was the ultimate source of its liquidity. The Bank itself seemed to have accepted that in times of difficulty it should support the system by "lending freely at high interest rates". This did not mean however that there was any formal announcement or dramatic change in the Bank's policy with respect to the rest of the system. The way in which these changes occurred, together with their effects, are the subject of the remainder of this thesis.

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[85] See Chapter Two.

CHAPTER FOUR

THE FINANCIAL SYSTEM 1870-1914 AND THE DEVELOPMENT OF THE ROLE OF THE LENDER OF LAST RESORT.

1: Introduction

The objective of this chapter is to detail the development of the lender of last resort and of the U.K. banking system over the period 1870-1914, that period during which Bagehot's ideas were being assimilated into the normal practice of the Bank of England. This involves a consideration of the extent to which the Bank had accepted the "Bagehot rules",[1] either implicitly or explicitly. B fore Bagehot, policy decisions had been taken somewhat arbitrarily, and any successful policy stance had been arrived at largely as a result of trial and error. Although Bagehot himself was responsible for the formulation of the first set of "rules" concerning what action should be taken by a central bank during a financial crisis, Henry Thornton had been advocating very much the same sort of policies three-quarters of a century earlier[2]. He, though, did not possess the advantage of being editor of one of the most important vehicles for the dissemination of commercial and financial information, The Economist.

The discussion below will in general be drawn from secondary historical sources, although some material from the Bank of England's archives is included.

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[1] To **"lend freely at high rates"** in the case of an internal drain, or to **"protect the reserve"** for a drain that was external in origin.

[2] in Paper Credit, published in 1802.

2: The Position at the Start of the Period.

By the early 1870s, the pre-eminent position of London at the centre of the international capital markets was well established. The trend towards external domination of the UK financial markets had started in the 1850s, but had especially gathered momentum after the Overend-Gurney crisis in 1866.[3]

Until the French defeat at the hands of the Prussians in January 1871, Paris had been the only major competitor for London's central position. The war however, together with the agreement of the French indemnity, which was largely financed through London, effectively put a stop to the development of Paris as a major financial centre.[4]

Domestically, the Bank of England was established as the central pillar of an increasingly sophisticated financial system. In the words of **Leoni Levi**, the Bank was a **"...banque de luxe in ordinary times, and of dernier ressort in times of crisis"**.[5] The latter duty was generally recognised to have been accepted by the Bank of England by the early 1870s, as a result both of its actions during

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[3] External in this sense means that many of the determining influences in the London financial markets had their origins abroad, rather than being solely home-based.

[4] This was due to the fact that most of France's internal financial resources were utilised in organising the payment of the indemnity to Germany, which had been set at approximately £200m. There was little time, energy or resources left for the continuing development of Paris as a major financial centre.

[5] Gilbart lectures, 1878. Quoted in Powell (1915), pp.492.

the Overend Gurney crisis and of the publication of Walter Bagehot's Lombard Street in 1873. There was however some dissent from this view of the Bank's overall responsibility to the financial system, voiced mainly by Thomson Hankey, as has already been discussed in an earlier chapter.

The strengthening of London's position in the international sphere can be regarded with hindsight as the single most important development affecting the Bank's management of the London money markets throughout this period. By 1870 London was the sole place of refuge for what was known as "hot" money: fluid international capital, and was also the greatest free gold market of the world.[6] The latter factor meant that newly mined gold would at least pass through London, with much of it remaining there, especially if there was a favourable change in the exchanges. The negative aspects of this situation were substantial however: the Bank of England's reserve was subject to much greater fluctuation than might otherwise have been the case as a result of these swiftly changing external influences, especially when gold imports and exports did not coincide.

The realisation of the power of Bank Rate in influencing the movement of both internal and external capital flows and thus affecting the size of the Bank of England's reserve came about during the third quarter of the nineteenth century. Initially its power was only

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[6] That is, gold could be obtained at all times and in any quantity.

recognised during a period of market tension as being important in strengthening the reserve, but later it came to be realised that the reserve could be protected at all times through the pursuit of an active Bank Rate policy.[7] The pursuit of this policy was not helped in the early 1870s and 1880s however by several institutional factors that served to weaken the link between Bank Rate and market rate. Firstly, one consequence of the move by the Bank in 1858 to make the discount houses more self reliant was the loss of much of the day-to-day market contact that the Bank had previously enjoyed, thus making it more difficult for the latter to make its views felt in the market. Secondly, the Bank's position as the "market leader" had been completely eroded as a result of the massive growth of the joint stock banks and of the discount houses, with a corresponding decline in its market influence. Finally, throughout this period and especially in the last two decades of the century, the Bank was at all times concerned about its income, a constant preoccupation being that its dividends were rising at a much slower rate than those of the joint stock banks.[8] This last factor was a force that

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[7] An active Bank Rate policy can be regarded as one where the central bank utilises changes in its discount rate in order to influence the course of the foreign exchanges. Thus if the Bank of England wanted to attract gold to Britain, and more particularly into the Bank's vaults in order to strengthen the reserve, it would increase Bank Rate. The opposite applies when the aim is the reverse.

[8] Various attempts to increase the Bank of England's volume of business were made: in 1878 it was decided to give discounts at market rate (less than Bank Rate) to

(continued...)

did not generally act to the benefit of the Bank itself or the system as a whole. It frequently prevented the Bank taking an independent position, especially with regard to the use of open market operations in order to make Bank Rate effective with respect to market rate.

The combination of these three factors meant that the Bank of England's level of market control in the latter part of the nineteenth century was not perhaps as great as it might have been. The Bank was helped however by the fact that the linkages between market rate and its gold reserve were particularly strong during this period. This was partly due to the importance of London in the international sphere: foreign lending was very sensitive to changes in the market rate and to disparities between rates in the various financial centres, and also because high rates in London had a powerful effect in drawing cash in from the country bankers. The latter followed a policy of sending cash to London when interest rates were relatively high, especially now that transport and communication networks had improved sufficiently for transactions costs to be less important.[9]

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[8](...continued)
those customers keeping their sole discount account at the Bank of England. This privilege was extended to such customers at the branches in 1888. The discount houses were re-admitted to re-discounting facilities at the Bank in 1890.

[9] The importance of this phenomenon was at its peak in the third quarter of the nineteenth century. By the start of the twentieth century its effects were insignificant. For further information on this subject see Sayers (1957) chapter 2.

3: 1870-1879 - Description and Market Control

This period saw the occurrence of two periods when there was an increase in tension in the financial markets, one fairly minor but the other rather more serious, and both very different in nature. The decade started with the outbreak of war between France and Prussia (July 1870), which was accompanied by a slight (precautionary) rise in interest rates, although this war did not have serious implications for Britain: she was at all times merely a spectator.[10]

After 1873 the decade was characterised by falling prices, the major facet of the period which has been described as the "Great Depression".[11] From the middle of the century up until 1873 prices had been rising, especially after 1866, reaching their peak in 1873. Thereafter, there was a fairly rapid fall until the end of the 1880s, followed by a somewhat slower decline.

The first period of market tension occurred in 1873. It originated on the continent, and was accentuated by the pressures the financing of the French war indemnity was putting on the system. By this point the effects of the crisis were being felt all over Europe, and by September it

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[10] The fact that Britain would not be involved in the Franco-Prussian war was not known with certainty at the outset of the war, hence the precautionary rise in interest rates.

[11] For example, Morgan (1943), chapter 9. This trend of falling prices was of course superimposed on cyclical fluctuations.

had spread to the New York markets. The Bank of England had felt fairly safe during the continental problems, and after increasing Bank Rate to 7 per cent in June, lowered it (by ½ per cent falls) to 3 per cent in August.

However, by September the continental crisis had once again gathered momentum and was greatly affecting the American markets, especially in New York, leading the Bank of England to increase Bank Rate once more: from 3 to 4 per cent on September 25th and 4 to 5 per cent on the 29th, eventually reaching 9 per cent on November 7th. In London the panic was confined to the Stock Exchange: there was no generalised financial or credit panic, although in New York the situation was rather more serious, with large scale bankruptcies of both financial and commercial firms.

The period of large scale activity on the London Stock Exchange was shortlived: by the beginning of January 1874 Bank Rate was once again back at 3½-4 per cent, the "normal" level for the period. The Bank of England had discounted where necessary, but the reserve was always large enough to cope with any difficulties.

The next few years were quiet, both at the Bank and in the markets as a whole. In the economy prices were falling, especially between 1873 and 1875 and at the end of the decade, and Bank Rate hovered around the 3-4 per cent level, although market rates were somewhat lower than this.[12] By 1876 the reserve had climbed to an unprecedented

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[12] One reason for the (relatively) high level of Bank Rate compared to market rates was that the Banque de France (continued...)

peak of almost £22m, though it fell later in the decade after an efflux of gold.

The second period of marked financial tension occurred in 1878-9, with the failure of the **City of Glasgow Bank** in October 1878. This bank had been viewed as being "suspect" by the Bank of England since the 1857 crisis when it had first suspended payment, at which time the Bank had refused to help it. Some observers felt that it had never been totally solvent since its initial problems, and by the time it failed completely it was a clear case of fraud and bad management. Its manager and directors were successfully prosecuted and jailed: only the second time in British joint stock banking history that bank management had been punished in this way.[13]

Shareholders in this problem bank suffered greatly from its failure: for every £100 share they had to find £2750, and only 254 of the 1819 shareholders were still solvent when the bank's business was finally sorted out.[14] Data on the bank's position when it failed makes fairly startling reading: against its liabilities of £12.4m it had assets of only £7.2m, with advances at 132.7 per cent of deposits. Of its liabilities almost a half were owed to the bank by only three firms: **Morton & Co.** (£2,173,000), Smith

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[12](...continued)
was trying to attract gold to Paris, to the detriment of the Bank of England's reserve. This was especially so in 1874-5, but equally applied at any time when other European banks were keen to attract gold to swell their reserves.

[13] See Clapham (1944), Vol.II, pp.410, footnote 2.

[14] Checkland (1975), pp.471.

Fleming & Co. (£1,968,000) and **James Nicol Fleming & Co.** (£1,238,000).[15] Depositors with the bank were however eventually paid in full, and the episode marked the end of unlimited liability in banking: hereafter there was a move towards limited liability.

The combination of all this bad banking practice led to a succession of adverse rumours regarding the bank's precarious financial position, and culminated in its stoppage on October 1st 1878. This precipitated a financial crisis that was however by and large confined to Scotland, with a higher than normal number of bankruptcies in the following two years. A committee was established to divide up the City of Glasgow's branches, one hundred out of one hundred and thirty-three of which were re-opened under the ownership of the remaining Scottish banks.

The failure of the City of Glasgow Bank did not have any major repercussions on the English financial and commercial world. The Governor of the Bank of England, **Edward Howley Palmer**, raised Bank Rate from 5 to 6 per cent on October as a precaution against the Glasgow failure, which had in any case coincided with the normal period of autumnal pressure, and this rate remained for five weeks. There were fairly large demands made on the Bank of England's reserve, but not enough to cause a crisis in the

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[15] Op cit, pp.470. An account of events preceding the failure can be found in the above book. See also Anderson & Cottrell (1974) pp.308-312, where an extract from the Banker's Magazine is reprinted, and Collins (1987), who gives a detailed analysis of the country-wide effects of the failure.

financial markets, and the reserve quickly recovered: it fell to £8.5m in October 1878, but had risen to over £21m by July 1879.[16] Bankruptcies in England were high, but no higher than the previous year.

Thus by the end of the 1870s it seemed that the Bank of England had gained control of Bank Rate as a weapon with which to influence the size of its reserve. Its hostility towards the bill market had reached a peak after the 1857 crisis, many of the causes of which were blamed on the bill brokers. By the late 1870s this hostility had receded, partly as a result of the Bank's concern over its income, although full re-discount facilities were not restored to the discount houses until 1890. This concern about its income arose after a period of slow increase in its dividends. As long as market rate was above the Bank of England's discount rate,[17]

the Bank had no real worries about its income since Bank Rate was low enough to ensure a continual supply of bills without any reliance on the business of the bill brokers. However, once the reverse occurred (ie Bank Rate lower than market rates, as the case after 1872), concern over income became prevalent. It was at this point that various suggestions were made to increase the eligibility of the bill brokers, for example to let them become regular customers of the Bank and thus keep a reserve there. This proposal was never taken up however, although when, in

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[16] Morgan (1943), pp.200.

[17] See Figures 6.0(a) and (b) in Chapter Six.

1878, the Bank decided to start discounting at less than market rate for those customers keeping their sole discount account at the Bank of England,[18] the Court decided to revert to the pre-1858 policy with respect to the bill brokers. Discount facilities were still withheld: the bill brokers were to be allowed to receive only advances at the B nk. This facility was again withdrawn from them in 1883, w n the Bank decided to restrict advances, except at the q arterly shuttings, since it was felt that the bill b okers had again come to rely on the Bank far too much.[19]

This last change was made even though the Bank's c ncerns about its income had not receded. In fact, by the mid 1880s there was an even greater margin between Bank Rate and market rate,[20] implying that the Bank had even more difficulty in attracting business than previously. This led to calls in the financial press for the Bank to intervene in the money markets more frequently in order to make Bank Rate more effective.[21] The end result of these demands was the decision on July 24th 1890 to re-admit the

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[18] By now a relatively small number. This move was another indication that Bank Rate was frequently higher than market rate.

[19] See Table 3.2 later in this chapter for a summary of Bank of England discount regulations.

[20] Gregory (1929), Vol.I, pp.xxxiv.

[21] The Statist, 29th November 1890, pp.613. In this sense "making Bank Rate effective" is concerned with the extent of the Bank's influence on the market: market rates should be seen to be "ruled" by Bank Rate in an attempt to avoid situations where market rates are at significantly lower levels than Bank Rate, which could cause problems for the Bank's management of the Gold Standard.

bill brokers to discount facilities, initially on short term bills (fifteen days maximum) but later on longer dated paper.[22]

The decision to re-admit the bill market was taken by **William Lidderdale**, one of the most active of all the Bank's Governors, who realised that in order to make Bank Rate effective in the market the Bank could not remain aloof from it. Thus the new policy had two advantages: it facilitated an increase in the Bank's income, and it gave the Bank a greater level of market control.

The fact that during much of the 1880s Bank Rate and market rate were not very closely correlated is a confirmation of the reasons why, when writing Lombard Street, Bagehot did not place much faith in the possibility of a Bank Rate policy bringing about an increase in the reserve.[23] He was aware of the weakness of the links between Bank Rate and market rate, as already outlined, but the change in discount rules in 1878 (after his death) enabled the Bank to increase its market contact. More importantly, the fact that the Bank's reserve was very responsive to changes in market rate meant that as soon as the Bank did act to get a change in Bank Rate reflected in the market rate,[24] the change in the reserve was brought

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[22] The term was extended to sixty days in 1895 and later to three months, which is the modern practice.

[23] Bagehot was in favour of an increase in the reserve per se.

[24] Through the use of open market operations (borrowing money at call on the open market) to force up (continued...)

about quickly and was substantial. This enabled the Bank to control the level of its reserve far more easily than previously.

4: The Market in the 1880s

In the first year of the decade it seemed as though there might be a check to the general fall in prices, but this proved to be slight and shortlived: prices recovered in 1880 but resumed their downward trend soon after, reaching a much lower level in 1884 than had existed in 1879. Interest rates were in general low, market rates being frequently lower than Bank Rate, and the level of the Bank of England's reserve continued to be of worry to financial commentators.

As might be expected given the low rates prevailing at the time, the Bank's problems as to the level of its income did not recede during the 1880s. The level of discounts and advances was low, the number of discounters having fallen from 450 in 1840 to 206 in 1888.[25] Various attempts were made to increase the Bank's business, such as the decision in 1884 to make the 1878 change in discount rules for customers keeping their sole discount account at the

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[24](...continued)
interest rates, the price of bonds being inversely proportional to the rate of interest.

[25] Clapham (1944), Vol.II, pp.321-2.

Bank,[26] apply not only to those customers at Threadneedle Street but also to those at the branches. This had negligible effects however, since the discount business at the branches was not, and never had been, great.

The most important event of the decade concerning relations between the Bank of England and the government was **Goschen's** debt conversion in March 1888, which dealt with almost £600m of debt. The reason it was carried out at this time was that interest rates were very low: Bank Rate stood at 2 per cent. One benefit accruing to the Bank from the conversion was a limited amount of income, something always welcomed by the Bank, concerned as it was about its level of dividends. The Bank's final commission was £112,000, a fairly modest amount considering the extent of the work undertaken by Bank staff.[27]

The early months of 1888 marked the end of the period of low interest rates: Bank Rate was not to stand at 2 per cent again until April 1892. The era of cheap money was followed directly by an economic boom, leading to a fall in unemployment and an improvement in trade. Throughout 1889 loans to both English industries and to foreign countries were very high, a factor that was to contribute towards the propagation of the Baring crisis in November 1890.

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[26] They were allowed to receive discounts at less than Bank Rate.

[27] Clapham (1944), Vol.II, pp.319-321.

5: The Baring Crisis - Causes, Passage and Aftermath [28]

The Baring Crisis is one of the most important and well documented episodes of British banking history. The house of Baring, one of the greatest of City names[29] and one that had frequently supported and aided the Bank of England (especially regarding the purchase of gold from other central banks),[30] was forced to appeal to the Bank for help on the 8th November 1890.

The origin of the firm's problems lay in heavy investment abroad, especially in South America. Barings was not the only company involved in South American investment, but it was certainly the one most deeply implicated by the area's problems. Loans had been issued to many South American companies, the status of some of which was, at the very least, dubious, but the loans appeared more secure because they were underwritten by London Issuing houses. Out of approximately £100m of sterling loans made to the River Plate Republics between 1880 and 1890, Barings was

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[28] For excellent accounts of the crisis see Clapham (1944), Vol.II, pp.326-39, and Pressnell (1968).

[29] In 1819 the Duc de Richelieu had said **"there are in Europe six great powers - England, France, Russia, Austria, Prussia and the Baring Brothers".**

[30] In 1825, and again in 1839 Barings, together with members of the Parisian "Haute Banque" (a group of approximately twenty institutions specialising in monetary affairs and especially in dealing in bills of exchange) had set up transactions whereby the Haute Banque sent gold to England. In 1839 for example, the Haute Banque sent some FF48-50m to the Bank of England, which helped the latter maintain payments during the 1839 crisis.

involved in approximately 30 per cent,[31] the greatest involvement of any individual bank.

By late 1890, three-quarters of Baring's asset portfolio consisted of Argentinean and Uruguayan loans. Thus, when the South American countries started experiencing problems in servicing their debt in early 1890 Barings were immediately involved.[32] The South American situation deteriorated over the following few months: a run on the banking system in Argentina was followed by the dispatch to London of a representative of the National Government, Dr. Plaza, to discuss the situation. Dr Plaza's aim was to secure further loans for Argentina to enable them to continue interest payments, but Barings refused this. By this time (early November) their situation had become precarious: the value of their assets had fallen substantially due to the significant decline in the value of the South American securities, and their income had also fallen due to the absence of much of the revenue from the River Plate financing. The Directors of Barings had begun to realise the extent of their problems before Plaza's arrival in early November: it was common knowledge in the city that Baring Brothers had received a sizeable loan from another large company in October.[33]

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[31] Batchelor (1986).

[32] There is a obvious parallel to be drawn here with the Latin American Debt crisis of the 1980s, when Western, particularly North American, banks lent huge sums to South American countries.

[33] Clapham (1944), Vol.II, pp.327.

On Friday November 7th there was a state of general uneasiness in the financial markets, with speculation as to the possible difficulties of a major house. Baring Brothers bills were coming in fast. The following day one of the Directors of Barings, **Lord Revelstoke** met with **Lidderdale** and with **Everard Hambro**,[34] at Threadneedle Street. At that meeting Revelstoke informed Lidderdale of Baring's difficulties. A meeting with the Chancellor was arranged for the following Monday (November 10th), when a clearer picture of Baring's situation was to be presented.

At the Monday meeting **Goschen**, the Chancellor, offered Lidderdale a Chancellor's letter,[35] which was refused. The Bank's reserve at this point stood at only £10,815,000, a level inadequate to meet the vastly inflated demand for discounts that would result if doubts arose as to the worthiness of Baring Brothers credit. It was decided that the Bank and the government would act only it were found that Baring's were in fact solvent, and to this end **Benjamin Bucke Greene** and **Bertram Currie**[36] were dispatched to undertake an "audit" of Baring's position, in order to determine whether they were insolvent or merely illiquid. Lidderdale also asked Goschen to try to arrange for Rothschilds to obtain an amount of gold from the Banque de

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[34] E.C.Baring, the Governor of the Bank of England, and a Director of the Bank respectively.

[35] Releasing the Bank from the constraints of the 1844 Banking Act.

[36] A former Governor (1874-6) and a director of the firm Glyn, Mills, Currie, respectively.

France. By Wednesday 12th £3m of gold had been borrowed in Paris and a further £1.5m bought from Russia .

By the middle of the week the precarious nature of Baring's position had still not been made official. The financial press knew that something was happening, since the existence of the loan from the Banque de France was common knowledge, and many people suspected that the trouble might involve Baring Brothers, since many of the latter's bills were being brought in for discount. By Friday 14th November it seemed that the markets were more certain as to Baring's involvement, since there was heavy discounting of their bills, and on the 15th an official statement was made.

Baring's real position had been ascertained the previous Wednesday morning, when Greene and Currie had presented their report. It seemed that the firm was fundamentally solvent (in terms of assets exceeding liabilities), but that a large injection would be needed to ensure their survival: Revelstoke had mentioned £6m as an appropriate figure, but Greene put it at between £8-9m. The latter thought it was unlikely that Barings would be saved, as the amount needed was so great, but Lidderdale was of the opinion that they should continue in business provided that a guarantee could be organised. In this way the Bank could execute its aim of making sure that the firm was reasonably solvent and then organising a fund to ensure its continued existence.

From the start of the episode it was certain that

neither the Bank nor the government would act, independently or together, to save Barings: the scale of their business was too great for either of them to undertake responsibility. The only solution lay in the formation of a guarantee fund, and, with this end in mind, on Friday 14th November Lidderdale asked the government to assume joint responsibility with the Bank for the risk of loss on Baring's liquidation. The government was not keen to accept this responsibility, and the Prime Minister repeated his offer of a Chancellor's Letter, which was again refused. Eventually they acquiesced and agreed to bear half the cost incurred on any Baring Brothers bills discounted between that time and 2pm the following day. Lidderdale himself set about raising the guarantee fund.

The Bank headed the list of guarantors with £1m, and by 5.30pm Lidderdale had promises of a further £2,250,000. The final total, reached in December, was over £17m and was made up as shown in Table 4.1.

The formation of the guarantee fund was presented as a "fait accompli" to the press and public at large, thus avoiding any real panic. Bank Rate never rose above the 7 per cent that was announced on November 7th. By July 1891 it stood at 2½ per cent.

Baring Brothers itself was liquidated and a new Company, **Baring Brothers and Co. Ltd** was formed with a share capital of £1m. The terms of the original guarantee allowed for a liquidation period of three years, but by the beginning of 1893 it had become obvious that Baring's

affairs were not going to be cleared up inside the three year period, and so the Bank of England started negotiations for an extension to the guarantee period. This proved to be a more difficult task than was first thought: several of the original subscribers to the guarantee were unhappy at the rate of progress being made in the liquidation. A years' extension was eventually obtained however, with an option allowing the Bank to extend it for a further twelve months.[37]

By the summer of 1894 renewed doubts were being expressed as to the slowness of the liquidation: in a letter to Barings, Powell, who had become Governor in 1892, noted that there had recently been relatively few sales of securities, even though there were securities available that could be sold.[38] This comment is an indication of the pressure that the Bank was starting to exert on Barings, for by this point even the former felt that progress should be faster.

The liquidation process was finally completed in January 1895, two months into the extra year allowed for under the extension agreement. Letters of thanks were exchanged between Baring Brothers and the Bank, between the Chancellor of the Exchequer and Lidderdale, and between Goschen and Lidderdale, congratulating the latter on a successful completion of the liquidation operation.

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[37] Up to November 1895.

[38] Baring Papers, Bank of England Archive Reference G15/192, folio 71a. (26/07/1894)

The guarantee had enabled Baring Brothers to pay off all their liabilities at maturity: Barings were never **insolvent**, merely **illiquid**. There had been a problem during the initial stages of the liquidation however: a mistake was made in the initial "audit" in calculating the extent of Baring's liabilities.[39] Six weeks after Greene and Currie had established what they thought was Baring's true position, Francis Baring informed Greene that the liabilities were approximately £1m more than Barings had stated, an oversight that was apparently the result of a genuine mistake. By that point it was too late to stop the process of liquidation as backed by the guarantee fund, and in any case the apparent surplus was still considerable. In the event, the underestimation proved to be less than was first thought: the 14th November statement gave a surplus of £3,807,328 which was corrected to £3,220,125 on 11th December, a difference of £580,000.[40] The eventual surplus was much less than either of these two figures, at around £1m.

Contemporary comment on the affair was practically unanimously favourable towards the Bank, but with some criticism of Barings for allowing their business to deteriorate to such an extent that the support of the whole financial system was necessary. The Economist in particular was critical of Barings:

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[39] Letter from B.B.Greene to Lidderdale, 12/02/1900. (Reference G15/192, folio 177.)

[40] Op cit, folio 178.

> "We feel unable to join unreservedly in the chorus of condolence which has been raised this week over the collapse of Messrs. Baring Brothers. It is, indeed, a pity that such a great house should have been brought so low, but it would have been still more to be regretted if the punishment for the errors that have been committed should have fallen, not upon those responsible for them, but on innocent parties. Had Messrs. Baring Brothers been able to shift the burden of their South American obligations upon the investing public they would now have been standing erect. ...We do not seek to blame Messrs. Baring Brothers because they were not satisfied with the safe and magnificent business that their splendid merchant banking business yielded. It is now seen that they acted very unwisely, but temptation to add riches to riches is hard to resist, and for whatever errors of judgement they committed they are now being made to suffer... we feel bound to say that it is better that things should have turned out as they have done, than that the Barings should have succeeded in relieving themselves from the evil consequences of their own rashness in the pursuit of wealth, at the expense of confiding investors."[41]

They also felt that the terms of the guarantee were too far reaching and that there was some indication that the assets of the firm were to be "nursed" over a period of time, together implying the problem of moral hazard. There was a warning too from The Times:

> "What happened in their (Baring's) case must not be taken as a precedent applying to smaller firms or institutions. Neither would it apply to an equally large firm if its liabilities were the result of something more than a "lock up". It must be remembered that Messrs. Baring possessed a large amount of really valuable assets, though many of them were of practically no value for the moment, as they were useless as security for loans, being at present unmarketable..."[42]

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[41] The Economist, 22/11/1890.

[42] The Times, November 25th 1890.

It was therefore generally agreed that the Bank of England was justified in its actions in initiating and organising the rescue of Baring Brothers in November 1890. The new company formed, Baring Brothers & Co. Ltd.,went on to enjoy continued success, taking up where the liquidated company had left off. Lidderdale's reputation was made by his actions, which had started to bring in a new spirit of co-operation between the institutions in the financial markets. These institutions had for the first time come together in order to secure the common good - the stability of the financial system, without thought to commercial rivalries. This was in marked contrast to their behaviour during previous crises, such as in 1866, when their actions had been de-stabilising rather than stabilising. The episode as a whole was to inspire a new outburst of discussion of banking matters, much as had happened after the 1866 crisis, as will be seen in the next section.

Table 4.1 The Baring's Guarantee Fund.[43]

Bank of England		£1 000 000
Banks:	London	5 650 000
	Country	1 685 000
	Scottish	2 100 000
	Colonial and Foreign	1 700 000
Discount Houses		890 000
Finance Houses, Merchants, etc		3 145 000
Individuals		935 000
		£17 105 000

[43] Source: Bank of England Baring Papers, File 3, folio 78.01.

6: After the Baring Crisis - The Bank in the 1890s

Although the panic element of the Barings affair was quickly dampened, the repercussions of the crisis continued for some time. As previously mentioned, the original firm, Baring Brothers, was not fully liquidated until January 1895, although the new company, Baring Brothers and Co. Ltd. had been in operation since soon after the launching of the guarantee fund.

The major influence that the crisis at Barings had on the financial system was to re-open the question of the level of bank reserves and the extent to which the financial institutions should be dependent on the Bank.[44] As the initiator and later co-ordinator of the guarantee fund, Lidderdale, towards the end of his Governorship, which had been extended for a year in 1891, was keen to further the new spirit of co-operation that seemed to have emerged between the Bank of England and the rest of the financial system during the crisis. His primary concern was that the reserves of both the Bank of England and the commercial banks were inadequate, and in an attempt to make the banks hold larger reserves he was keen to force them to publish regular accounts, preferably on a monthly or even weekly basis. Goschen, too, was involved in trying to force higher reserves: in a notable speech given to the Leeds Chamber of Commerce he spoke of the need for larger

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[44] For an extensive discussion of Lidderdale and Goschen's efforts to increase both Joint Stock and the Bank of England's reserves, see Pressnell (1968), pp.208-217.

reserves to guard against unforseen circumstances.

At the same time that pressure was being brought to bear on the commercial banks to keep higher reserves, Lidderdale was also trying to bring about an increase in the Bank of England's reserve. With this end in mind he suggested to the Bank's Court that a committee should be set up to consider the current and future state of the reserve, together with any possible measures that could be utilised in order to improve its position. In Lidderdale's words, this committee was to report on whether:

> **"... it is possible to introduce amendments in the practice of the Bank as regards the facilities granted to the public, especially with regard to the admission of brokers and discount houses for advances."[45]**

Thus it was to be a "special committee with respect to the maintenance of an adequate reserve". The committee was appointed and was to consist of Benjamin Buck Greene, Lidderdale, Goschen, Wallace and Birch.[46] However it made no formal report back to the Court and thus it is doubtful whether it ever formally met. Lidderdale's attempts towards bringing about a strengthening in the Bank's reserve position, a move which after all had been regarded as being of fundamental importance by Bagehot in the early 1870s,

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[45] Lidderdale to the Bank's Court of Proprietors, 19/01/1893.(Court of Proprietors' Minutes, Bank of England Archive Reference G4/15, pp.180-6.)

[46] John William Birch was a Bank Director for much of the period between 1860 and 1897, and was Deputy Governor and then Governor between 1877 and 1881. Alexander Falconer Wallace was a Bank Director between 1887 and 1903 and between 1907 and 1918, and Deputy Governor and then Governor between 1903 and 1907.

were therefore defeated, at least for the present.

Another committee was initiated and did meet several times in 1895 however: the **Committee on Advances**, appointed on 18th April 1895. This was set up with the aim of examining the methods currently used by the Bank in allocating discounts and advances, and to see if any improvements could be made. The background to the appointment of this committee was a desire on the part of the Bank to increase the volume of bills it held under discount, a move partly motivated, as previously, by concerns over its income.

At a meeting of the Committee on July 18th 1895 it was decided that the discount market was to be re-admitted to Bank of England discount facilities, subject to certain conditions, namely that the rate charged would be at least market rate, that bills submitted had less than sixty days to run, and that discount facilities would not be granted to the Discount Houses as of right, but rather would only be available as and when the Governor judged it to be expedient. It was also decided to allow discount houses advances on bills,[47] but that these transactions would be charged at least ½ per cent more than the current discount rate. The discount/advance figures were to be presented weekly before the Committee of Treasury.[48]

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[47] As opposed to only on securities.

[48] Data to be presented were as follows:
(i) total volume of discounts made to the discount houses since the previous meeting.
(ii) amount granted to each firm/company.
(continued...)

In this way an attempt was made both to increase the Bank's income from discount/advance business and to increase its importance in the day to day financial markets. The latter was important as a weapon with which to influence interest rate movement, and thus the foreign exchanges, as already outlined. The new measures introduced with respect to the discount houses were an extension of the decision made by Lidderdale in July 1890 to re-admit the brokers to discount facilities, but in this case for bills with less than fifteen days to run and for transactions carried out at not less than Bank Rate. Antipathy towards the erstwhile bill brokers, at its peak after the 1857 crisis, had receded almost completely by this point and it was no longer felt that they would necessarily be propagators of any financial crisis.

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[48](...continued)
(iii) average value of bills taken.
(iv) total amount of discounted bills taken from the discount houses.

Source: Court of Proprietors Minutes, 5/9/1895 (G4/118 pp. 135-6.)

Table 4.2: Summary of Discount Regulations, 1830-1931.[49]

Nov	18th	1830	Bill brokers not excluded from applying for discount accounts.
June	3rd	1841	Discount accounts for bill brokers closed. Governor empowered to discount/make advances to bill brokers at his discretion.
March	11th	1858	Bill Brokers only allowed advances at certain periods - no discounts.
June	24th	1890	Bill brokers allowed to discount bills having less than 15 days to run.
Dec	31st	1891	Discounts from bill brokers may average 15 days.
Feb	8th	1894	Average currency of discounts from bill brokers extended to 30 days.
July	18th	1895	Bill brokers may offer for discount bills having less than 63 days to run.
Sept	9th	1897	Extended from 63 to 90 days.
Oct	7th	1907	Bank of England takes only short bills from brokers.
Oct	24th	1910	Short loans and 7 day discounts at 5½ per cent (Bank Rate = 5 per cent). No other discounts for brokers.
August		1912	Governor restricts discounts for bill brokers.
Aug	29th	1912	Brokers receive 30 day bills at Bank Rate.
Feb	6th	1930	Governor agrees that the minimum average currency of bills to be accepted for discount should be increased from 21 to 28 days.
Oct.	14th	1931	Average currency reverts to 21 days (minimum = 15 days)

[49] Source: Bank of England Archive reference C29/2 folio 24.

7: Market Conditions During This Period

As earlier discussed, the financial markets were fairly quick to recover after the disruption of the Barings affair. Bank Rate had fallen to 4 per cent by early January 1891, and the average daily discount figure for December was only £30,800, as opposed to £181,000 in November.[50] In fact, the decade as a whole was characterised by low interest rates:[51] between February 1894 and September 1896 Bank Rate stood constant at 2 per cent for the whole period.

One of the major events affecting the Bank in this period was the scandal in November 1893 over its Chief Cashier, one of the most senior of Bank appointments, who was alleged to have been involved in several irregularities with respect to various companies. The man concerned, Frank May, had been employed in this post for over twenty years, and it was this apparent disloyalty from a long serving employee, together with the fact that his misdemeanors had been occurring for several years without discovery, which inspired most of the rumours that quickly spread about the City. Stories of the imminent resignation of Bank Directors quickly proved to be unfounded however, and the cashier

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[50] Source: Daily Discount Books, Bank of England Archive reference C28. See Chapter Five for an extensive discussion of these data.

[51] Bank Rate rose above 4 per cent only once between 1891 and 1899.

resigned and left the Bank.[52] The Bank itself allowed for a sum of £250,000 to cover any losses from any of the investments or overdrafts authorised by the miscreant, and the full story was published by The Economist, which finally put paid to rumours of more serious turn of events.[53]

By the middle of the decade the Bank's reserve was reaching new peaks: in September 1895 the reserve of coin and bullion in the Issue Department stood at £40m,[54] which reflected the fact that this was a period of "cheap money", thus implying a very low level of income for the Bank itself. The latter reached its lowest level of the decade in 1895-96, when the dividend was only 8 per cent,[55] as compared to 10 per cent from 1897-1904, and its profit fell to £1.375m in 1895 and £1.160m in 1896.[56]

Successive Governors were forced to take account of the Bank's low income position and to push for an increase in business, at both Threadneedle Street and at the branches. In both places what was occurring was an increase in "private" banking business, something that the Bank

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[52] It was, apparently, this event which led to the implementation of a system of internal audit at the Bank of England.

[53] For a more detailed description of the episode, see Clapham (1944), Vol.II, pp.358-63, and also The Economist.

[54] Clapham (1944), Vol.II, pp.365.

[55] Sayers (1976), Vol.I, pp.18.

[56] This profit position can be compared with that of 1890, when the Bank declared a profit of £1.495m, or with 1908, when it was £2.06m.
Source: Sayers (1976), Vol.I, Appendix 35.

itself was keen to foster as long as it did not conflict with any of its central banking objectives. This increase was most obvious at the branches, since it was here that the Bank was least demonstrably a "central bank" and most like the joint stock and private banks against whom it was competing: the branches had been set up, after all, with the aim of extending the Bank's sphere of influence. In the last few years of the century, the Agents at the branches worked hard in an attempt to retain their customers, and to this end took advantage of the fact that jobbers on the Stock Exchange were willing to pay very high daily rates on money borrowed at call from banks, which they would then use to finance their buying and selling of stocks and shares. Bank Agents started to "manage" customers funds by lending a proportion to a jobber, using the branches' own broker as an intermediary. The customer gained the advantage of a high interest rate (less a ½ per cent margin that the Bank took as its commission). In this way the Bank did not violate its rule of paying no interest on deposits, and yet still kept its customers, since one of the attractive benefits of holding an account with a joint stock bank was that they frequently paid interest even on current accounts.[57]

During the 1890s these types of transactions were widely undertaken by the Bank on a customer's behalf, both at the branches and in London. The practice was widened in

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[57] A later chapter will consider in more detail the country banks' feelings on the Bank's increased presence at the branches.

1893 when the Bank itself started lending directly to brokers, a lucrative source of income which peaked in the late 1890s when transactions were generally large and frequent. In the early years of the twentieth century this method of raising income was used less frequently however, as concern over the Bank's income had receded. Another new type of business was undertaken from 1895 when the Court authorised Governors to make advances to urban district councils and to school boards. This reached its peak in 1899 when the Bank's total lending to these borrowers was £4.5m.[58]

In these ways the Bank struggled to maintain its income and thus its dividend throughout the quiet years of the mid and late 1890s. One of the reasons why it was not as vigorous in its search for new business and its nurturing of old customers at the turn of the century was the commencement of the Boer war in October 1899. Although this war was not to affect British society in the same way as did the later World Wars, all the same it had effects on the London financial markets .

Rumours of war in September and October 1899 had led to a drain on the Bank's reserve and to an increase in Bank Rate from 3½ to 4½ per cent on October 3rd and to 5 per cent on October 5th. This was followed by an increase to 6 per cent at the end of November, but these relatively high rates did not continue: by late January 1900 Bank Rate stood once again at 4 per cent and generally remained at or

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[58] Sayers (1976), Vol.I, pp.23.

below this level for the duration of the war.[59]

Interest rates had been raised at the onset of war as a precaution against any surprises the war might bring, a normal occurrence or precaution under the circumstances. They fell back when it became obvious that the war was not going to upset domestic life to any large extent, and this movement was encouraged by the Bank of England, which was trying to keep rates as low as possible in order to ease the Treasury's burden of war finance. In fact, government finance was the dominant influence in financial markets during the course of the war, with total government borrowing increasing from £1.4m in 1899-1900 to £62m in 1900-1901.[60] This caused additional strains on the Bank's income, for not only did it try to keep interest rates as low as possible, but also had to manage the increased debt, a time consuming task that brought only a limited source of income.

Besides the effect on the rate of interest, the other main effect that the South African war had on internal finance was in the interruption of South African gold supplies that followed upon the commencement of hostilities. In 1898, South Africa provided approximately a quarter of the world's gold supplies, although at this time gold discoveries in other parts of the world meant that

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[59] These rates were relatively high for the period concerned: the average interest rate for the preceding five years had been around 3 per cent.

[60] See Table xxii in Morgan (1943), pp.220.

South African mines were becoming less important.[61] Even after making allowances for this reduced reliance on South Africa, the war meant that the Bank of England's gold reserve was becoming seriously depleted. The normal Bank reaction to this would be to increase the discount rate in an attempt to draw gold into London, but as discussed above it was loath to do this because of the demands of government debt financing. Thus from 1899 onwards the Bank commenced direct operations on the gold market which included giving interest free advances to importers of gold, sometimes referred to as the use of gold devices. An example of this occurred on August 15th 1900 when Barings were given an advance of £1.58m against gold,[62] a transaction that was non-interest bearing. King (1936) explains this mechanism which the Bank of England used as an alternative to increases in Bank Rate as follows:

> "...the authorities, following the example of several continental banks, began to allow importers of gold the free use of money for up to a fortnight free of interest, against an undertaking to repay the loan in gold, thereby attracting bullion before the normal gold point was reached."[63]

This was therefore a method of attracting gold to London from elsewhere without recourse to increasing the discount rate, and thus prevented movements in internal interest

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[61] New sources of gold were found in, for example, the U.S.A. and Australia.

[62] Source: Daily Discount Books, Bank of England Archive Reference C28.

[63] King (1936), pp.315.

rates being determined solely by external factors. The practice was also described in the evidence given to the U.S. National Monetary Commission in 1909.[64]

The first use of the so called "gold devices" was discussed in The Statist on June 6th 1891, when it was declared that the Bank had paid for a shipment of gold from a road before it arrived in England, the advance being secured on stock from the importer, which was returned when the gold arrived at the Bank. Transactions of this sort were not always non-interest bearing however: on January 1st 1900 **Deutsche Bank** had £100 000 advanced to them at 2½ per cent, when other transactions that day carried a rate of 6 per cent. In this case the incentive given to the gold importer to encourage them to import gold into Britain was not as great as giving them an interest free advance, but it was still considerable.

Thus by the start of the twentieth century the Bank of England had established itself not only as the pillar of the British banking system but also as the most important central bank in the world. It was increasingly regarded as being not only the keeper of the domestic gold reserve but also as the source of the gold necessary for the efficient functioning of the international gold standard. It had coped admirably with the major financial crisis of the preceding period (Baring's) and had established a means of market control: the use of Bank Rate in order to attract gold to London, backed up with the use of gold devices.

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[64] See Sayers (1976), Vol.I, pp.73.

Finally, it had survived the low income years of the 1890s intact, and had even managed to find new sources of income. In short, it had prepared itself well for the events that were to follow in the subsequent decades.

8: The First Years of the Twentieth Century and the Crisis of 1907

The Boer war ended in May 1902, bringing the restoration of South African gold supplies. This however seemed to make little difference to the level of the Bank of England's gold reserve which was never consistently high during these years, even though the world's output of gold in 1904 was more than twice what it had been in 1893.

The first four years of the century were fairly uneventful, the general fall in prices up to 1902 having been checked, with Bank Rate hovering about the 3-4 per cent mark. There was no post war boom: within weeks of the signing of the peace treaty everything had returned to normal. This situation remained until the end of 1905, when some signs of financial stringency appeared: Bank Rate was increased from 2½-3 per cent on September 7th and then to 4 per cent on September 28th, a level at which it remained for six months. These increases were in response to an export of gold. The Bank decided to make this 4 per cent "effective" both by borrowing in the market and by charging a higher rate for certain advances. Most of the market borrowing was carried out by Messrs. Mullens, the Bank's

broker, and in general it was the joint stock banks that lent to the Bank of England. These transactions were costly to the Bank however: £77,268 between October 1905 and February 1906.[65]

Bank Rate stood at 4 per cent until April 1906, when for four weeks it fell to 3 per cent, fluctuating between the two rates until October 11th when it finally increased to 5 per cent. In the spring attention was concentrated on the west coast of the United States, where on April 18th an earthquake followed by a fire had destroyed most of San Francisco. This disaster had significant effects on the London insurance market, which was said to have suffered losses of up to £10m.[66]

The 5 per cent Bank Rate of October 11th lasted for only one week, increasing to 6 per cent on October 19th. This further increase was in response to two factors: the fact that market rates were continually exceeding Bank Rate and because heavy demands were being placed on the Bank and the reserve was still falling. By this point financial stringency had reached other European financial markets: rates had been high all year in Berlin, and in Paris the Banque de France was worried about the effect a further increase in Bank Rate would have on their markets. With this in mind the Banque de France relaxed its restrictions on gold exports and it discounted a large number of English bills, in an attempt to stave off further increases in Bank

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[65] Clapham (1944),Vol.I, pp.384.

[66] The Economist, 11/08/1906.

Rate that would have endangered its own position. This move was in itself enough to ease the Bank of England's position, thus avoiding (for the present) the need for a 7 per cent Bank Rate, although 6 per cent held for six months.

Market tension did not recede to any great extent however: early in 1907 the Bank was still experiencing a drain of gold, and the situation in New York, where there had earlier been a large degree of speculation, was still causing disquiet in London. It was expected that the New York boom would soon come to a halt, a view that was confirmed in March when there was a panic on the Stock Exchange, although this proved to be just the first stage of a much longer drawn out crisis. This phase calmed by early summer, when the Bank was able to reduce Bank Rate first to 4½ per cent and then to 4 per cent, with the reserve staying fairly constant. However, by late summer 1907 the final phase of the American crisis gathered momentum: the demand for copper and steel fell greatly and a crash was expected imminently. This did not arrive as quickly as expected however, but when it eventually did so it was violent in its intensity. It was centred on New York, although its repercussions were felt all over the North American continent, as well as in Europe. The catalyst was the failure on October 22nd of the **Knickerbocker Trust**, the third largest trust investment company in New York, with deposits of over $62m, and it was this failure that was to send the American banking system

into disarray, since once deposits had been withdrawn from an institution the proportion that were re-deposited with an alternative institution was very small, leading to a large withdrawal of money from circulation.

Meanwhile, the Bank of England had increased Bank Rate to 5½ per cent on October 31st, 6 per cent on November 4th and 7 per cent on November 7th, the highest level it had reached since November 1873. It was faced with a massive drain of gold (mainly external), but the high Bank Rate was very successful in attracting gold into Britain, especially from the gold producing countries. Despite the gold drain there was no panic on the London markets and only a few failures, none of which concerned important houses. This was not the case in the U.S. however, where there were widespread failures and a restriction in cash payments throughout the system. The large incidence of money hoarding made it very difficult however to calculate the true extent of the fall in the money supply.[67]

The American crisis was regarded as a banking failure: an indication of the flaws that existed in the fabric of American banking.[68] The Economist felt that the American system's greatest weakness was its lack of a central bank, since it was the existence of the Bank of England, an institution that was strong, well-respected and free,

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[67] Although attempts have been made: Friedman & Schwartz (1963) estimated that the money stock fell by 2½ per cent between May and September, and 5 per cent between September and February.

[68] For an excellent account of the American crisis see Sprague (1908).

theoretically, at least, from manipulation by self interested parties, which was felt to ensure the continued strength and stability of the British banking system. Furthermore, the same magazine[69] suggested that a run on an English bank, similar to those experienced in October 1907 in the States, would not produce a panic induced collapse in the money stock, since peoples' reaction would simply be to withdraw money from one bank and to re-deposit it immediately in another, or, if the panic was very serious, in the Bank of England itself. In this way the aggregate level of the money stock would have been preserved: the only result would have been a re-distribution of deposits among institutions.[70]

As in 1906, the Bank of England was helped during the crisis by gold from the Banque de France. The initiative for this aid is said to have come from the Bank itself, but like the previous year the incentive for the Banque to help came from the fact that it wanted to avoid having to raise its own discount rate in response to further increases in Bank Rate.[71] In fact, £3m of gold was sent, not an inconsiderable amount, but a fairly small proportion of the

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[69] The Economist, 26/10/1907.

[70] This is a fairly startling thesis, both when considering when it was written, and in that we are still today discussing the sequence of events that would ensue as a consequence of a run on the financial system.

[71] In fact, it avoided increasing it above 4 per cent.

total of £19m that was sent to London during the crisis.[72]

The American response to the crisis was to instigate an overhauling of their banking and financial system, which took the form of the formation of the **National Monetary Commission** which reported in 1910. This Commission took a large amount of evidence from the Bank of England, and concluded by recommending the formation of the Federal Re erve System, which finally came into existence in 1913. The evidence submitted by the Bank of England regarding British banking practices gives interesting insights into the position of the British system as regarded by contemporary bankers, and will be considered in the next section.

9: 1908 Until the Outbreak of War

The tightness that had characterised the London markets had receded by the end of December 1907, although the Bank of England did not start to reduce Bank Rate until the start of January in order to protect the reserve over the normal period of increased end of year pressure.[73] By the middle of March Bank Rate stood at 3 per cent, around which level it hovered for the following eighteen months.

Low interest rates, together with the implied low level

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[72] These payments were **not** made directly by the Banque de France to the Bank of England: the former was forbidden by its statute from doing this. Instead, intermediaries, such as Rothschilds, were used.

[73] See other references to the commercial bank's practice of "window dressing".

of discount and advance business at the Bank, had their usual implications for the level of the Bank's income.[74] Income from the discounts fell from £462,000 in 1907-08 to £151,000 in 1908-09, and from short loans and advances from £322,000 to £200,000 over the same period.[75] The branches continued to be important in the generation of steady income, as earlier discussed, to the annoyance of some of the competing commercial bankers, and the Bank was able to declare a dividend of 9 per cent in 1908-9.

The evidence given to the U.S. National Monetary Commission covered a wide range of central banking matters, from the organization of the Bank and its officials, through its discount regulations, to the regulation of the reserve by the manipulation of Bank Rate. Fairly detailed answers were given to many of the questions by the then Governor of the Bank, **Reginald Eden Johnston**, particularly as regards the last mentioned mechanism - the relationship between Bank Rate and the state of the reserve. Johnston stated that he regarded the raising of Bank Rate as the most effective way of attracting gold to the Bank, and that in his experience this method had never failed, provided Bank Rate is kept effective, at least in attracting gold

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[74] This is an example of an important conflict of interest inherent in the Bank's discount operations: a low level of activity brought with it the problem of a reduced income for the Bank, whereas the alternative was infinitely worse: a high level of activity implying problems for the Bank in its management of the financial system.

[75] Clapham (1944), Vol.II, Appendices C & D. Figures given are a total of the branches and Threadneedle Street and are for a year of August to August.

from places other than the continent.[76] As an example of this mechanism in action he gave the most recent occurrence - the Bank of England's actions during the gold drain in November 1907.[77]

Johnston also stated the Bank's position on other aspects of reserve and gold policy and on the Bank's position as a lender of last resort. He admitted that interest free advances to gold importers had been used as a policy weapon with which to attract gold to London, and described what he felt to be the Bank's reactions to a financial crisis: to increase Bank Rate rapidly whilst at the same time extending credit liberally to the financial system, considering on merit each set of bills offered to them. He also stated that the Bank did from time to time borrow money in the open market with the express purpose of increasing market rate.

The statements made to the National Monetary Commission may seem fairly simplistic, since most of what the Governor revealed was in practice common knowledge at the time. The evidence is interesting however from a slightly different perspective: this was the first time for over thirty years that there had been any official statement on the activities of the Bank of England. The last report of a Select Committee had been in 1875, when

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[76] Johnston went on to explain that due to the absence of free continental gold markets, gold was not released until interest rates reached a level which disturbed continental countries' financial position.

[77] The American crisis.

there was a report on note issues, but the evidence given to the Select Committee of 1858, set up in the aftermath of the 1857 financial crisis, was of more relevance to the Bank of England's discount practices. Thus this formal statement of the Bank's activities is of great benefit in illuminating its attitude towards the financial system.

The years between the 1907 American crisis and the heightening of international tension that led to the outbreak of war in August 1914 were in general without major upsets both for the Bank of England and for the economy as a whole. The economy experienced steady growth: prices were rising and unemployment falling. There were several minor bank failures,[78] but despite the fact that the institutions concerned were small and had in general been badly managed and were known to be weak, the Bank found itself to be involved in the sorting out of their affairs. The first mention in the Bank's records of its involvement in one particular failure comes in the minutes of the Court of Directors in August 1911,[79] when the Court was told that the Bank had subscribed £250,000 to the fund that had been launched to provide an injection of capital into the **Yorkshire Penny Bank**. Later (September 7th) the Governor laid down a full statement before the Court detailing the events involved in the rescue.

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[78] For example: Charing Cross Bank - October 1910.
Birbeck Bank - November 1910.
Yorkshire Penny Bank - later reconstituted as a joint stock bank.

[79] Court Books Ie, Bank Archive reference G4/134, pp.106-8.

The Yorkshire Penny Bank had been established in 1859, with deposits amounting to only £3,252 in its first year of operation. Thereafter it experienced fairly rapid expansion: after three years it held £50,000 in deposits and had 18,000 accounts, rising to £1m and 120,000 accounts by 1880. At the time of the onset of its troubles it could boast 700,000 accounts and over £18.5m in deposits. It had been established as a savings bank,[80] and as such was without share capital, although it did include a reserve fund of £500,000 on its balance sheet. Its assets consisted of high class investment stocks, loans, mortgages and cash.

Because of the way it was constituted it had never been regarded as the most secure of institutions, with fairly low reserves, but in July 1911 it faced the prospect of a deposit run after the failure in June of the Birbeck bank and consequent rumours as to its own safety. The origin of the firm's problems initially seemed to lie in the depreciation of gilt edged securities, in which a large proportion of the bank's assets were held. This depreciation had already increased market apprehension, the fear being that certain institutions might run into liquidity problems were they faced with any prospect of a run, since the value of their assets would have fallen.

The Governor's attention was first drawn to the

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[80] This explains the large number of accounts that were held with it relative to the volume of deposits. These banks tended to attract small savers, as the name of the YPB suggests.

situation when he received a telegram at his weekend residence from the Bank of England's Chief Cashier telling him that **Edward Holden** of the London City and Midland Bank wanted to see him urgently in London. Holden was concerned about the possibility of the failure of the Yorkshire Penny Bank (YPB) and had become involved because his own bank shared the same auditors as the troubled institution. The position of the YPB was apparently that there was a shortfall of assets over liabilities of some £600,000, possibly more if their securities depreciated to any greater extent. Holden had already spoken to the chairmen of the **Union of London and Smiths Bank**, the **London Joint Stock Bank** and the **National Provincial Bank**, and laid out his ideas for a consortium of bankers to take over the business of the troubled bank. However, in order to put this scheme into practice £2m was needed to ensure the future of the reconstituted bank, and it was help with the organization of this task that Holden was requesting from the Governor of the Bank of England.

In order to acquaint himself more fully with the facts the Governor of the Bank, **A.C. Cole**, arranged to meet the General Manager of the YPB, and the fears that Holden had expressed were confirmed: the bank was expecting a run.

The Governor had meetings with various influential joint stock bankers,and it was decided that provided a guarantee fund could be organised to protect subscribers, an appeal for a fund to help the YPB would be launched. The Governor had met with the Chancellor of the Exchequer and

informed him of the problems that might arise if the YPB was to shut. The Chancellor was of the opinion that the Government should not get involved unless it was absolutely necessary: all possible efforts to raise the fund should be made without government intervention.

The £2m that Holden had decided was necessary to secure the future of the YPB was reached fairly quickly, all the major banks with dealings in Yorkshire pledging money with the exception of the National Provincial Bank. The amounts pledged were as shown in Table 4.3. The guarantee fund to cover subscriptions was then organised by Holden and the Governor. The Bank topped the list of Guarantors with £250,000, for reasons that the Governor outlined to the Court some five weeks later:

> **"In view of the seriousness of the situation that would be produced in the banking world and the further heavy depreciation in securities which would be bound to follow any forced liquidation of the securities of the Yorkshire Penny Bank, after consultation with the Deputy Governor and with some members of the Treasury Committee I decided to head the Guarantee fund by subscribing £250,000 for the Bank of England."**[81]

The target of £1m was reached within two days, other institutions being quick to follow the Bank's lead. In fact, the target was slightly exceeded and so initial contributions were scaled down accordingly, as shown in Table 4.4. The contributors were all Clearing and Joint Stock Banks, although N.M.Rothschild offered £500,000 if private firms were to be asked to contribute, and Coutts &

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[81] Bank of England Archive Reference G4/134 (Court Book Ie).

Co. would have given £50,000 had £1m not been obtained from the Clearers and Joint Stocks.

Although the depreciation in the value of consols acted as a catalyst for the development of the liquidity problems of the YPB, its problems were in fact associated with the fact that in structure it was a savings bank, with little or no reserve and a complete absence of share capital. Despite the rather lowly position of the bank there was no contemporary criticism of the actions of the bank's management. Rather, opinion seemed to hold that it was unfortunate, but surprising, that the management had not foreseen the problems that the nature of the bank's structure would eventually entail, and thus restructured their activities accordingly. The Bankers Magazine said that they had **"no word of complaint against the management"** of the bank, and in fact the existing management did continue in office when the new joint stock bank was formed, although additional directors were appointed.[82] The Economist was slightly more critical of the YPB, but there was still no entertainment of the idea that perhaps the bank should have been allowed to fail; the accepted view was that the Bank of England was justified in reacting to Holden's request for a rescue mission.

The Economist however did express a view that there should be a more adequate system of supervision of the savings banks, or alternatively that they should be taken over by the joint stocks. It added that although when banks

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[82] Bankers Magazine, September 1911, pp.333-339.

such as the YPB had been established there had been a real need within the community for such institutions, that need had now passed and the customers using these banks would be better served one of the joint stocks or even by the Post Office.

This was the first time since 1890 that the Bank of England had intervened in the banking system to stop a bank failing, although this time the initiative came not from the Governor of the Bank but from Holden, who was amongst the most active and influential members of the financial community at the time. There are certain parallels that can be drawn between the events depicted above and those occurring twenty-one years previously: in both cases the Bank undertook the organization of a rescue fund to prevent a bank failure, with the co-operation of the financial community as a whole. On this occasion however, the business of the bank concerned was on quite a different scale to that of Baring's. Another similarity was that to a certain extent the management of both institutions were not held to blame for their respective troubles, nor were they penalised very much for their mistakes.

Holden was also taking an active role in banking affairs generally, especially regarding the gold holdings of the commercial banks. He was a dynamic and independent figure, and wanted the banks to hold their own reserves, separately from those held by the Bank of England, in order that the deposits of the commercial banks would be more secure. Other voices in the City felt that increased

reserves would help promote the stabilisation of interest rates. These proposals never resulted in very much however, since other banks were not very willing to follow Holden's lead, even though they had been worried enough when faced with the failure of one of their number to subscribe to a rescue fund. The mood of the time among the commercial banks was still very much that they would prefer to act when a crisis was looming, rather than attempt to take preventative measures in advance of any problems.

Table 4.3: Subscribers to the Yorkshire Penny Bank Relief Fund[83]

Institution	Amount
London City and Midland Bank	£500,000
London Joint Stock Bank	£250,000
Barclay & Co.	£250,000
Lloyds Bank	£250,000
Union of London & Smiths Bank	£250,000
Beckett & Co.	£100,000
Bank of Liverpool	£100,000
Manchester & Liverpool District Banking Co	£100,000
Williams Deacons Bank	£100,000
Lancashire & Yorkshire Bank	£ 50,000
Manchester & County Bank	£ 50,000
	£2,000,000

Table 4.4: Yorkshire Penny Bank Guarantee Fund.

	Original Amount	Reduced To
Bank of England	£250,000	£223,314
London County & Westminster Bank	£250,000	£223,314
Parrs Bank	£100,000	£ 89,286
Capital & Counties Bank	"	"
Glyn Mills Currie & Co.	"	"
United Counties Bank	"	"
London & South Western Bank	£ 50,000	£ 44,643
Metropolitan Bank of England & Wales	"	"
National Bank	"	"
London and Provincial Bank	"	"
Robarts & Lubbock & Co.	£ 10,000	£ 8,928
Martins Bank	"	"
	£1,120,000	£1,000,000

[83] Source for both tables: Bank of England Archive Reference G4/134, pp.107-108.

10: The Position by 1914

The confidence with which the Bank of England had handled the problems of 1906 and 1907 seemed to imply that by the end of the pre-war era it had established itself completely at the centre of the British banking system, as the single most important constituent of it. The Bank had received congratulations from many quarters for its role in the Baring's affair, but its handling of the later crisis seemed to exude a new level of confidence.

Aside from its handling of periods of crisis, by 1914 the Bank had arrived at a position of market control that was greater and more complete than ever previously. Having recognised the power of changes in Bank Rate in attracting gold both to London and into the Bank of England, the Bank proceeded to exploit this mechanism to the full, until the position as described to the U.S. Monetary Commission was reached. The Bank had also learned that they could influence the level of the reserve in other ways, for example through the use of gold devices.

The Bank owed some of its success, together with some of its problems, to the fact that it was the focal point of the international gold standard, which had functioned very efficiently during these decades. With this in mind, it had a "duty" to the international community to ensure the smooth operation of the standard, a role which sometimes took precedence over its obligations to domestic industry

and commerce.[84] This duty involved the maintenance of sterling convertibility, and it was this goal that was the underlying aim behind all its actions.

The period discussed in this chapter represents the one during which Britain's world influence was at its peak. By the time of the signing of the peace treaties that marked the end of World War I hostilities, Britain was no longer the most influential world nation. America, already growing in stature even before the commencement of the war, had stepped into the gap vacated by Britain whilst she was occupied elsewhere. This meant too that London no longer enjoyed such a crucial role in the passage of the world's financial transactions, a decline that was to have important implications for the position of London as a financial centre and for its development in the subsequent decades.

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[84] For example the increase in Bank Rate during the 1907 American crisis in an attempt to attract gold to London.

CHAPTER FIVE

BANK OF ENGLAND DISCOUNT AND ADVANCE OPERATIONS AND "DAILY DISCOUNTS", 1870-1914.

1: Introduction

In this chapter we deal exclusively with primary material retrieved in the main part from the archives of the Bank of England.[1]

There is a vast amount of data available in the Bank's archives, although much of the material is subject to restricted access. In addition, much of the useful information available is statistical: there is a dearth of descriptive detail explaining **why** the Bank took particular actions at particular times. For example, changes in Bank Rate were agreed upon by the Committee of Treasury, but the m'nutes of this Committee reveal no discussion as to the reasons for the change. Sources which at the outset appear promising, for example the minutes of the Committee of Treasury of the Bank, prove not to contain anything of interest, in this case because there was no secretary in attendance at meetings and thus the Governor was able to reveal only that which he chose.[2]

Of course, in an ideal world we would not have to surmise what policies the Bank was pursuing at certain times and for what reasons, since policy documents would be available that told us how and why the Bank was acting. Unfortunately, these are not available, and so we have to

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[1] With some additional information from commercial bank archives and from the British Library.

[2] In my experience, the most depressing sentence found in bank archives, which is repeated with annoying regularity, is "after a full and frank discussion it was decided that..." !

be content with considering the options that were available to the Bank at certain times. We will do this through a consideration of its behaviour both at moments when it was under a certain amount of pressure in the financial markets, and at times which could be regarded as being "normal".[3] Much of the data available in the Bank's archives with regard to how the Bank behaved with relation to the discount market are numerical, and thus it is analysis of these data that will be carried out in order to determine what actions the Bank took and when.

With this in mind, the structure of the chapter is as follows. Firstly, we will discuss the nature of the discount administration of the Bank of England at this time, with special attention to the means by which discounts and advances could be obtained at the Bank and to the types of customers involved. This is important in order that we can establish how discounts and advances could be obtained, both by regular customers and others. At a later point we will consider whether in times of pressure the Bank discriminated against non-habitual customers.[4] This will be followed by a discussion of the type of data

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[3] Another issue that will be considered in a later chapter is the regulatory environment in which a LLR operates.

[4] Theory suggests that LLR facilities should not be discriminatory, other than on grounds of the quality of paper presented for discount or as security for an advance. However, during this period the Bank of England was frequently searching for new methods of raising income, and thus its regular customers became very important. One can therefore envisage a situation whereby habitual customers got preferential treatment over those with no discount account at the Bank.

collected from the Bank's archives, together with a graphical and written description of them. Finally, we will conclude with a brief review of what the chapter has achieved.

2: Discount and Advance Administration During this Period

Besides considering the analysis (empirical and descriptive) undertaken on the data set, it is also useful to consider in greater detail the discount administration of the Bank. To this end, in this section we will consider the way in which discount and advance transactions were dealt with by the Bank's Discount Office, how those individuals or companies with discount accounts were classified according to their status, and the various Discount Committees that were in existence before, during and after the period.

2.1: Procedure for Discounting

The discounting of bills and the granting of advances were administered at the Bank of England by the Discount Office. A person or company wishing to obtain discount facilities lodged his bills with the Discount Office together with the appropriate form, at which point the "Day Book"[5] was written up, leaving space however for any bills

[5] Daily Discount Books: Bank of England Archive reference C28/30 - C28/74 (1870-1914).

that were refused. The submitted bills were then scrutinised by the Principal of the Discount Office, who checked that the limit placed on discount facilities for any one name had not been exceeded and that the bills conformed to the Bank's standards on length and acceptances. The next morning the bills were submitted to the Committee of Daily Waiting, and if found to be acceptable were passed back to the bill office. Any bills that were unacceptable were entered in the Day Books under "refusals".[6]

Advances to brokers were made along similar lines, normally for seven days at an interest rate of current Bank Rate plus ½ per cent. They were secured on either bills or securities.

2.2: Discount and Advance Committees

Several discount and advance committees were in existence in the nineteenth and twentieth century. They had a "watching brief": their function was to consider both the past and future state of the discounts and to discuss any possible future changes and improvements. For example, the agenda for a particular meeting might include discussion as to unusual advances at the branches, discounters exceeding

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[6] A reason was sometimes, although not always, given explaining why a bill or package of bills was refused. Examples of reasons given are:

"cannot collect"	"beyond 90 days"
"irregular"	"insufficient security"
"wrong stamp"	"has only 1 British security".

their limits, changes in the rating of discount accounts, etc. A summary of the main changes in the development of the committees is shown below:[7]

16th April 1804:	**Special Discount Committee** appointed, with the aim of considering the state of the discounts and reporting from time to time to the Court of Directors.
15th February 1810:	It was decided that *the Discount* **Committee** would be appointed annually as soon after January 1st each year as was practical, in order to examine the state of the discounts in the previous year.
11th July 1895:	**Advances Committee** appointed as a permanent committee to meet yearly and to consider the existing advances at Head Office, to examine the "nature of the securities" and generally to report to the Court on any subject relating to advances which they thought should be brought to their notice.
5th April 1906:	Discount and Advances Committees combined to form the **Committee** on

[7] Source: Bank of England Archive reference G15/62, Folio 33A (Committee on Advances and Discounts: General).

Advances and Discounts, which continued reporting annually (in February) but also had regular meetings which were held quarterly or sometimes even monthly.

March 1946: Committee on Advances and Discounts disbanded, since the Bank's advances business was small and its discount accounts were confined to eleven Discount Houses whose demands were subject to little variation.

The Reports of the Committees on Discounts and on Advances are important from a historical perspective because they are one of the few sources where we can find more detailed information on the Bank's activities. Even so, the minutes of their meetings are not ideal information sources; for example, the minutes of the Special Discount Committee of 13th March 1867,[8] reporting on the state of the discounts in 1866, make no reference to the Overend-Gurney crisis that took place in May of that year, although the fact that twice as many discounters suspended payments in 1866 as compared to the previous year was mentioned. If a crisis as severe as we know Overend-Gurney to be does not merit a mention in the minutes of the Discount Committee meetings, it is possible that other events too were omitted, and thus we cannot regard the omission of any event as being an

[8] Bank of England Archive Reference C35/5 (Minutes of Special Discount Committee).

indication of the relative unimportance of that particular event.

The number of discounters suspending payment was part of the normal report on the discounts both at Head Office and at the branches. Every Annual Discount Report started with Head Office data on increases and decreases in the volume of advances and discounts of that year over preceding years, and then continued by giving the number of discounters utilising the Bank's discount facilities and the number of discounters suspending payment. The same information was then given for the branches.

Graphical representation of the number of Bank of England Discounters (1870-1914)[9] and of the number of discounters suspending payment are given in figures 5.1 and 5.2[10] The first graph gives confirmation of the fact that the number of Bank customers was falling significantly over the period: the figure for 1909 is only 17 per cent of its 1871 value. This fall was fairly smooth over the period as a whole, the only major deviation from trend occurring in 1876 when there was a fall of 33 per cent in the number of discounters, followed by a recovery over the subsequent three years.[11]

The simple implication of this fall in the number of

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[9] Source: Bank of England Archive reference C30/3 (Discount Operations of the Bank, 1844 - 1928).

[10] The data available on the number of discounters suspending payment do not cover the whole period: for some reason data are not given after 1896.

[11] The Bank's records provide no explanation of possible reasons for this fall.

discounters over the period as a whole is that the Bank was engaged in less discount business, at least with its own customers. When the total volume of discount business over the period together with the number of bills discounted are considered however, it is immediately obvious that this is not true.[12] What was in fact occurring was that the average value of each bill discounted was rising fairly steeply over the period, especially between 1889 and 1913.[13] This is depicted in figure 5.4, and occurred as a direct result of the increase in the volume of discount business, since, as is shown in figure 5.3, the number of bills discounted did not fall significantly, except during the first decade.[14]

The data on discounters suspending payment displays large peaks in 1876 and 1878, and after 1882 follows a downward trend.[15] However, the data source gives no

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[12] These can be seen graphically in figure 5.9 later in the chapter and in figure 5.3 below.

[13] Between 1870 and 1888 there is no trend growth in the average size of each bill discounted, the value fluctuating around £400. In 1914 there is a fall of some 20 per cent in the average value of each bill discounted. This can be explained by the fact that a huge number of bills were submitted for discount during the crisis of the summer of that year. Many of these were of small denominations, and they thus had the effect of decreasing the average value of bills in 1914 as against the figure for 1913.

[14] The sharp increase in the number of bills discounted in 1914 is obviously not part of the secular movement. Rather, it can be explained by the financial crisis that occurred in the summer of 1914. See later sections for further details.

[15] Of course, these data on discounters suspending payment concern only firms with a discount account at the

(continued...)

indication of the size of the institution concerned, and so we have no idea of their degree of importance.

2.3: Classification of Discounters

People applying for discount facilities at the Bank of England were graded according to the type and extent of their business, in order that the Bank might have some "prudential" control over the amounts each company received in discounts. In 1804 it was decided that the limit of discount accommodation that was to be given to any one house should not exceed £30,000 in general, irrespective of the scale of their business. However, it was decided at the same time that this limit could be exceeded in particular cases if the Special Discount Committee felt it to be appropriate.[16]

The Special Discount Committee of 1815[17] specified five classes of discounter together with their associated

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[15](...continued)
Bank, and so can be looked upon only as an indication of the failure of financial firms in general. Data on bank failures is shown in comparison with that on discounters suspending payment in Figure 5.5. It can be seen here that there is some sign of a positive relationship between the two data sets, although this is not very strong.
The source of the data on bank failures is an unpublished series collated by Dr.A.R. Webber, of City University Business, School, London, during the preparation of Capie & Webber, (1985).

[16] The problem here of course was that the Special Discount Committee always met "after the event": after limits had been exceeded. There is no explanation of how this inconsistency was to be resolved.

[17] Bank Archive Reference C35/5: Minutes of the Special Discount Committee.

limits:

(1) Bankers, merchants and persons of extensive business. This class was to have no "mark" against their name, but it seems that the upper limit of £30,000 was intended to apply to them.

(2) Wholesale dealers: "persons of the greatest respect and opulence". This category was given the mark "B" which signified a discount limit of £20,000.

(3) Middle men - those with business that could be classified as being one level lower than (2). These were given the mark "A" indicating a limit of £15,000.

(4) Persons engaged in a more prudent scale of business were given a mark of "N" signifying an upper limit of £10,000.

(5) People of little business who were low in the estimation of the Bank and of their peers. They were thus given a limit of £5000 with the associated mark "K".

This classification system was intended to be regarded as the "proportion of credit which it would be proper to allow to each account", and the categories of discounters were to be revised annually by the Special Discount Committee. It is doubtful however whether they were ever treated as the absolute limits that perhaps they were intended to be, since four years after they were initiated, the 1819 Special Discount Committee was given a list of 118 discounters whose accounts exceeded their marks by a total

of £900,000 on discounts of £2.5m. Thus in certain cases the authorities obviously decided, consciously or unconsciously, to disregard the limits that had been previously set. However, we have no idea as to the criterion by which these decisions were made.

2.4: "Exceptional" Discounts

"Exceptional" discounts were defined as bills discounted and advances made at a rate of interest below Bank Rate. Details of these transactions were kept in a separate ledger from other discount and advance business and were considered by the Special Discount Committee at their annual meetings. The first entry in this ledger appears in January 1893, and discounts and advances are not treated separately: with each entry there is no indication as to whether the transaction recorded is a discount or an advance. The only indication is given by the value of the sum recorded. For example, one would imagine that a transaction of £150,266[18] would refer to a package of bills discounted, since this represents the total of the amounts received for each bill, whereas one of £435,000[19] would be an advance since the latter are normally given in "rounded off" figures.

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[18] This transaction took place on 5th November 1906, and the recipient was the Canadian Bank of Commerce. The discount rate was 5 7/8 per cent, when Bank Rate stood at 6 per cent.

[19] To Hambros, 3rd December 1896, at 3½ per cent, when Bank Rate was 4 per cent.

Graphical representation of the percentage of bills discounted at less than Bank Rate is given in figure 5.6. As would be expected, in known periods of financial stringency,[20] the percentage of bills discounted at rates of interest lower than the current Bank Rate declines, for reasons discussed below. In addition, throughout the "quiet" years of the late 1880s and 1890s, this percentage increases, as the Bank at this time was searching for ways to increase its income.

Whilst over the period as a whole 18.24 per cent of discounts and advances were given at rates lower than Bank Rate, during the summer of 1914 there were only four instances where companies received discounts or advances at these preferential rates.[21] These were:[22]

A.Ruffer & Co.	£43,503	at	6%,	Bank	Rate =	8%
Morton Megaw & Co. Ltd.	£5178	"	"	"	"	"
Chartered Bank of India	£151,247	"	"	"	"	"
Ryder & Co.	£162,887	"	"	"	"	"

Thus, when market conditions were very tight the Bank gave very few advances and discounts at preferential rates, as one would expect, since these discounts and advances at rates lower than Bank Rate were intended really as a bonus

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20 For example, 1878, 1890 and 1914.

21 Between weeks 31 and 42 of 1914 (July end-September end) only 1.65 per cent of bills discounted by the Bank of England were transacted at rates less than Bank Rate.

22 Source: Bank of England Archive Reference C30/5 (Discount Office, Exceptional Discounts).

for Bank customers when there was no particular pressure on the Bank's resources.[23] At the other extreme, when the Bank was trying to impose a high Bank Rate on the markets, it was obviously not in its interest to grant loans or discount bills at lower rates, no matter who the recipient was.

2.5: Summary

This section has shown in rather more detail how the administration of the Bank of England's discount and advance activity actually worked. The Discount Office was the main administrative department responsible for Bank discounts and advances, and it was overseen in turn by the relevant discount and advance committees. The "watching brief" function of the discount and advance committees must not be over-estimated in terms of the day-to-day running of the Bank however: the infrequency of meetings left no real possibility for any extensive regulation. Because of the inevitable time lag between events occurring and their later discussion by the appropriate committee,[24] the best that the committees were able to do was to reprimand the personnel of the Discount Office: they were too far removed from the daily activities of the Bank to be

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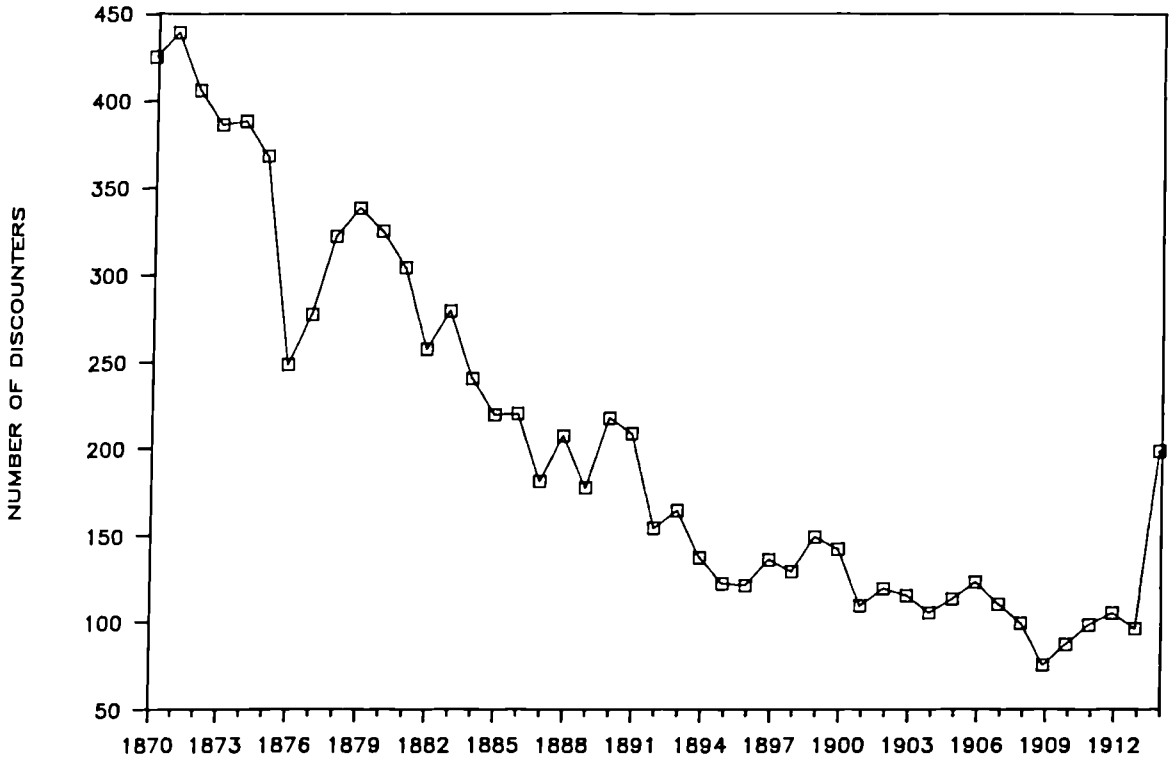
[23] And, of course, at times when the Bank was under pressure to increase its income, these transactions were seen as a way of encouraging customers to use the Bank, at times when facilities could frequently be obtained cheaper elsewhere.

[24] Sometimes a delay of up to a year.

consulted on events as they were occurring. The Committees did execute the important function however of deciding on any changes in discount administration that members of the Committees felt were appropriate in order to prevent the re-occurrence of mistakes. In this sense they were important in shaping future policy.

FIGURE 5.1: NUMBER OF DISCOUNTERS

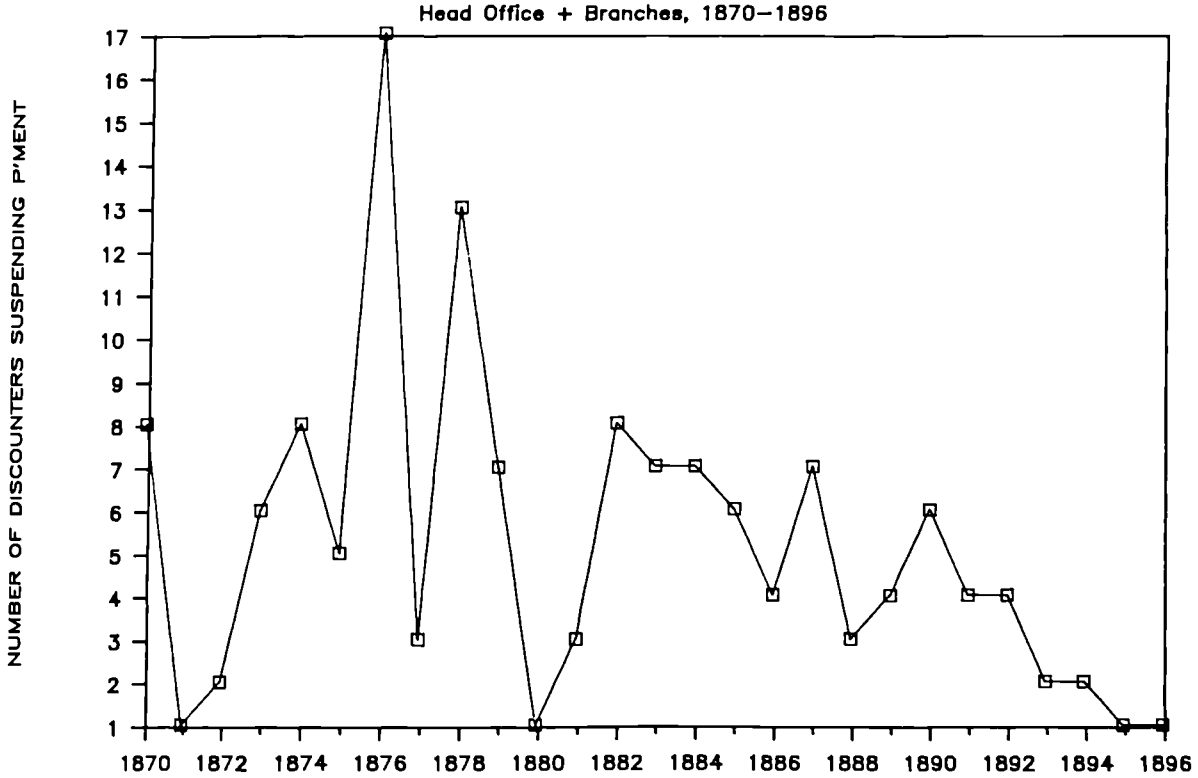
1870–1914



Source: B of E Archive Reference C30/3

FIGURE 5.2: DISCOUNTERS SUSP'ING P'MENT

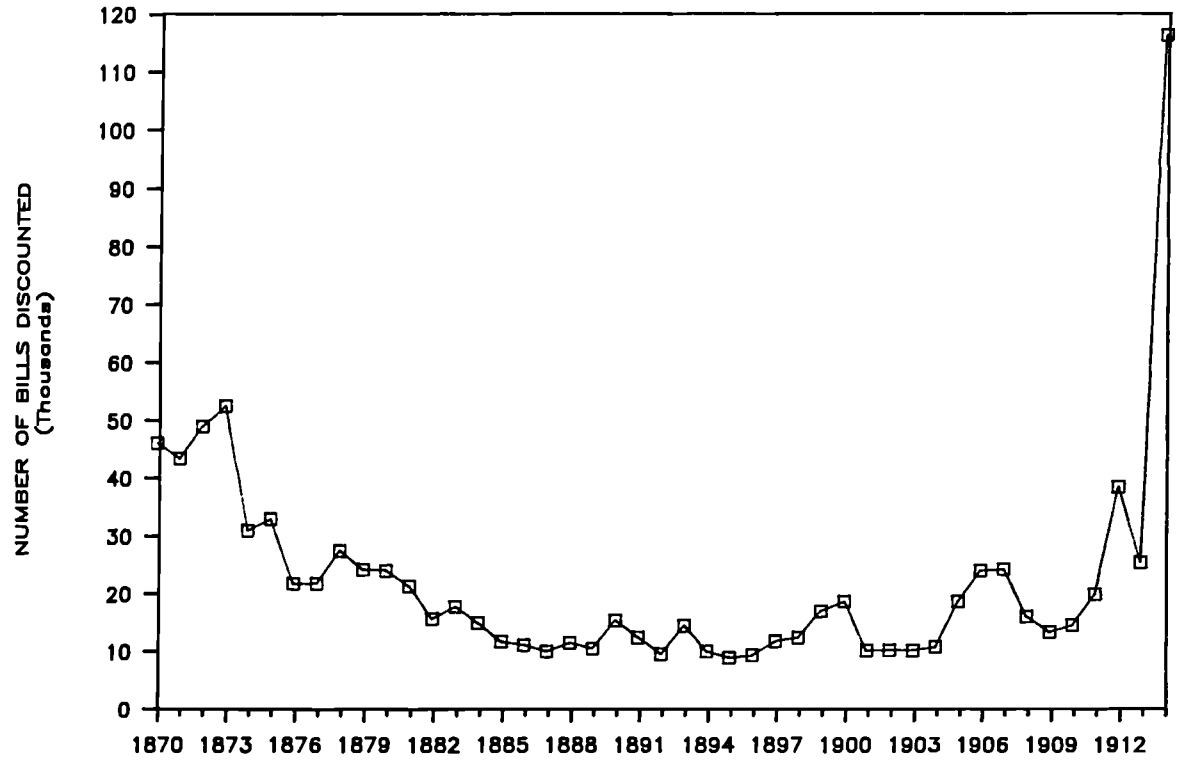
Head Office + Branches, 1870–1896



Source: B of E Archive Reference C29/2

FIGURE 5.3: NUMBER OF BILLS DISCOUNTED

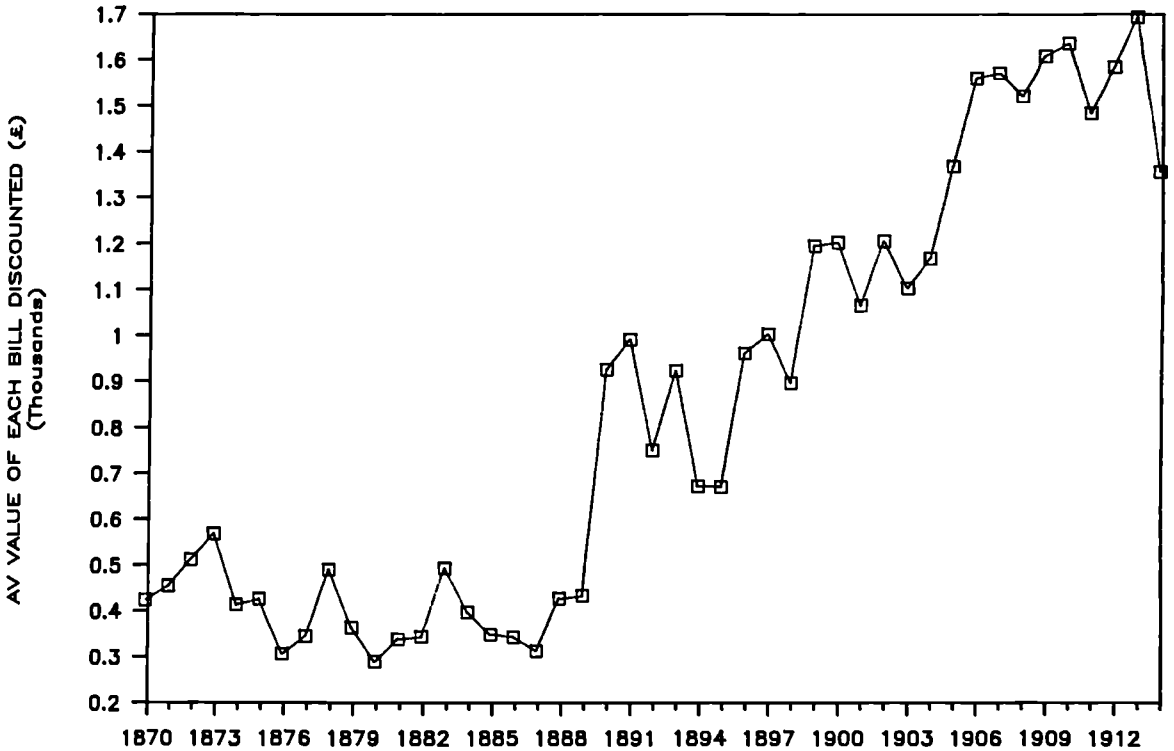
1870–1914



Source: B of E Archive Reference C30/3

FIG 5.4: AV VALUE OF EACH BILL DISC'ED

1870–1914



Source: B of E Archive Reference C30/3

FIG 5.5:FAILURES OF BANKS & OF BE DISC.

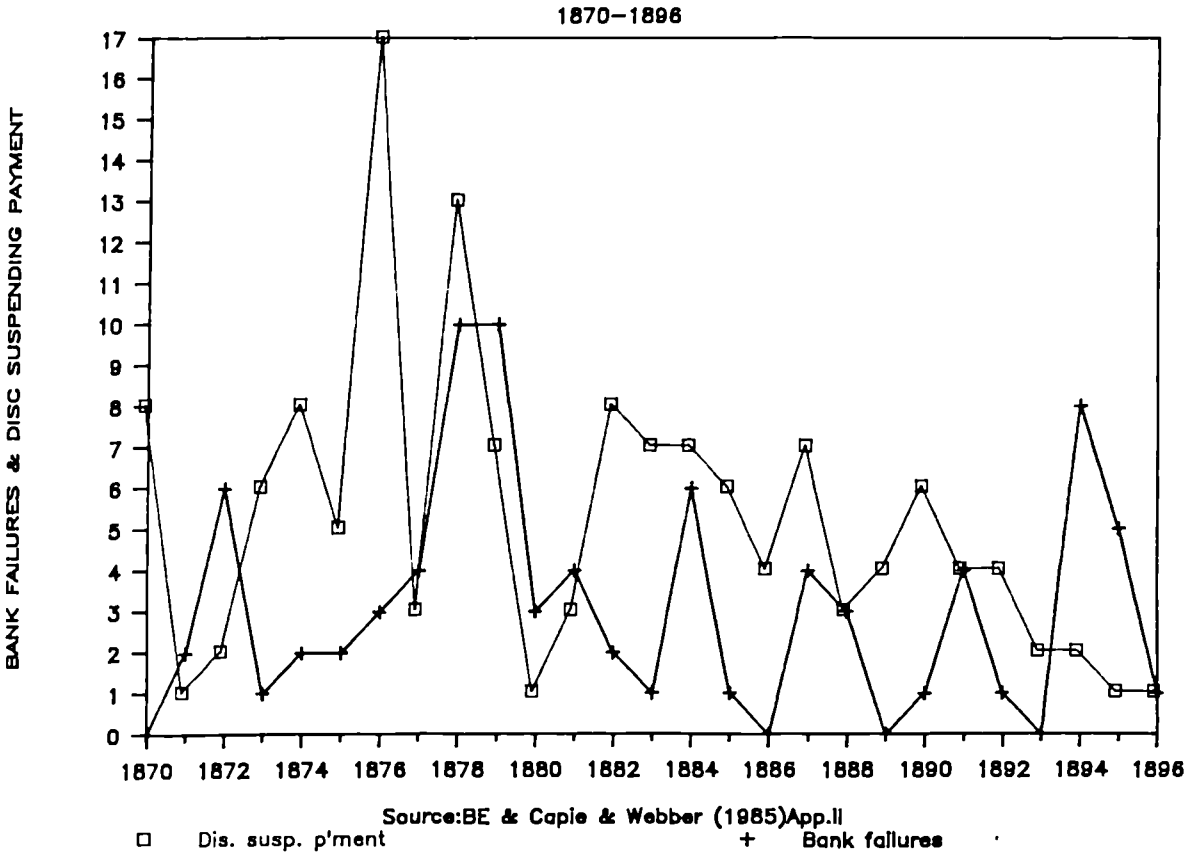
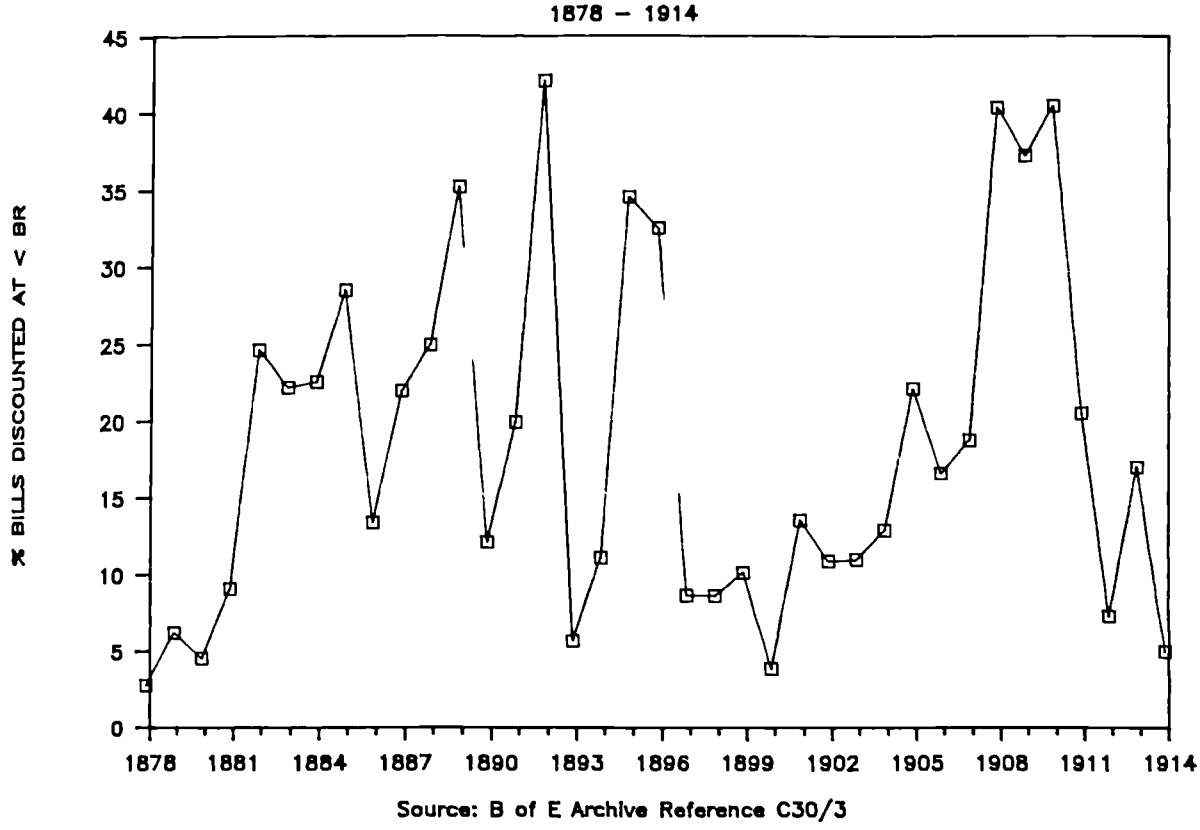


FIGURE 5.6: % BILLS DISCOUNTED AT < BR



3: The Data

In this section we will consider the data that are available in the archives of the Bank of England, discussing more fully that which was selected as being most appropriate and most likely to supply the answers to the questions proposed in this study.

3:1 Data Available

The material concerned in this section[25] are data from the Daily Discount Books, covering the period 1870-1914, a total of forty-five years.[26] Data collection was limited to this pre-first world war period because of the vast scale of the operation: in all data were collected on eight variables, a total of approximately 13700 observations in all.[27]

The main aim behind data collection on such a vast scale is an attempt to trace how the Bank was behaving during the period under consideration,[28] utilising methods

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[25] This data set will also be the subject of a large part of the analysis contained in much of the rest of the thesis.

[26] Bank of England Archive Reference C28/30 - C28/74. These data are given in Appendices A and B.

[27] This gives some idea of the scale of the data collection: daily data on eight variables for a period of forty-five years give a total of well over 100,000 data points in all.

[28] 1870 - 1914.

which will be detailed at a later point. In brief, it was decided that in order to document the interventions in the financial system that were undertaken by the Bank of England it was first necessary to gain a detailed knowledge of the latter's discount and advance operations during the period. Once this data had been collated, it would then be possible to identify moments of financial tension or crisis, and these moments could be examined in greater detail.

Although there is a vast amount of data available in the Bank of England archives, it was felt that the wealth of data contained in the Daily Discount books was by far the best means of obtaining detailed information about the Bank's actions, especially since because it was in a numerical form empirical analysis of it would be possible. Daily Discount data available in the archives are presented in the form of the original A1 size ledger books, with one page allocated to each day. Trading occurred six days a week, with fewer public holidays than there are now, thus giving a total of approximately 305 trading days per year. A list of the companies concerned appeared on the left hand side of the page, together with the number of bills discounted (if applicable) and the interest rate at which the transaction took place. Further to the right of the page appeared the amount of discount business transacted or the amount of the advance, whichever was applicable to the

transaction.[29] At the top of each page was the date, figures for the amount of discounts and advances "going off",[30] together with the days' totals for discounts and advances, which also appeared at the bottom of the page under the list of transactors. The average number of transactions per day was approximately eight to ten, although there would be occasional days when there would be none (especially during "quiet" years such as 1895), and others when more than one page would be needed to cover the day's business. A good example of the latter case is August 1914, during the financial crisis caused by the onset of World War I which threatened the whole system of international payments, when some days required three or more pages.

The volume of data caused considerable collation and estimation problems. Ideally, there would have been no aggregation of the data since the essence of these data is that they appear in a daily form, but it was decided that due to the large number of observations the data would be aggregated on a weekly basis, thus reducing the number of observations from 13700 to 2340. Initially, data were also aggregated on an annual basis in order that a complete picture of Bank of England discount and advance behaviour during the period could be presented in a graphical form. The graphs of the annual series are presented in figures

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[29] Until 1894 there was only one advances variable, but after this point a distinction was made between advances on bills and on securities. (See below.)

[30] That is, maturing.

5.7 to 5.17.[31] All these graphs will be discussed in section 3.4 later in this chapter.

Because of the novelty of the daily discount data, other empirical work related to this subject is not extensive.[32] Work has been done however on certain related issues: Hoppit (1986) has studied financial crises in eighteenth century England using data on bankruptcies; Duffy (1982) has worked on Bank of England discount policy but again during an earlier period.[33]

The importance of this data set should not therefore be underestimated. Because of its extensiveness (in terms of the period covered and its frequency and volume) it is at the very least an addition to the literature on the period, which although voluminous is almost completely concentrated on descriptive accounts of events occurring. Empirical work on this period is therefore needed in order to redress the balance and illuminate any differences between what the Bank said it was doing and what it actually did during these years. At the present time there is a gap in the existing literature that it is hoped will be filled at least partially by the analysis undertaken here.

The variables on which data was collected describe a data base that had never been exploited prior to this

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[31] The raw data is presented, in weekly form, in Appendices A and B.

[32] See however section 3.2 which deals with the work of Lovell (1957).

[33] During the suspension of Cash Payments, 1797-1821.

exercise and are as follows:

TVB	Total value of bills discounted
TNT	" number of discount transactions
TVA	" value of advances on bills
VAOS	" value of advances on securities
VAOB	" value of advances on bills[34]
TNAT	" number of advance transactions
TNR	" number of refusals
TVR	" value of refusals
R	Interest rate for the discount and advance transactions

3.2: Seasonality

When analysis of the data is being undertaken certain other factors besides the time path of the data have to be borne in mind. One of these factors is seasonality, which in terms of Bank of England discounts shows up as the commercial bank's practice of **"window dressing"**, re-arranging their asset portfolio in order to present the strongest possible balance sheet at the end of each half year.[35]

Seasonality is an important concept to take into account when considering Bank of England behaviour during this period, as the volume of discounts and of advances could vary by enormous amounts depending upon the time of year. The problem is best illustrated through the use of an

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[34] Up to the end of 1894 there had been only one advances variable shown: advances on bills, although it was not specified as such (it was labelled merely "advances"). From 1894/95 onwards advances were split up into advances on bills and on securities (VAOS and VAOB), the latter referring to loans made on "floaters", which were prime bearer securities. See footnote 59 for further discussion.

[35] See Goodhart (1972) pp.34-36 for further details.

example: a comparison of the level of transactions at the months' end for two months in 1895.

	30th November 1895	31st December 1895
Total value disc. (£)	2000	599 000
Adv. on securities (£)	0	1 515 000
Adv. on bills (£)	0	1 490 000

1895 was in fact a "quiet" year, when Bank rate stood at 2 per cent for the whole year, but even given this low level of activity throughout the rest of the year the commercial bank's practice of building up their balance sheets for the end of the year is clearly illustrated in the above data. The figure for November 30th is fairly typical of that year's level of transactions.

In addition to window dressing, there were other seasonal drains on the Bank of England's gold reserve. For example, there was frequently an autumnal drain of gold to New York which was linked to the harvest. These drains were not always external in destination: there were also drains to Scotland and Ireland necessitated by changes in their circulation.[36] The Bank of England itself was well aware of these seasonal variations and was thus able to take account of them in its discount and advance operations by providing

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[36] In the second volume of A Treatise on Money, Keynes (1930) comments that it is "remarkable to observe that nothing has been done to mitigate the seasonal flows of gold." He estimated that the autumnal drain would decrease the Bank of England's reserve by as much as 20 or 30 per cent, and that this drain never worried anyone.

the market with extra funds at the appropriate times.

However, an interesting question concerns what would have happened if there had been a failure of a major financial institution occurring at a time when the Bank was already fully stretched in dealing with a seasonal drain. It could be postulated that extra demand on the Bank at these times, whether internal or external in origin, would have caused serious problems. The Bank of England's gold reserve was after all finite, and so it is possible to envisage a situation whereby unanticipated drains when added to those that are anticipated could exhaust the Bank's reserve.[37]

3.3: Previous Empirical Work Dealing With Bank of England Discounts

As mentioned at an earlier point, **Lovell** (1957) addressed the question of whether the Bank of England was behaving as a Lender of Last Resort in the eighteenth century. His conclusion, derived from a consideration of the literature and simple statistical analysis of data presented in Clapham (1944) and Hoffman (1955), was that in many ways the Bank could be regarded as acting as a LLR in the eighteenth century.[38] In this section Lovell's

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[37] Miron (1986) provides evidence for the U.S. showing that an event such as a large loan default was more likely to precipitate a financial crisis if the market was already stretched due to seasonal pressure.

[38] This is perhaps a somewhat surprising conclusion, since one of the aims of this study is to determine to what (continued...)

analysis will be examined and then duplicated using data from the 1870-1914 period.

The data used by Lovell were that presented in Appendix E of Clapham's first volume and in Table 54[A] of Hoffman's book, and covered the period 1758 to 1798. The volume of bills discounted is not reported directly in Clapham, but the income received by the Bank on such business is included. Lovell's procedure was thus to calculate the volume of discounts by dividing the income received by the discount rate, assuming a constant 5 per cent interest rate.[39] He then used this generated series in a regression equation relating the volume of discounts to the number of bankruptcies and to the level of industrial production. He found the level of bankruptcies but not the level of industrial production to be statistically significant in determining the volume of discounts, although there was some evidence of autocorrellation in the residuals.[40]

A further estimation was conducted by Lovell in order to analyse short run fluctuations in bankruptcies and

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[38](...continued)
extent the Bank was fulfilling this function during the nineteenth century.

[39] This was the maximum possible rate at this time because of the Usury Laws. In fact, 5 per cent was the appropriate discount rate for this period: see Lovell (1957) pp.19.

[40] It should be noted at this point that the analysis was being undertaken in the mid 1950s, when mechanical aids to empirical work were not readily available, and further that econometrics had not reached its (relatively) advanced present state.

industrial production by specifying variables in terms of first differences. In this estimation autocorrellation was not a problem, and bankruptcies were still significant in the equation. There was however a reversal of the sign on industrial production (positive to negative),[41] suggesting that short run falls in industrial production below trend levels were bringing about an increased demand for discount facilities at the Bank of England.[42] From these results Lovell concluded that the Bank was acting as a LLR, since, as illustrated by the second estimation, both bankruptcies and industrial production performed in a way consistent with the hypothesis that the Bank was acting as a LLR by providing liquidity to the market in times of stress.

The duplication of Lovell's analysis was carried out using data from the "Daily Discount" series which has

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[41] Industrial production was still statistically insignificant in this equation however.

[42] Lovell's estimated equations were as follows:

Sample 1758 - 1798:

(a) $D_t = 84.01 + \underset{(1.01)}{2.30P_t} + \underset{(2.68)}{2.44B_t}$ $\quad R^2 = 0.403$

where:
D_t = estimated volume of discounts
P_t = level of production index (1913 = 100)
B_t = bankruptcies (1913 = 100)
all at time 't'.
't' statistics are in parentheses.

Sample 1759 - 1798:

(b) $D_t = 92.84 - \underset{(-0.35)}{1.45P_t} + \underset{(5.53)}{3.04B_t}$ $\quad R^2 = 0.522$

where:
$D_t = D_t - D_{t-1}$ etc.

already been described.[43] Data for bankruptcies and industrial production were available from the same source as used by Lovell,[44] and the equations were estimated for the period 1870-1914. The only difference between the analysis for the later period and that of the original one was that the Hoffman data source gives two series for industrial production (industrial production including and excluding building), and Lovell gives no indication in his paper which of the two he uses. Thus the equations were estimated separately for this period using both series.

The main area of disparity between the equations for the earlier (eighteenth century) and later (late nineteenth -early twentieth century) periods was that the coefficient on bankruptcies was consistently negative throughout the estimation for the later period, implying that the volume of bills discounted decreases as the number of bankruptcies increases. This is obviously not as one would expect, and so a series representing bank failures[45] was substituted into the equation, but with indifferent results.[46] However, the variable representing bank failures carried a positive coefficient rather than a negative one in these equations, indicating that Bank of England discounts do in fact

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[43] This is in fact the same series as that generated by Lovell for use in his analysis.

[44] Hoffman (1955) Table 54, Part B.

[45] As opposed to failures of all types of business units. The series used was that reported in Capie & Webber (1985), Appendix II. See figure 5.5.

[46] In the sense that the results were of similar magnitudes but with smaller R^2s and 't' statistics.

increase as failures of banks increase, as would be expected, in contrast to the previous analysis. The coefficient on industrial production was positive in both long and short run estimations, implying that the influence of rising industrial production creating an increased demand for Bank of England accommodation outweighs the effects of shortfalls in production necessitating extra-ordinary funds from the Bank, even in the short run. There was no real difference in the equations irrespective of which industrial production term was used.[47]

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[47] Examples of the estimated equations are as follows:
Sample = 1870-1914:

(a) $TVB_t = 33639 - 573Brupt_t + 713IPinb_t$ $R^2 = 0.31$
(-3.47) (3.79) $DW = 1.08$

Where: TVB = Total volume of bills discounted at the Bank of England (£000's)
Brupt = bankruptcies (1913=100)
IPincb = industrial production including building (1913=100)

(b) $TVB_t = 22527 - 469Brupt_t + 8161IPexb_t$ $R^2=0.35$
(-2.98) (4.21) $DW=1.25$

Where: IPexb = industrial production excluding building (1913=100)

(c) $TVB_t = -30298 + 638BF_t + 6061IPinb_t$ $R^2=0.12$
(0.47) (2.83) $DW=0.81$

Where: BF = bank failures (number)

Sample 1871-1914:

(d) $TVB_t = -51632 + 1170BF_t + 10241IPexb_t + 0.44AR(1)_t$
(0.93) (2.42) (1.63)

$R^2=0.29$, $DW=1.51$

(e) $DTVB_t = 16905 - 154DBrupt_t - 13026DIPinb_t$ $R^2=0.14$
(-0.73) (-2.80) $DW=1.99$

(continued...)

Lovell's conclusion that the Bank of England was acting as a LLR is derived partly from his analysis of written sources and partly from the statistical analysis undertaken. The application of this analysis to a later period (1870-1914) does not produce the sort of results one would expect: not only does the inclusion of bankruptcies as a explanatory variable produce a negative coefficient on the variable, but the inclusion of bank failures instead, possibly more relevant for this analysis, produces coefficients that are of the appropriate sign but are insignificant. However, in the light of these results it is not possible to conclude either that the total volume of bills discounted was inversely proportional to the incidence of bankruptcies, or that the incidence of bank failures had no influence on the extent of Bank of England accommodation. Rather, it would seem that analysis in annual terms is inappropriate here, since it "misses" too much of the activity at the Bank.

Lovell's analysis has much to recommend it, since it tests whether the Bank of England was acting as a LLR in the "Classical" sense: as an aid to the market in times of stress. The analysis is testing whether the liquidity

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47 (...continued)
Where: $DTVB_t = TVB_t - TVB_{t-1}$ etc.

(f) $Dtvb_t = 17252 + 157DBF_t - 13207DIPinb_t$ $\quad R^2=0.12$
$\qquad\qquad\qquad\quad (0.18) \qquad (-2.82)$ $\quad DW=1.00$

In equation (d) an AR(1) term is used in attempt to eradicate some of the autocorrellation that is present, as indicated by the low Durbin Watson statistic in the earlier equations.

injections that the Bank makes into the market are high firstly when market conditions are tight (as proxied by both bankruptcies and bank failures), and secondly when there is a downturn in the economy as a whole (as proxied by industrial production). However, the main problem, which is a recurrent one in analysis of the Bank of England's behaviour in relation to the markets in times of financial tension, is that the study uses annual data, which is too low a frequency to capture much of the market activity occurring on a day-to-day basis. In effect, what is happening is that much important information is lost when Bank discount data are aggregated into an annual form. However, the reason that studies use annual data is again a perennial one: the unavailability of much of the production and bankruptcies data, not to mention a reliable income series,[48] in higher frequencies.

In conclusion then, the investigation performed both above and thirty years ago by Lovell is valuable mainly because it forces us to consider firstly which variables might affect the demand for Bank of England accommodation, and secondly whether analysis of this sort using annual data is worthwhile at all. Unfortunately, in some ways we are forced to conclude that the analysis misses far more than it is able to pick up.

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[48] Data on income is available quarterly, but none of the other variables are available at even this frequency, making analysis impossible.

3.4: Graphical Description of the Data

In this section we will describe more explicitly the pattern of the data over the forty-five years under analysis, starting with the annually aggregated series and then continuing with the data which has been aggregated on a weekly basis and is graphed annually.

These graphs are presented in figures 5.7 to 5.17, eleven graphs: two showing a comparison of the annual trends (the volume of discounts, advances and refusals on one and the number of transactions variables on the other), and the other nine depicting the time path of the individual variables, including that of the average (daily) interest rate at which these transactions were carried out.[49] In addition, the data aggregated into annual form is shown in Table 5.1 overleaf, together with the annual average and standard deviations.

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[49] The volume and number of transactions variables are totals: weekly or annual sums of all business taking place in that time period. However, it makes no sense to have an aggregated interest rate, and so the weekly or annual rate has been averaged over the appropriate time period.

Table 5.1: Annual Daily Discount Data.

	TVB	TNT	R	TVA	TNAT	TVR	TNT
1870	18935968	4676	2.63	25384884	917	479480	617
1871	18819097	4144	2.42	25127274	874	709585	649
1872	24810114	4128	3.45	28086527	827	1550184	40
1873	30733684	4772	4.18	22368601	655	2380141	839
1874	12391567	3365	3.06	10979877	357	619845	494
1875	13525260	3347	2.73	10827203	388	569880	507
1876	7103781	2447	2.17	5053150	279	283249	352
1877	7420878	2478	2.42	4856141	251	664006	371
1878	13026771	2624	3.16	13484555	397	1543957	469
1879	9304862	2388	2.09	4165872	254	264955	351
1880	6649206	2347	2.29	15169737	391	182299	267
1881	6913860	2253	2.91	15456463	305	532152	227
1882	5246258	1953	3.35	16372257	273	132101	164
1883	8349348	2051	2.96	10741884	234	142218	203
1884	5728038	1719	2.41	10091967	236	770163	199
1885	3928596	1613	2.41	4449277	167	269069	169
1886	3558691	1327	2.48	5178659	146	925658	134
1887	3061377	1202	2.63	9476531	183	51555	76
1888	4651233	1246	2.59	12487554	188	413481	118
1889	4233431	1167	2.70	10424536	176	531970	89
1890	13208236	1368	3.55	15289270	245	1429458	117
1891	11429514	1353	2.64	3413717	123	1095358	104
1892	6540290	1082	1.88	4242119	121	84826	76
1893	38531721	970	3.19	59911542	672	32142	27
1894	703902	904	1.59	11351289	160	33603	74
1895	5530656	824	1.38	14094752	195	197508	54
1896	8307895	842	1.74	14726866	179	119234	48
1897	9833041	857	1.85	31509711	344	39589	44
1898	10719165	792	2.49	71636379	1008	21819	45
1899	19855048	949	2.65	55343813	744	609024	57
1900	23116832	991	2.93	86662908	1128	692238	44
1901	10301294	624	2.61	104118046	1202	9854	16
1902	11565831	592	2.51	201882702	2043	2193	8
1903	10409245	609	2.71	186381357	1757	5083	11
1904	11778775	589	2.25	59204423	576	11047	9
1905	25077244	740	2.04	77244444	731	46082	25
1906	38531721	970	3.19	59911542	672	32142	27
1907	36244643	939	3.50	42822894	487	42563	20
1908	23985923	664	1.99	42053354	470	25739	18
1909	20695352	563	1.89	38621378	396	48126	15
1910	23385272	651	2.48	68818538	563	382180	31
1911	32363850	667	2.29	59755815	525	77228	29
1912	58186576	1053	2.70	47387740	434	216872	75
1913	41585828	785	2.97	41381165	349	151318	64
1914	154112109	3240	2.72	44068705	305	7391995	1322
Avge	19119822	1664	3.00	37822609	509	573626	209
STD	23718115	1162	1.00	42117311	408	1145438	271

FIG 5.7: BE DISCOUNT & ADVANCE ACTIVITY

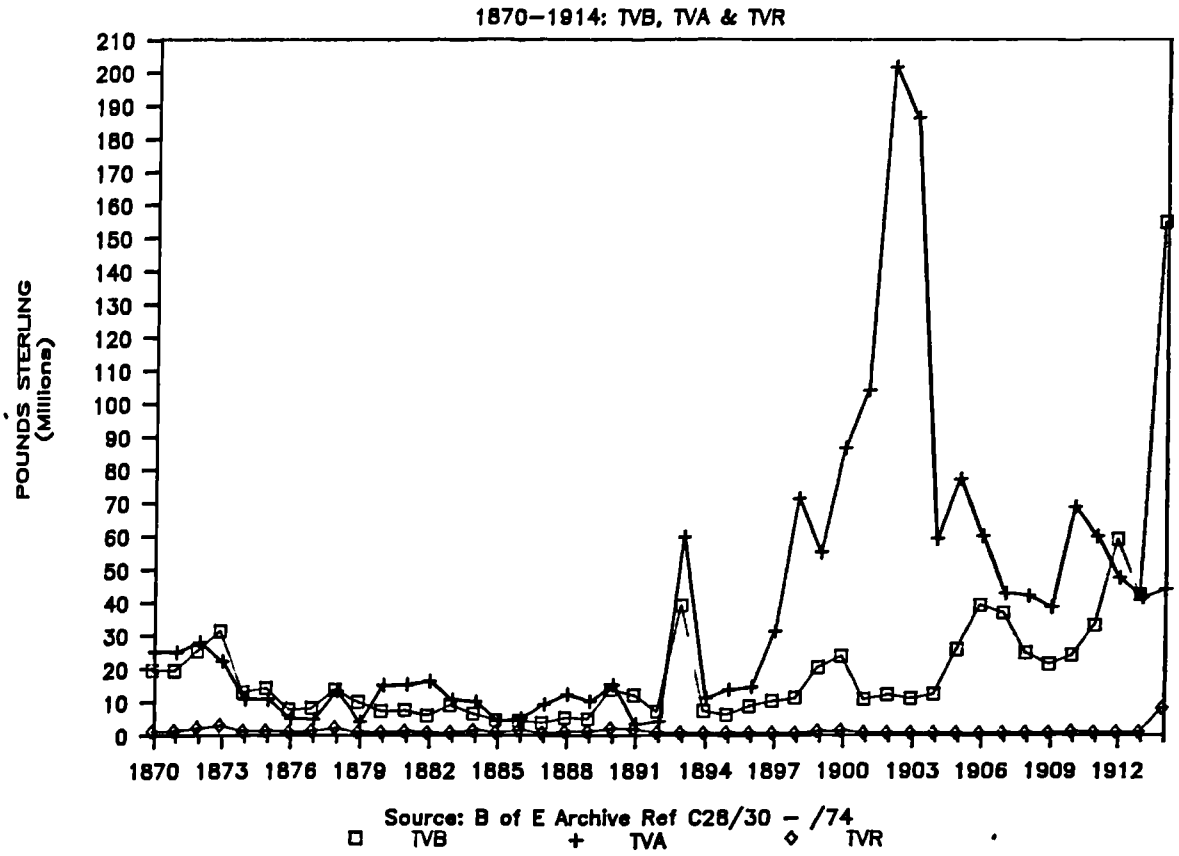


FIG 5.8: BE DISCOUNT & ADVANCE ACTIVITY

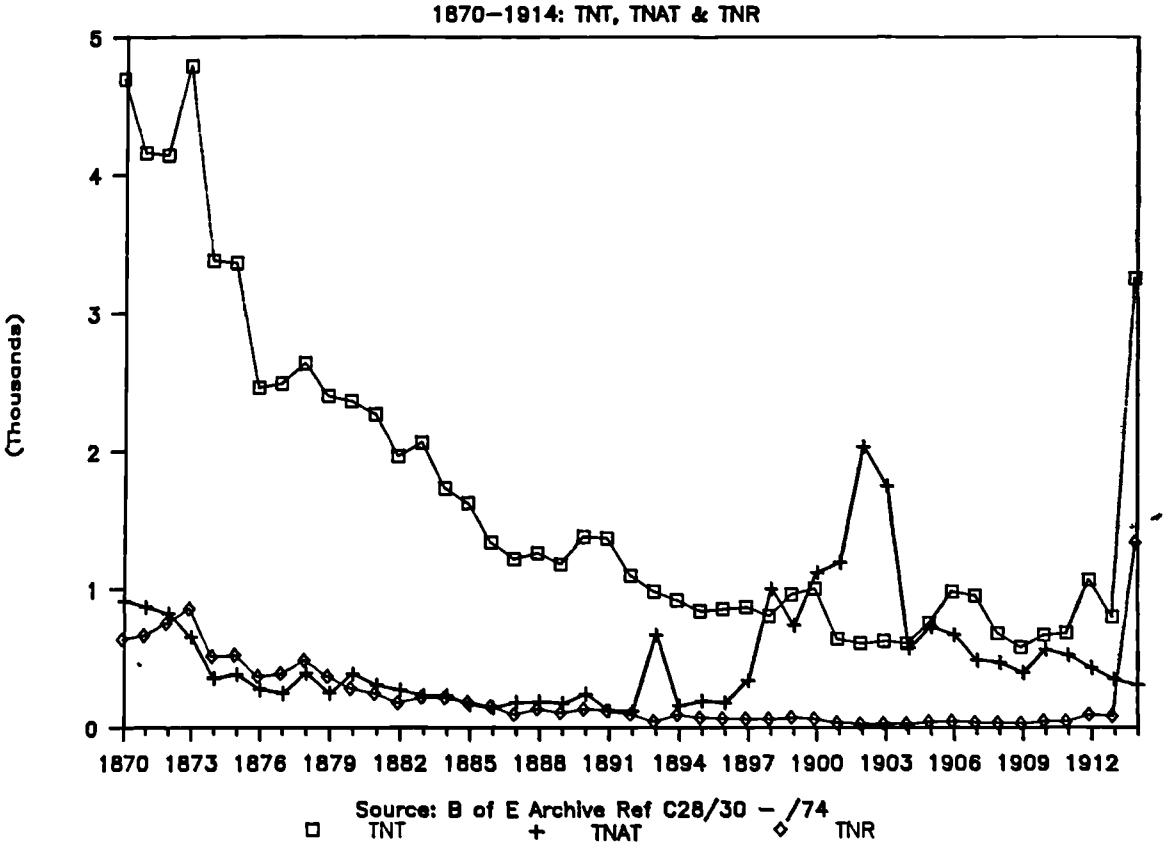
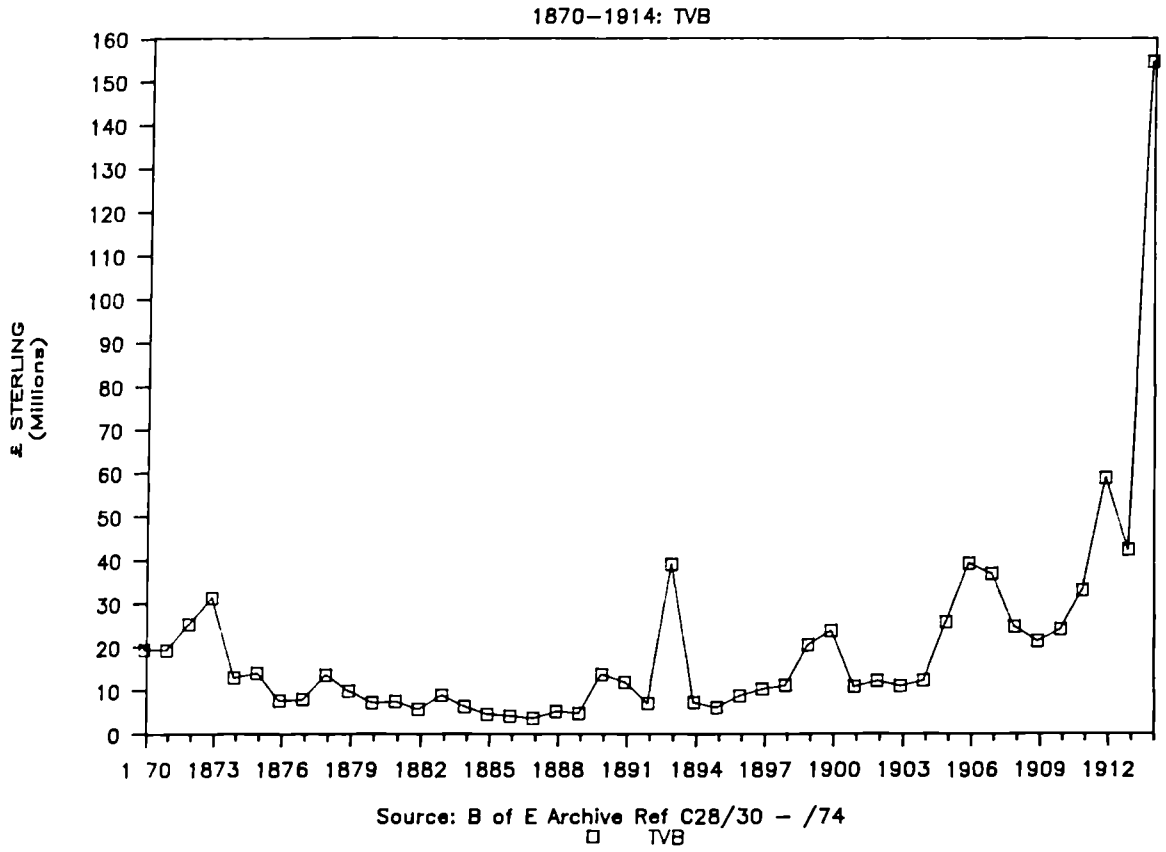


FIG 5.9: BE DISCOUNT & ADVANCE ACTIVITY



F G 5.10:BE DISCOUNT & ADVANCE ACTIVITY

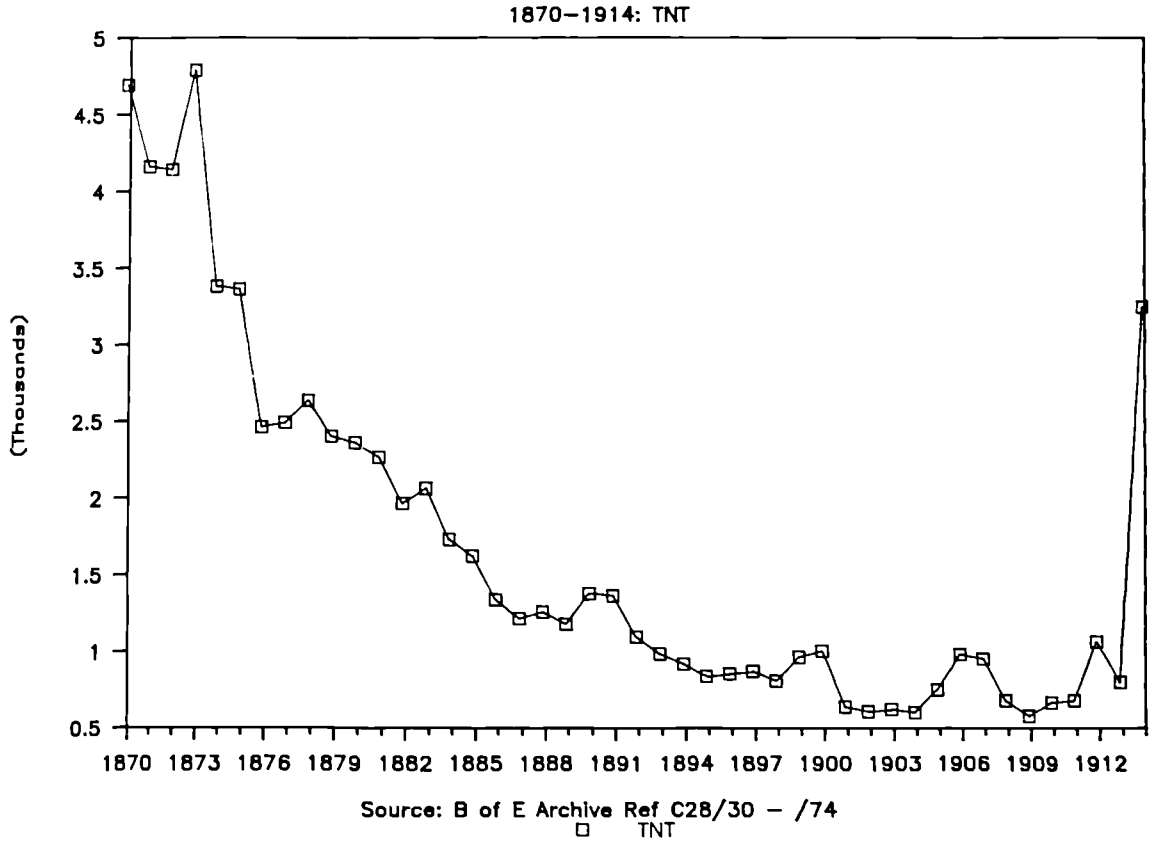


FIG 5.11:BE DISCOUNT & ADVANCE ACTIVITY

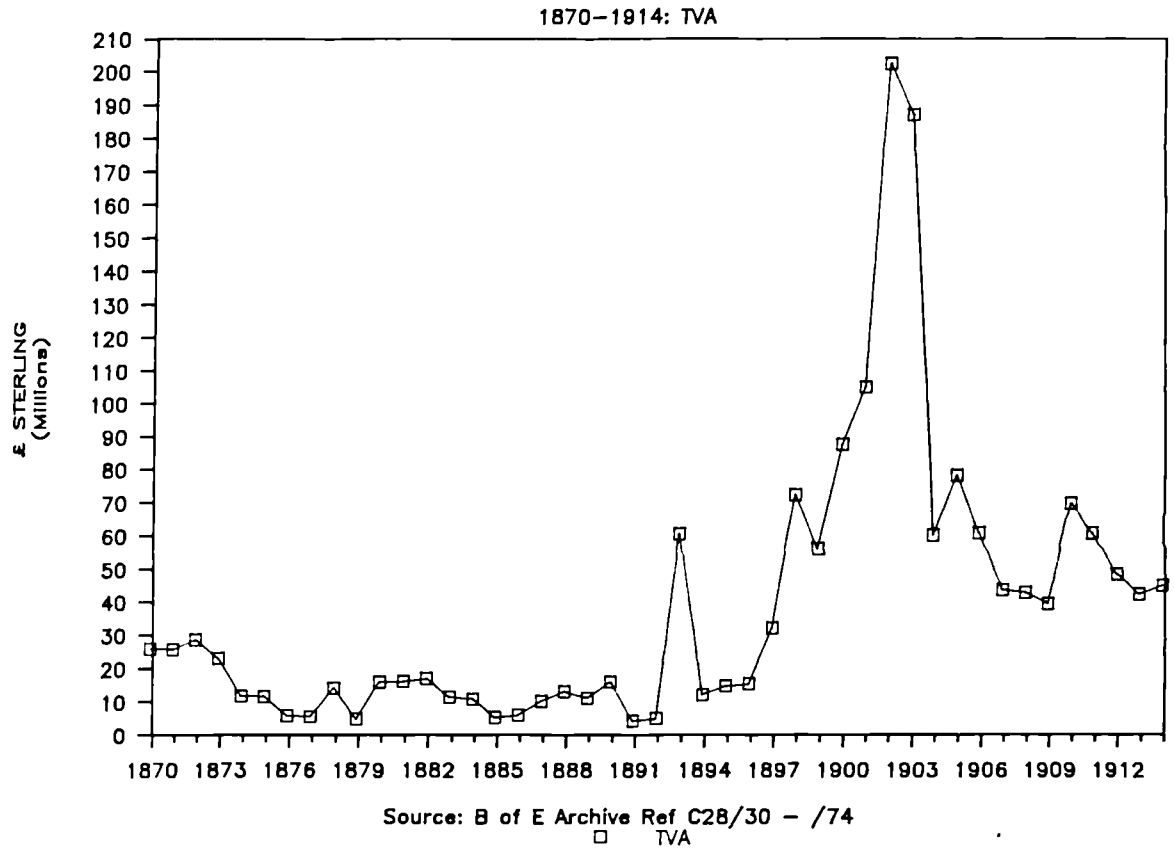


FIG 5.12:BE DISCOUNT & ADVANCE ACTIVITY

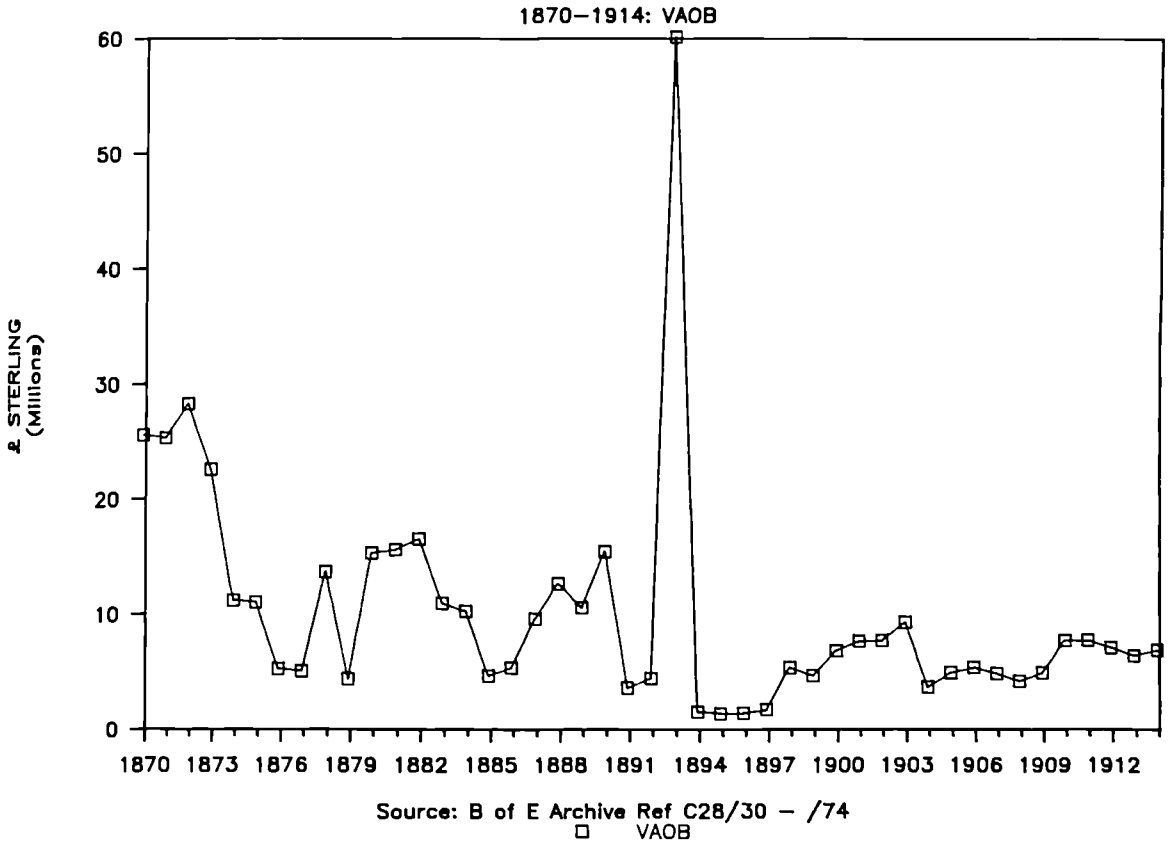


FIG 5.13:BE DISCOUNT & ADVANCE ACTIVITY

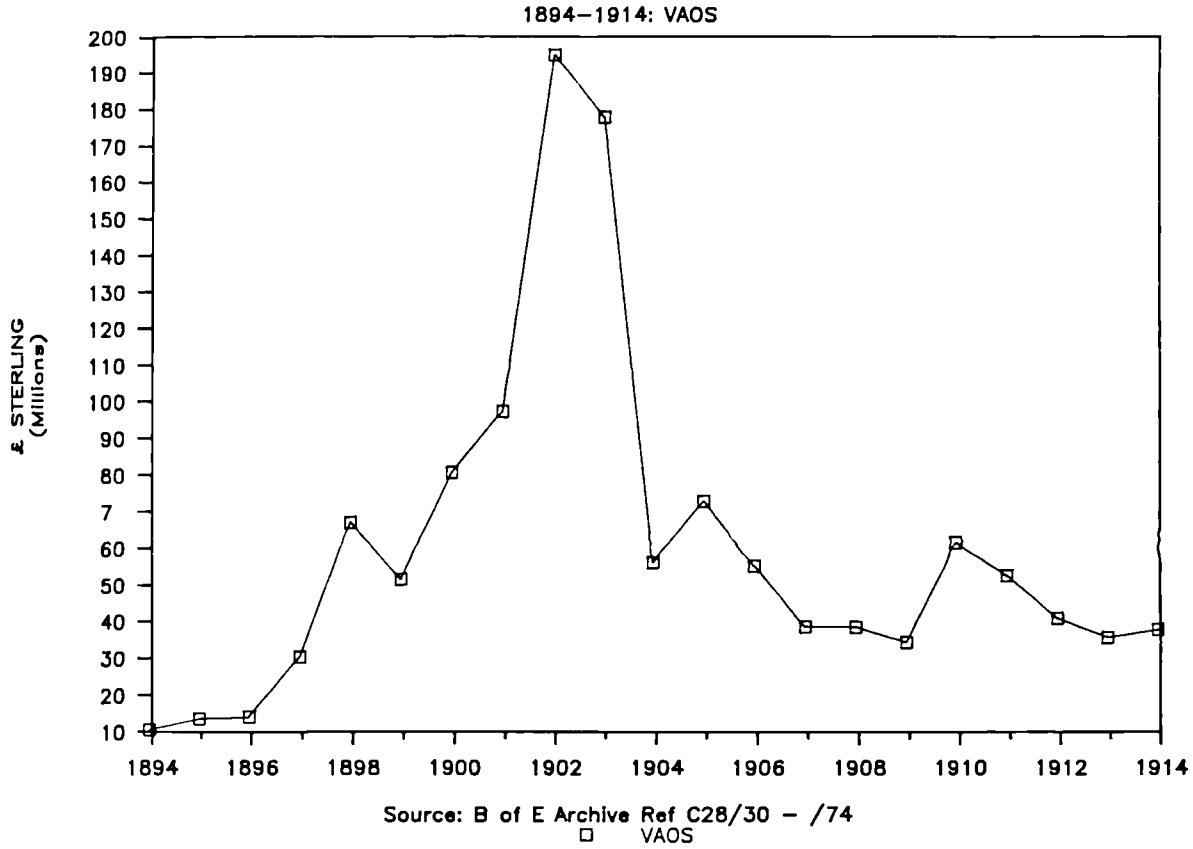


FIG 5.14:BE DISCOUNT & ADVANCE ACTIVITY

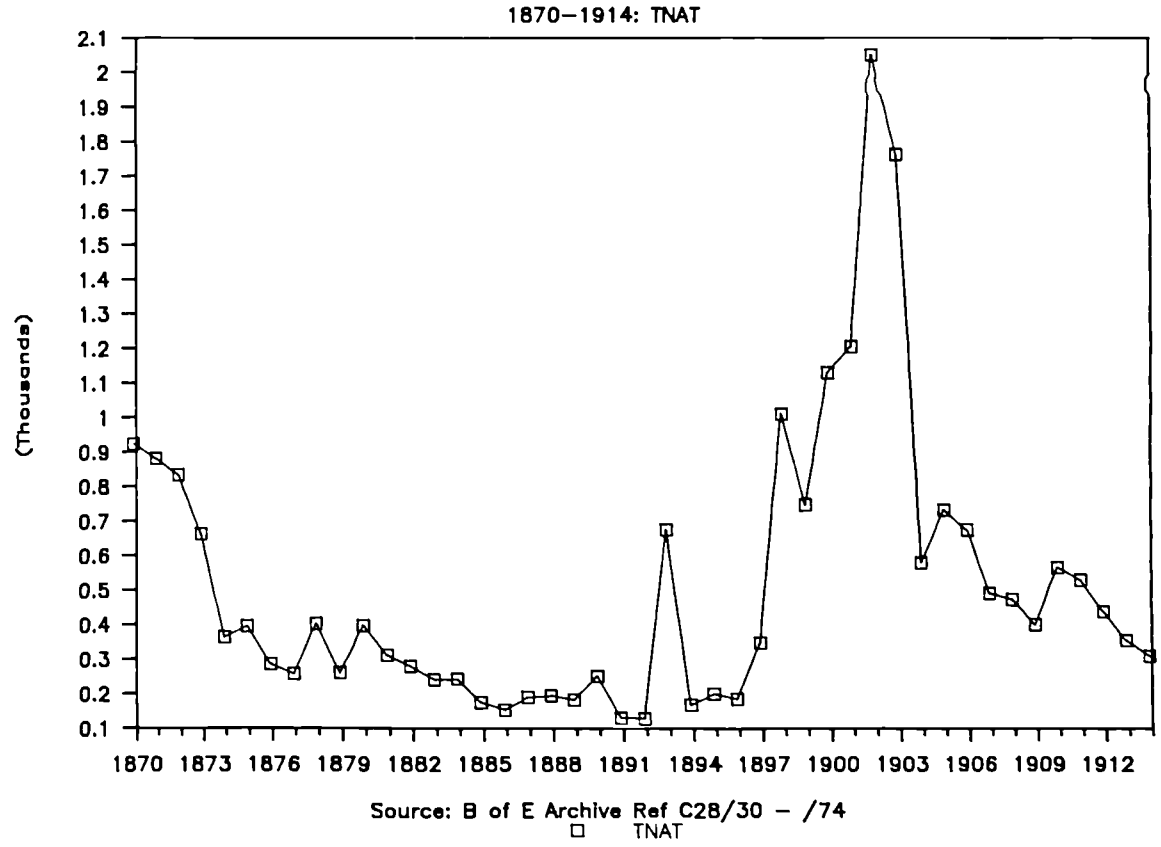


FIG 5.15:BE DISCOUNT & ADVANCE ACTIVITY

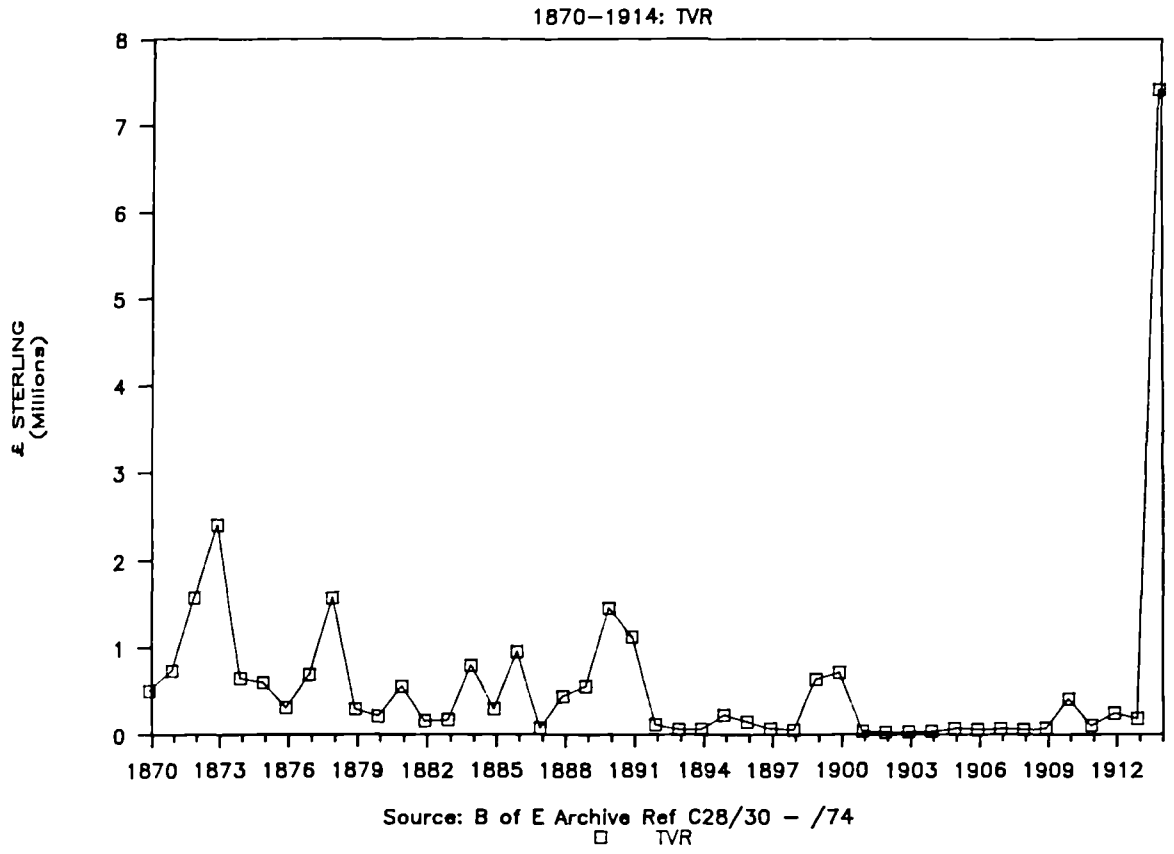


FIG 5.16:BE DISCOUNT & ADVANCE ACTIVITY

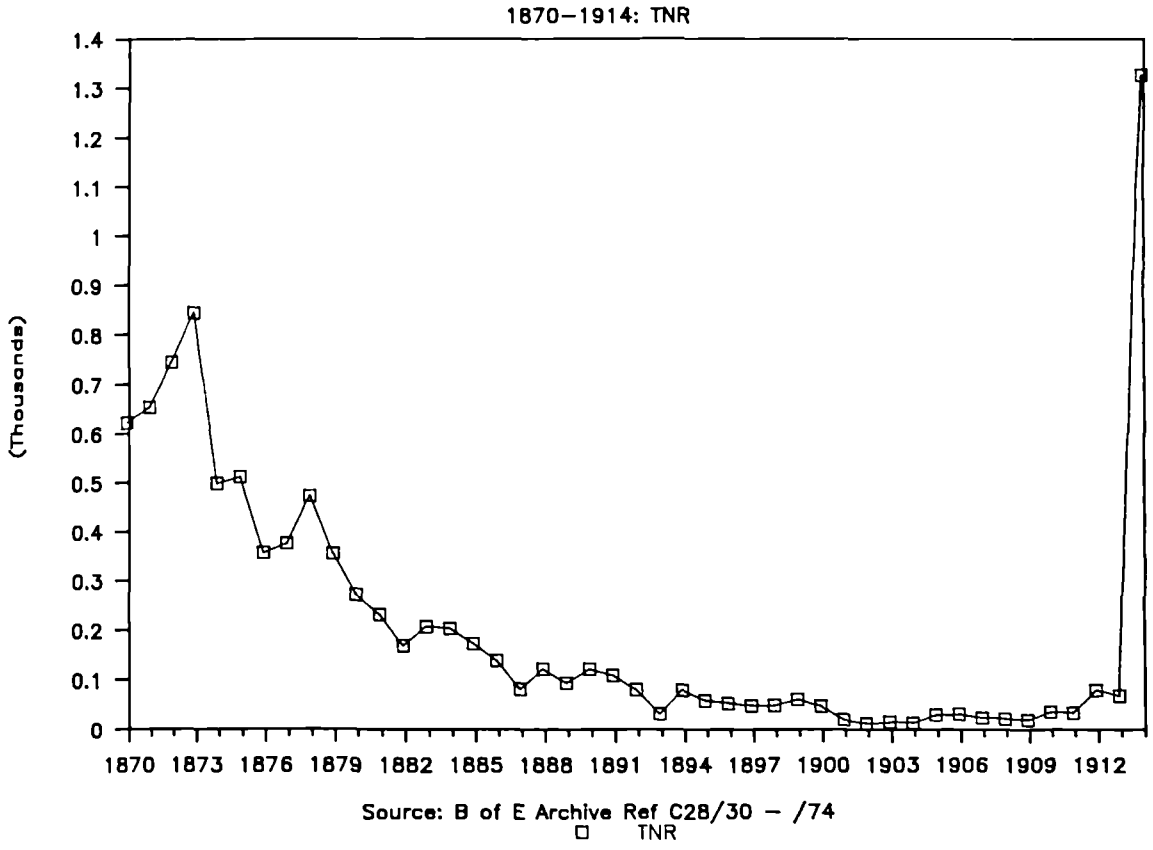
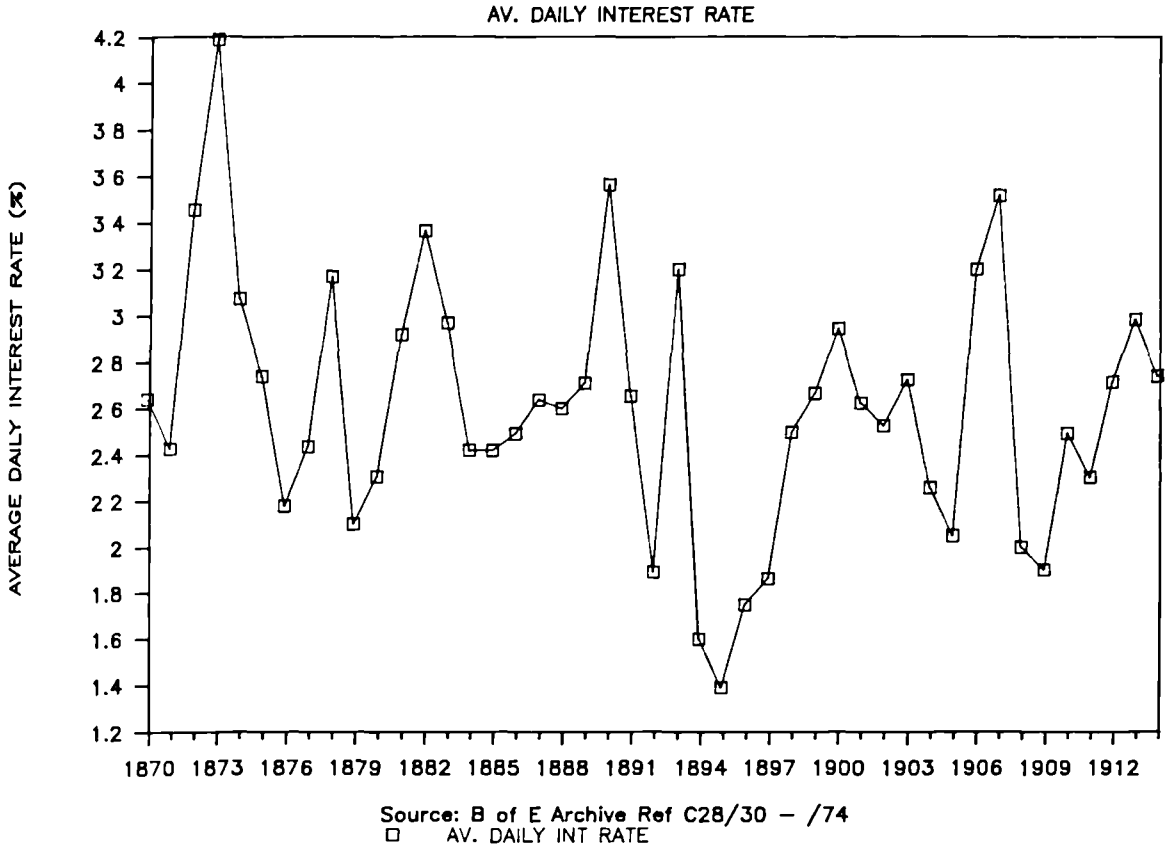


FIG 5.17:BE DISCOUNT & ADVANCE ACTIVITY



3.4.1: Annual Series: 1870-1914

These graphs give an indication of the changing pattern of the Bank of England's discount and advance behaviour over the period 1870-1914, depicting in part the changing relative importance of discounts and advances. Until 1896 discounts and advances follow a similar time path, both experiencing the same peaks and troughs, although advances were in general larger in volume than discounts. In addition, advances show a greater standard deviation than discounts.[50] Between 1897 and 1910 however advances become much more important: whereas discounts fluctuate between approximately £8 and £40m annually, advances vary between £35 and £200m and are in general over £50m. Advances peak in 1902 at a value of slightly over £200m, followed by £190m in 1903.

Between 1911 and 1914 discounts become predominant, especially in 1914 when advances accounted for only 22.25 per cent of total advance and discount business.[51] This particular concentration on discounts rather than on

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[50] For the period 1870-1914, using annual data, the figures for the mean and standard deviation of discounts and advances are as follows:

	Discounts	Advances
Mean	£19,119,822	£37,822,609
Standard deviation	£23,718,115	£42,117,311

Thus the mean discount figure is just over half that for advances, with a significantly lower standard deviation.

[51] Compared with advances accounting for 94.58 per cent of the total in 1902.

advances can be accounted for mainly by the fact there was an agreement made in the summer of 1914 between the government and the Bank of England that the latter would discount any approved bill of exchange that had been accepted before August 14th 1914, in an attempt to stabilise the financial system which was under great strain at the time due to the outbreak of war. Furthermore, the Bank agreed to lend money to the acceptor (at a rate of interest of 2 per cent above Bank Rate) if the acceptor was not in a position to pay when the bills matured. Any balances that were not recovered by the acceptor would not be claimed by the Bank until one year after the end of the war. This had the affect of stabilising the financial position of the U.K. trading sector, but was at the cost of an enormous increase in the monetary base.[52]

The number of transactions variables do not in general display the same characteristics in their time paths as their associated volume variables. The total number of discount transactions (TNT: figure 5.10) shows a steady downward trend over the period, except for a sudden increase in 1914, and the total number of refusals variable (TNR: figure 5.14) follows a similar pattern.[53] However,

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[52] Changes in the Monetary Base (MO):
1914 - increased by 21.68 per cent
1915 - increased by 16.37 per cent
The greatest increase occurred in Quarter 3 of 1914 when MO increased by 27.48 per cent, followed by 21.88 per cent in Q4.
Source: Capie & Webber (1985) Table 1.(1)

[53] This relationship between the number of discount transactions and the number of bills refused would be
(continued...)

the total number of advance transactions (TNAT: figure 5.13) follows a time path that is much more highly related to its associated volume variable, TVA, with peaks and troughs occurring at roughly the same time. There do not therefore seem to have been the underlying changes occurring in the market for advances as were occurring in the market for discounts.

We will now continue with a discussion of the weekly aggregated data: the figures given are thus weekly totals.

3.4.2 - 1870

1870 shows a large variation in advances: 0 to £490,000. Discounts are not as active, but there are far more discount than advance transactions. There is a large leap in advances in July (£430,000) with an associated movement in discounts, although this is less accentuated. This increase in discounts and advances may be explained by the outbreak of the Franco-Prussian war in July, which was accompanied by a slight precautionary rise in interest rates. Seasonal pressure (SP) at June and December end.

3.4.3 - 1871

Jumps in discounts and advances in weeks 8 and 37 and 38

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[53](...continued)
expected, since it is logical that as the number of bills presented for discount increases, the number that are refused will increase also. It is also possible that the ratio of bills refused to bills presented will increase as the volume of bills increases, as people who are anxious to obtain cash present bills to the Bank for discount that they would not normally bother with.

(February and September), but refusals and interest rates are fairly steady. Transactions variables follow much the same pattern.

3.4.4 - 1872

1872 shows lower maximum values for all variables, and thus the trends depicted on the graph are exaggerated. There are two periods of SP, June and December. Weeks 6-18 are busy, especially for the number of discount transactions variable, TNT. There is less activity by the middle of the year, but it becomes busier again in July and August, when there is a maximum of £300,000 on both discounts and advances.

3.4.5 - 1873.

Low maximum values, especially for advances (around £350,000), with a large degree of fluctuation in both discounts and advances. There is little SP in June, but more in December. The maximum value of TVB occurs in week 39 (£430,000), with a similar peak in TNT. However, there is not as much variation in the number of transactions, and therefore the <u>size</u> of transactions is varying significantly over the year, as shown by figures 5.18 and 5.19 which illustrate the average size of discount and advance transactions respectively. It is obvious from this graph that, aside from the fact that advance transactions are in general significantly larger than those of discounts,

FIG 5.18: 1873 – DISCOUNTS

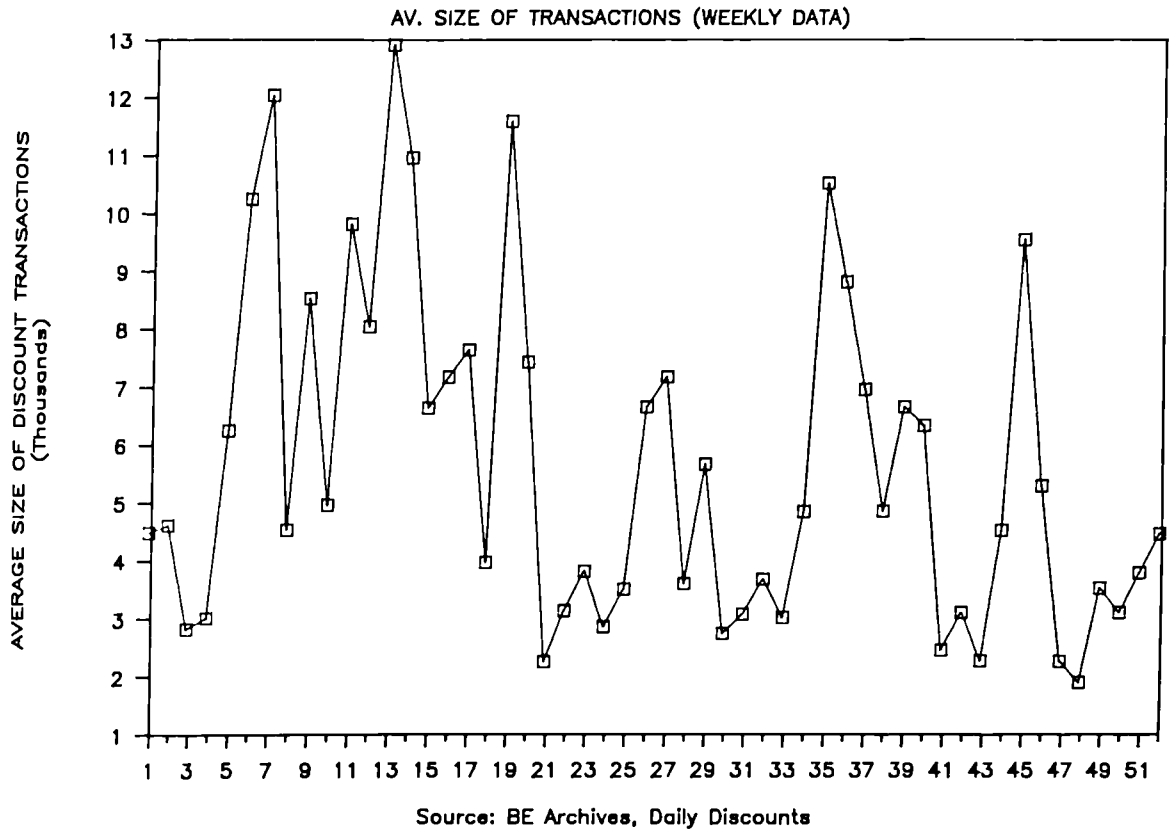
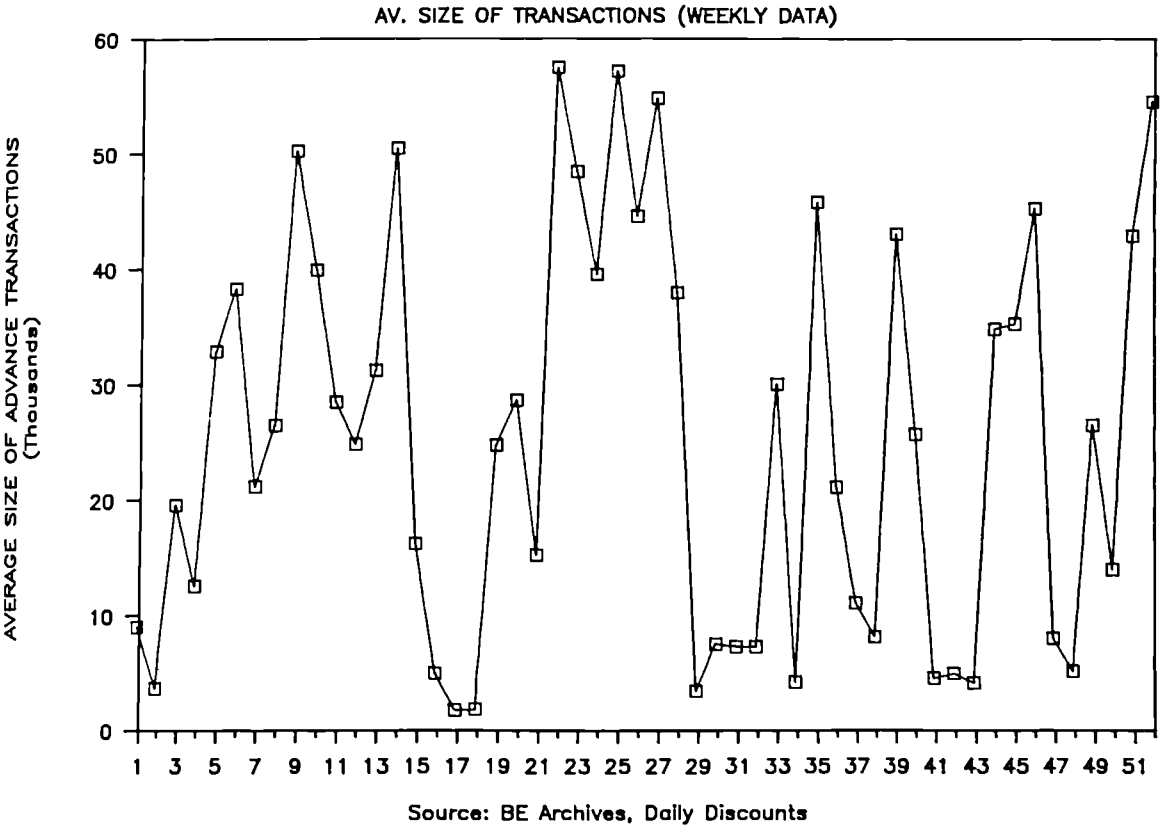


FIG 5.19: 1873 – ADVANCES



advances also display a greater variation than discounts.[54]

3.4.6 - 1874.

1874 marks the beginning of a period of four years when there was significantly less discount and advance business at the Bank of England.[55] The maximum volume of transactions occurs as SP at the end of December (£280,000 on advances), with the maximum apart from SP standing at £200,000 (discounts).

3.4.7 - 1875

1875 was even quieter at the Bank than the previous year: even at the end of December there was only a daily average of £200,000 of advances and £55,000 of discounts. Interest rates are steady at around 4 per cent, but there is slightly more variation in the number of discount transactions, TVB, than in the number of advance transactions.

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[54] In 1873 (and in general throughout the period), advances display a larger standard deviation than discounts: the figures for 1873 are 16106 for advances as opposed to 2884 for discounts.

[55] A comparison between the average yearly advance and discount figures for this and the preceding period reveals the following data:

	TVB	TVA
1870-3	£23,324,716	£25,241,822
1874-7	£10,110,372	£7,929,093

ie there is a 57 and 69 per cent fall in the average yearly discount and advance total respectively in the middle years of the 1870s.

3.4.8 - 1876.

Very quiet - the only time there is more than an £80,000 daily average of business is at the end of December (SP), when advances are equal to £140,000. Between weeks 16 to 51, interest rates are steady at 2 per cent.

3.4.9 - 1877.

Still very quiet, but big leap in week 12 when TVA is equal to £290,000. For the rest of the year TVA is never greater than £90,000 and TVB than £70,000, even at the end of July and of December. Interest rates rise as high as 5 per cent (weeks 42-46).

3.4.10 - 1878

The maximum values of transactions are not a great deal higher in 1878 than they have been in the previous few years, but there is a great deal more business being undertaken at the Bank. There are several large peaks, in discounts as well as in advances: weeks 8-11 (peaks of around £160,000), SP at the end of June (especially on advances), and a bigger peak in week 41 (October): the week of the City of Glasgow Bank failure. Interest rates stand at over 5 per cent from week 41 until week 46.

3.4.11 - 1880.

Two periods of SP - June and December (around £320,000, nearly all the business being on advances). The markets are quiet after June. Interest rates are steady at

approximately 3 per cent.

3.4.12 - 1881.

Apart from SP, the only other significant point is the leap in advances in week 13 (£260,000). There is little other business.

3.4.13 - 1882

Seasonal pressure is far more significant: more than £500,000 in December and £350,000 in June (both on advances). Discounts are very quiet all year. There is a moderate amount of advance business between weeks 4 and 15, with an average daily TVA of approximately £124,000,[56] but it is quiet in the second half of the year. Interest rates vary from 3 to 6 per cent (weeks 4-6).

3.4.14 - 1883

Again, it is busier in the first half of the year, especially on advances. SP occurs in June and December. Non-seasonal advances peak at £270,000 in week 13 (late March). Interest rates are steady all year at around 3½ - 4 per cent.

3.4.15 - 1884

Another quiet year, which is typical of the mid 1880s when discount business in particular is minimal. Advances peak

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[56] As against a daily average for the whole period of £126,827.

at £250,000 in late March. Interest rates climb towards the end of the year, to stand at 5 per cent in December.

3.4.16 - 1885

Again, there is a minimal amount of business on discounts. The maximum value of advances is low (£150,000 in March). Little SP.

3.4.17 - 1886

The peak in advances occurring in March (£330,000) is very noticeable, more especially since there is very little else happening. Little SP.

3.4.18 - 1887

Two periods of SP. The maximum value of advances[57] is £140,000, occurring in March. Little else.

3.4.19 - 1888

Very little discount business. Advances peak at £280,000 (March and September), aside from SP. Interest rates range from 2½ to 5 per cent (December).

3.4.20 - 1889

The advances peak of £360,000 occurs at the end of December, and thus is SP. There is little else over £150,000 on advances and nothing noticeable on discounts. Interest rates finish the year at slightly over 5 per cent.

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[57] Aside from SP.

3.4.21 - 1890

In 1890 there is much more business carried out at the Bank of England, especially on discounts, although there is little SP. The maximum volume of discounts occurs in November (weeks 46-48), which is accounted for by the Baring Crisis, during which period TVB is equal to £370,000.[58] The increased amount of discounting at the Bank is shortlived however: whereas the average daily volume of discounts is equal to £190,000 in November, by December it has fallen to £26,000. Interest rates reach a peak of 6½ per cent in late November.

3.4.22 - 1891

Less business again and little SP. Discounts are more important than advances for the first time in more than ten years, and reach a peak of £250,000 in March. There are very few advance transactions: more business is done on discounts.

3.4.23 - 1892

Advances take over from discounts again: their peak again occurs in March (£250,000). Interest rates hover around 2½ per cent. There are very few advance and refusal transactions.

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[58] Compared to other points in the data, this is not an enormous volume of discounts, as we will see in the next chapter. This thus prompts the question of whether, in rescuing Barings, the Bank of England "over-intervened", or whether it was so successful in its actions that it suppressed the pressure before it got out of hand. We will consider this in more detail in the next chapter.

3.4.24 - 1893

It is busier in the first half of the year, especially in weeks 12 until 22, when there is frequently an average of more than £100,000 of advances or discounts. Interest rates are fairly steady at around 3½ per cent.

3.4.25 - 1894

Less busy: most of the years' business occurs in weeks 8 to 19. After this point the only two instances of any variable exceeding £11,000 are June and December's SP. Both discounts and advances are active in the early part of the year, with an advance maximum of £240,000 and discounts of £150,000. Interest rates stand at 2½-3 per cent throughout the year.

3.4.26 - 1895

The maximum values are much higher: £550,000 on advances and £460,000 on discounts, both at the end of December. Advances show three other jumps: in late February, March and at the end of June, of the order of approximately *£150-200,000*. Apart from these movements, there is practically no business at the Bank. Interest rates are low all year (1½-2 per cent), and there are few discount and advance transactions except during the busy end of year period. However, this is the first year that there were two sorts of advances available at the Bank: on securities and on bills (VAOS and VAOB), and therefore the figure for

total advances is the sum of these two variables.[59]

3.4.27 - 1896

Very little activity in the first half of the year. SP occurs in June, and there is increasing business from mid September onwards, culminating in fairly heavy SP at the end of December (£550-600,000 on both advances and on discounts). Interest rates are steady at around 1½ per cent and then climb towards the end of the year to around 3½-4 per cent.

3.4.28 - 1897

SP in June and December is fairly heavy. There is little business before the SP in June, but it is busier from September onwards. Interest rates are steady and there are a fairly low number of discount and advance transactions.

3.4.29 - 1898

1898 is the year that marks the beginning of a much heavier period of activity at the Bank of England, as can be seen from the following figures:

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[59] In May 1894 it was decided that all applications for short term loans on securities, whoever they originated from, should be handled by the Discount Office, rather than as previously by the Chief Cashier's Office (**Court Books Rd, 24.5.1894, Minutes of the Bank's Court of Directors**). The aim of this was to achieve some greater degree of unity between the Bank's discount and advance operations. Centralising these on the Discount Office was seen as a second best solution however; the original aim was to have all business carried on in the Chief Cashier's Office, but "structural difficulties" apparently prevented this.

	Average Yearly Totals	
	TVB	TVA
1891-1897	£12,411,003	£19,892,856
1898-1905	£15,352,929	£105,309,259
	Average size of transaction	
	TVB	TVA
1891-1897	£12,715	£77,621
1898-1905	£20,867	£91,696

It is obvious that the greatest increase in business comes from advances, which show a 162 per cent increase between the two periods. Note also that there is a fairly significant increase in the average size of both discount and of advance transactions, which is a reflection of the fact that the number of clients with access to facilities at the Bank was declining over these years, but that the amount of business that these clients were involved in was increasing.[60]

SP at the end of December reaches close to the £1m mark on both VAOS and VAOB (ie a total value of advances of approximately £1.8m). There is heavy discounting and advancing from mid February until mid May, reaching a peak of £660,000 (VAOS), £420,000 (discounts) and £320,000 (VAOB), all around the middle of March. It is quieter for the rest of the year. Interest rates are steady at 3-4 per cent throughout the year, with not very much variation in the transactions variables, except for a large number of advance transactions (24) during the end of year SP.

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[60] See section 2.2 for further discussion.

3.4.30 - 1899

SP is very heavy in June and in December. There are other large maxima however: £680,000 in March (VAOS) and over £500,000 of advances on bills in successive weeks at around the same time. Discounts are of a lesser magnitude but are active throughout the year, reaching a maximum of almost £500,000 in late September. Peaks in the transactions variables coincide with peaks in their ass ciated volume variables. Interest rates creep up towards 6 per cent by the end of the year: this is a precautionary rise associated with the onset of the Boer War.

3.4.30 - 1900

Advances are still significantly larger in volume than discounts, but the latter are larger than they have been in previous years. Advances reach a maximum in week 11 *(£1.4m)*, at which point discounts and the number of advance transactions also have their maximum values for the year (£920,000 and 30 respectively). This early period of pressure might be due to the continuing speculation as to the nature of the Boer War. SP is much less important: in neither June nor December do discounts/advances reach anything like their March levels. Interest rates fall back quickly from their early peak of 6 per cent to hover around 4 per cent for the rest of the year.

3.4.31 - 1901

SP is more pronounced: maximum values are reached in June and December. However, a period of consistently heavy advance business occurs from February to May: the average advance on securities is £319,450 and on bills is £230,075 per day, 4.3 times the average total advance figure for the period as a whole. The average size of advance transactions is smaller in these months than for the period as a whole however: £46,550 as against £74,243, implying that the pressure on advances came from many different sources and was not concentrated on a few large firms wanting advance facilities at the same time. Interest rates are steady at around 4 per cent for the whole year.

3.4.31 - 1902

Even larger maximum values for SP (mostly advances on securities: £1.45m in June and £1.7m in December). Advances on securities are heavy all year, but particularly for the first six months, coming to a peak of £1.3m towards the end of March. Over the year as a whole total advances reach their maximum value for the period 1870-1914: £205m, since although the weekly maximum is not as large in 1902 as it is in other years, there is a consistently large volume of business being carried out at the Bank over several months. Discounts and advances on bills are noticeably quieter this year, and interest rates are fairly constant at 3 per cent.

3.4.32 - 1903

SP is almost absent compared to the maximum value reached by advances on securities in week 19 (beginning of May) of £3.1m, accompanied by £1.3m on advances on bills but only £0.1m of discounts. Over the first half of the year the mean daily figure for VAOS is £747,950, dropping to £121,589 for the second six months, giving a figure of £434,769 for 1903 as a whole. For example, on 8th May 1903 a total of £11.5m was advanced (£8m on securities and £3.5m on bills), with the average size of transaction equal to £140,000.[61] The greatest proportion of the business on advances came in the first half of the year, with very little occurring in the second six months. This pattern is repeated in the time paths of the other variables: what activity there is occurs before the end of June. Interest rates do not vary a great deal over the year from their initial level of 3 per cent.

3.4.33 - 1904

Quieter than the previous year: SP is noticeable again, especially in June. Discounts are still quiet: activity is centred once again on advances on securities, which reach £600,000 in early April and £550,000 in late July. Interest rates vary between 2 and 3½ per cent, giving an average daily rate over the year of 2.68 per cent.

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[61] According to the Bank's records, this was the highest amount discounted or advanced in one day. (Bank of England Archive Reference C29/2, folio 14.)

3.4.34 - 1905

Most of the year's activity is concentrated into the two points of SP in June and December and there is very little other business taking place. Discounts are still very quiet, and interest rates stand at 2-3 per cent all year.

3.4.35 - 1906

Busier, but SP is still dominant. Discounts are active again in the first few months of the year, but are overtaken by advances at the SP points. However, discounts are increasing in relative importance from here on. Interest rates vary between 3 and 6 per cent (end of year).

3.4.36 - 1907

The yearly totals for advances and discounts are closer together in 1907 than they have been in any year since 1896: discounts exceed advances in value for much of the year, but advances are dominant at the SP points. Associated with this, the number of discount transactions is greater than it has been for several years. Interest rates vary between 2 and 7 per cent (end of year).

3.4.37 - 1908

Slightly quieter than the previous few years on both discounts and advances,[62] and advances on bills are more

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[62] As shown by the following figures:

	Av. Daily Vol. Discounts	Av.Daily Vol. Advances
1906	£740,995	£194,113

(continued...)

important than on securities for the first time. There is one peak (apart from SP) - £550,000 of advances on bills in March; similar lower peaks on securities and discounts. In general there is a low number of transactions. Interest rates decrease over the year (4 - 2 per cent).

3 4.38 - 1909

Advances are slightly higher than discounts over the year: most of the advances are on bills rather than *on* securities. High SP in June and December - nothing over £400,000 apart from this. During the quiet few months of July, August and September the daily average for discounts is £17,617, for advances on bills £1577 and advances *on* securities average zero on a daily basis over the period. Activity is similarly quiet as regards the transactions variables with only the SP providing any significant movement. Interest rates hover around 2 per cent until November when they start to rise, reaching 5 per cent by the end of the year.

3.4.39 - 1910

Here we see higher maximum values than in recent years, although mainly concentrated on the SP points. Other maxima occur in March (£700,000 of advances on securities) and October (£500,000 of advances on bills). Discounts are fairly low. The average number of transactions per day

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[62](...continued)

1907	£697,012	£140,403
1908	£78,642	£137,879

across all variables is less than 3. Interest rates vary between 2 and 4 per cent.

3.4.40 - 1911

Discounts reach a peak of £1.43m at the beginning of March, but SP is greater than this: £1.7m in June and £2.6m in December, both on advances on bills.Interest rates hover around 3-4 per cent.

3.4.41 - 1912

Discounts exceed advances in value for the first time since 1891. Although SP is concentrated on advances (on bills), most other business throughout the year is carried out on discounts: peaks in March (£900,000) and in early June (£1m). The number of discount transactions reach similar peaks at these points. Interest rates vary between 2 and 6 per cent over the year.

3.4.42 - 1913

There is a lower volume of discounts and of advances than the previous year, and a fair amount of activity on discounts in February and March: the average daily volume of bills discounted is equal to £363,899. SP occurs in June and especially in December, when advances take over from discounts as the dominant variable. Rather more activity on the number of transactions, echoing the pattern of discounts. Interest rates are very variable between 2½ and 5½ per cent.

3.4.43 - 1914

The pattern of business in 1914 is obviously very different from previously. Discounts overshadow advances throughout the year, with the former reaching their maximum value for the period 1870-1914, but advances only total just over £44m for the year, 22 per cent of their peak value of 1902. Discounts reach a maximum value of almost £4.8m in the third week of August; 89 per cent of the total discounts for the year occur in the seventeen weeks between August and mid November, with the average daily discount figure being equal to £1,380,592, compared to £505,284 for the year as a whole. For almost the first time, the total value of refusals are noticeable: in 1914 they are equal to almost £7.4m, as opposed to an annual average over the preceding forty-four years of only £428,400.

Transactions variables also show much more activity in 1914. The number of discount transactions reach a maximum of 67 at the same point as the maximum in the volume of *discounts is* reached, and remain high for the remainder of the year. Advance transactions similarly increase, and the number of refusals rises simultaneously with the rise in the volume of refusals. Interest rates, having risen at the beginning of August,[63] stabilise at 5 per cent, a level at which they remain almost until the end of the year.

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[63] Bank Rate rose from 3 to 4 per cent on July 30th, to 8 on July 31st, and finally to 10 per cent on August 1st, where it stood for four days during the extended Bank holiday, until it was brought down to 6 on August 5th.

4: Conclusions

This chapter has achieved several things: firstly, the way discount and advance business was handled at the Bank of England has been discussed, and in addition the setting under which the analysis of Bank of England Daily Discount data will take place has been set out, the data source has been discussed and there has been a description of the raw data itself.

As in most types of historical analysis, the historian's biggest complaint is that the ideal records do not exist, and those that do exist do not provide enough information. In the case of the Bank of England's discount and advance behaviour, it is a great pity that the Discount and Advance Committee Minutes do not give any analysis of why changes in the Bank's regulations were made. Because of this, the best we can do is to surmise what may have been the reasons, and to use the data we have to prove or disprove certain hypotheses.

The next chapter will discuss the empirical analysis that has been carried out on the data set, together with successful and unsuccessful attempts to carry out certain types of other econometric estimations. The main reason for the failure of some of the estimation methods was the length of the data series. This issue will be discussed in full in the next chapter.

CHAPTER SIX

EMPIRICAL ANALYSIS OF DAILY DISCOUNT DATA.

1: Introduction

The analysis undertaken in this and in the following chapter is fundamental to the research project as a whole, the aim of which is to determine whether the Bank of England changed its discount policy at the end of the third quarter of the nineteenth century with respect to its role as a LLR and its relationship with the market. If the Bank did alter its behaviour, was it as a result of Bagehot's proclamations on what the Bank should and should not do,[1] or as a result of its cumulative experience in dealing with crises over the preceding half century, or, perhaps the most likely case, resulting from a combination of both the aforementioned factors, together with other factors.

Thus, the analysis undertaken in an attempt to prove or disprove these possibilities must centre on the Bank's handling of any moments of financial tension and on its relationship with the *discount market*, the institutional changes of which have already been discussed. If any periods of tension can be found that were previously unknown, then by definition the Bank must have altered its behaviour, since with hindsight we are fully aware that these moments of tension did not develop into full blown financial crises. However, if no "mini crises" are discovered then the situation is rather more complicated. In this case there are two possibilities: either the Bank was faced with no tests, which would make this period

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[1] See Bagehot (1873) and Chapter 2, section 3.3.

totally different from the years which preceded it which were crisis-ridden, or, more interestingly, it responded so quickly and so efficiently that it curbed any crisis before it got underway.

The structure of the chapter is as follows. We will start with a discussion of the aims underlying this analysis. We will then consider the expected pattern of the data[2] during a crisis or pre-crisis period. The empirical analysis is introduced in section four, when we undertake various statistical procedures in order to identify periods when there was an abnormal amount of discount and advance activity undertaken at the Bank of England. These proc dures fall into three categories: tests to indicate the presence of a LLR, ARIMA analysis[3] and, most importantly, polynomial analysis. Finally, there is a discussion of tests carried out on the residuals from the polynomial estimations.

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[2] The "data" refers to the **Daily Discount** data introduced in the previous chapter unless otherwise specified.

[3] Autoregressive Integrated Moving Average.

2: The Aims of the Analysis

The primary aim of this data analysis is to identify periods of market pressure: times when the banks, financial institutions and other commercial companies were coming to the Bank of England for discount and loan facilities in the latter's capacity as a lender of last resort. The easiest way to achieve this objective is to trace the numerical pattern of the Bank's discount and advance operations, in order to distinguish any abnormal changes which are not explained elsewhere.

The only alternative to a data-based approach would be painstaking search through all the written records of the Bank, such as Court, Committee of Treasury minutes and other records in an attempt to pick out odd facts that, when pieced together, might present perhaps only a partially complete picture of the whole story. In addition, the main problem with such an approach is that initially we have no idea of the information that might be available and thus have no idea finally of how complete a picture we have.

The literature on certain moments of crisis between 1870 and 1914 is extensive, for example on the near failure of Barings in 1890 and on the problems in North America in 1907. Whilst attempts were made to uncover any more information other than that which was already available about these particular episodes, of more interest was an attempt to reveal the existence of any other moments when

the Bank of England acted in a way that could be described as being a lender of last resort, or occasions when the Bank's interventions were actually more far reaching than was at first thought, or even perhaps when it was guilty of "bailing out" institutions. Analysis of discount and advance data thus provides a means of studying events rather more closely than might otherwise be possible, and enables a more detailed study of episodes that seem to be of greater interest.

During the period 1870-1914 there were no major financial crises, at least not on the scale of the Overend-Gurney crisis in 1866. The major question that has to be addressed is thus why there was this absence of crises as compared to the experience of the preceding century?[4] In terms of the analysis of the LLR we are left with two possibilities: either there were no problems in the financial markets which needed the Bank of England's intervention, or the Bank's behaviour changed to allow for the implementation of policies that would either prevent crises from arising, or would mitigate the effects of them once they arose. Since it is unlikely that there was a complete absence of periods of tension, we can pursue the second hypothesis: that the Bank's behaviour somehow altered in order to take account of what many, although not

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[4] The preceding hundred years could fairly be described as being "crisis-ridden": major financial crises occurred in 1772-3, 1783, 1793, 1797, 1825, 1836, 1847, 1857 and 1866. See Chapter 3 for a discussion of these crises.

all,[5] contemporary bankers, economists and politicians felt to be its "duty": to provide an injection of liquidity into the financial system in times of a shortage of liquidity.

At the outset it would appear that there are two methods which could be utilised to determine how the Bank of England may have changed its behaviour. The first of these involves starting from a macro-economic viewpoint and studying how the behaviour of the Bank might have changed with respect to changes occurring in the rest of the financial system. The second takes the form of a qualitative investigation and involves an intimate study of all the records of the period. Since all good history involves a combination of these two approaches, this study has tried, in a sense, to combine the two: the starting point of the analysis is the relationship between the Bank and the rest of the system, but in addition to using a data-based approach there has also been an attempt to integrate information derived from historical sources such as the archives of the Bank of England and other commercial banks.

Once we pursue the hypothesis that the Bank's behaviour did change, we then have to consider the ways in which these changes are likely to have come about. This relates mainly to two different types of event: firstly, policies pursued in order to prevent crises from taking place, and secondly policy measures taken as an immediate

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[5] See, for example, the views of Thomson Hankey (1867, and discussed in Chapter 2, section 5.1).

reaction to the possibility of a financial crisis occurring, in order to reduce its secondary effects. Thus, we need to look at two different types of policy:

(a) those dealing with the Bank of England's relationship with the markets in general and with the Discount Market in particular, at all times: how the Bank was shaping the regulatory environment in an attempt to prevent the failure of financial institutions, rather then dealing with them once they had arisen.

(b) the Bank's policy and reactions with respect to moments of financial tension, when it is actually faced with the possibility of having to act as a lender of last resort.

The obvious source of information regarding the behaviour of the Bank of England is the Bank's archives. However, this information source brings with it certain problems, as detailed in the previous chapter.[6] Of course, in an ideal world we would not have to surmise what policies the Bank was pursuing at certain times and for what reasons, since policy documents would be available that told us how and why the Bank was acting. Unfortunately, these are not readily available, and so we have to be content with considering the options that were open to the Bank at certain times. We will do this through a consideration of its behaviour both at times when it was under a certain

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[6] See the introduction to Chapter 5.

amount of pressure in the financial markets, and at times that could be regarded as being "normal".

As outlined above, one of the issues that is always addressed when considering the LLR in a contemporary context, but is frequently overlooked in historical studies, is the regulatory environment in which it (normally, but not exclusively, a central bank) operates. This is an important area since it involves prevention rather than cure. Formal bank regulation is a comparatively recent development, occurring as a result of the advent of the increasingly sophisticated financial systems of the late 1960s and early 1970s, and in policy terms is associated with the implementation of monetary policy. However, the Bank of England has for many decades used what informal powers it possessed to influence the behaviour of the financial sector, through the use of "moral suasion": the exertion of influence on the commercial banks and other institutions in order to persuade them that their best course of action is to follow the Bank's "advice" and do as they are told. The ways in which moral suasion was implemented, together with its effectiveness in the 1870-1914 period, are issues which will be considered in Chapter Eight.

Apart from moral suasion, the Bank's only other method of imposing its will on the markets involved the regulation of its discount and advance operations. Thus, in order to determine the extent to which these operations were used as a regulatory device we need to know, for example, how the

eligibility requirements for bills were decided on, and whether they were ever relaxed, either in times of tension or perhaps to the Bank's own customers at other times. We also need to be aware of how effective Bank Rate was as a control weapon, and to consider from what time it could said to be effective, if indeed it ever was. The effectiveness of Bank Rate has obvious relevance for the study of Bank of England policy in these years, since its manipulation was the Bank's major tool in influencing the flow of funds in order to ensure the smooth operation of the Gold Standard.[7]

The other aspect of changes in Bank of England behaviour, and the one that we will concentrate on here, is its reactions to financial crises. Although, as already mentioned, in the period 1870-1914 there were no major financial crises, this does not mean that there were no moments at which the Bank acted in order to prevent a failure, in itself possibly a relatively minor event, from developing into a fully blown financial crisis. The first step in a study of these times is to identify them, an exercise that will be described at a later point. Then, individual episodes are studied in order to determine the Bank's role in each of them, since with hindsight we know that there were no major crises and therefore any minor points of tension must either have been quelled by an outside agency or have faded away of their own accord.

The type of questions needing answering in this area

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[7] See Bloomfield (1959).

are those concerning the Bank of England's discount and advance policies at specific moments of tension: what was the pattern of its transactions over the period - was the average size of transaction large (implying market concentration in the demand for discounts) or small (implying the diffusion of pressure)? Did the Bank, for example, discount more freely to one particular institution than another? We also need to address the question of whether the Bank adhered to Bagehot's first "rule" (ie to **"lend freely at high interest rates"** in the case of an internal drain).[8] Were the interest rates charged by the Bank on discounts and advances sufficiently high to promote an efficient allocation of funds? The implication of this is that high interest rates would deter any person or institution from borrowing at the Bank if they were able to obtain funds elsewhere at a lower rate. In this way the Bank would really be acting as a **last resort** lender rather than one of first resort.

The answers to these two sets of questions will tell us firstly the extent to which the Bank of England was aware of the options open to it in the field of the prevention of financial distress, and to what extent it

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[8] A problem with Bagehot's rules, first identified by Rockoff (1986), is that whilst Bagehot clearly states the two rules, he gives us no objective criterion by which to judge the state of the market and thus to decide which rule to apply. Political pressure may force a central bank to define a period of market tension as an internal drain, leading it to "lend freely", when with hindsight the drain may have been external in origin and thus a better policy would have been to "protect the reserve". For a more detailed discussion of this problem see Chapter Two, section 5.2.

made use of these options. In addition, once the answers to the second set of questions have been resolved we should be in a position to know whether the Bank did actively intervene in the financial markets in order to quell any possibility of widescale financial disruption. The juxtaposition of these two aspects of the problem will enable us to answer the underlying question of whether the Bank altered its behaviour towards the financial system, and if so in what way.

There is one side issue that must always be borne in mind when analysis of the Bank of England's behaviour in any period before 1946 is undertaken, namely the conflict between the Bank's aim, as a private institution, of maximising profits, and its role as a central bank. This was a consideration which must have always been of central importance to those governing the Bank, and is important in the context of this study for the implications that the conflict has for its behaviour during periods of tension. After all, any prolonged period of higher than normal levels of discounting, probably taking place at increased interest rates, was obviously beneficial to the Bank's income, however detrimental it might have been to the financial system as a whole. Related to this is the issue of why the number of personal customers at the Bank was in steady decline over these years, given that it was still a private, profit making institution. Although it was under obvious commercial pressure from the other banks, one would have thought that it would have made every effort possible

to retain its customers in an attempt to bolster its income.

One other aspect of the problem that should be borne in mind is the question of the time consistency of policy actions (how much faith people have in the governing body's ability to carry out a stated policy)[9] and the level of confidence in its actions that the Bank of England had managed to instill in the system. Bagehot's main criticism of the Bank Directors was that they were not prepared to say definitively how they would react to a financial panic. His solution was for the Bank to state categorically that it would act as a lender of last resort, since panics occurred for the very reason that people did not know how it would react. Uncertainty is thus greater than it has to be: the pre-Bagehot position. It is possible that over a number of years the banking system as a whole had acquired such a large amount of confidence in the Bank that it was able to curb any period of dangerous speculation or loss of confidence-induced over-trading before it reached the panic stage.

Having discussed possible outcomes of the analysis, we will now consider in more detail the expected pattern of the data, both in "normal" times and in periods of financial tension or crisis. This consideration will take the form of the outlining of a number of hypotheses which aim to describe the physical characteristics of a crisis.

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[9] See Section 6 of Chapter Two.

3: Expected Pattern of Data During Crises

First we frame a number of hypotheses relating to the expected behaviour of the data during a crisis or pre-crisis period, in order that something can be established which can be used as a "yardstick" which to compare different periods of data.

3.1: Hypotheses

The hypotheses developed are basically descriptions of how we would expect the data to behave if a crisis were in progress.

They are as follows:

(1) The demand for discounts and advances is directly related to the level of market pressure. Thus, in a crisis or pre-crisis period we should observe:

   (a) An increase in the number of transactions.

   (b) An increase in the total value of discounts and advances.

(2) That the time path of the average size of transactions during a crisis will give some idea of whether market pressure is diffused: an increase in the average size implies that individual people or institutions want a greater volume of bills discounted or a larger value of advances, that is, market concentration during a crisis, whereas a decrease in the average size of transaction implies that market pressure is being

diffused throughout the system as smaller customers come in for discounts and advances. This question of the diffusion of market pressure may have consequences for the LLR since it has implications for the methods the Bank of England uses to aid the system. If market pressure is diffused, the best method of aid is obviously going to be to aid the market as a whole whereas if pressure is concentrated then more attention may have to be paid to particular institutions.[10]

(3) During a period of crisis interest rates will rise significantly, normally to at least 6 per cent although much higher rates were recorded at various points in known crisis periods.

(4) Linked to this last hypothesis, it is possible that interest rates during a period of financial tension will show a greater spread, since they will be changing by a larger amount and will reach higher levels. For example, a normal rise in a quiet period may be a change from 2 to 2½ per cent, whereas in a period of financial tension it may be 3 to 6 per cent.

In addition to these hypotheses that relate to specific

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[10] This in turn brings out the main problematic area of the theory of the LLR, as detailed in Chapter One: the distinction between illiquidity and insolvency, and the question of whether central banks should aid solely the system as a whole, or should provide liquidity to specific institutions. There is no doubt that on efficiency grounds LLR aid should certainly not go to insolvent institutions, which are suffering problems as a result of their own mistakes. These banks should be allowed to fail, "pour encourager les autres".

moments of crisis, there are many questions that can be asked of the data relating to the discount and advance activities of the Bank itself. These questions can be split into three sections: those relating to the volume of discounts and advances, those relating to refusals and those relating to the interest rate.

3.2 - Discounts and Advances

When discussing the volume of discounts and advances we need to establish some sort of "yardstick" by which to judge normal and abnormal behaviour. This would mean that if discounts or advances were greater than this value then we could regard them as being abnormal and make further enquiries about the period concerned. There are several possible measures that could be used to judge this concept: the mean, the median, the mode, or even a modal range. The problem with using a measure of central tendency such as the median is that if this is calculated for the period as a whole then the effect of any trend is lost; if, for example there is a rising trend over the sample period then the range of values over which the median is taken will be very large, and thus the value obtained may not be a good reflection of what was abnormal in the early period. For this reason, when empirical analysis of the data was undertaken, they were split into five sub-periods, in order that the summary statistics for each period would not be as

distorted by the effects of the trend.[11]

Besides looking at the average size of transactions during a crisis, it is also interesting to look at this pattern over the sample as a whole, since it gives an indication of the changing nature of the Bank of England's customers. The number of customers keeping their sole discount account at the Bank fell during this period, and so we might reasonably expect the average size of transaction to show an increasing trend over the same sample.[12] Why the Bank had fewer personal customers is not immediately obvious, since it was still a private, profit making institution. Indeed, in many of these years it had constant problems in keeping its income at levels that were acceptable to its shareholders, so one might think that it would have done everything in its power to keep as many customers as possible, especially in the "lean" years of the mid 1890s. It seems however that by this time the Bank of England was already more of a public bank than a private one, a question that will be addressed more explicitly at a later point.

There are other customer-related questions that can be addressed by these data. Did, for example, discounts and advances attract different customers? We know already that these two types of transactions had different interest

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[11] See later discussion of the empirical analysis. A further reason for splitting the sample was the limitation imposed by computer memory: a sample comprising of 2340 observations was too large for many packages to handle.

[12] See Chapter Five, section 2.2.

rates applying to them, but it would be interesting to discover whether customers holding their sole discount account at the Bank also received advances there. In addition, it is possible that during a period of market pressure, for whatever reason, the Bank's own customers were given preferential treatment concerning the granting of discounts and advances.

Unfortunately, the answers to many of the questions concerning the Bank's customers are not available, since the Bank itself is extremely sensitive about the nature of its relationship with its customers, even when the period concerned has long since passed. Information about general discount and advance activities is freely available, but as soon as a matter of customer confidentiality is concerned the information source quickly becomes extinct.

The last question concerning discounts and advances that needs to be addressed concerns advances on securities, commonly known as "floaters". These were brought into the Discount Office in 1894, and thereafter are included in the data as a separate advances variable, the volume of advances on securities (VAOS). There is no indication in the Daily Discount Books as to the nature of these advances and as to why they were transferred to the Discount Office at this point, and yet it is obvious from the data that the inclusion of these advances on securities in the total advances variable makes a fairly large contribution to the overall magnitude of the variable in the subsequent

years.[13]

3.3 - Interest Rates

The second set of questions that we can attempt to answer through the use of these data concerns interest rates. The most interesting issue here concerns the "effectiveness" of Bank Rate. When the Bank of England, as part of its management of the Gold Standard, wanted to influence the inflow and outflow of gold to and from London, it needed a mechanism through which it could be fairly sure of controlling domestic market interest rates. In this way an outflow of gold could be arrested before it became too serious by increasing Bank Rate, which would then tend to bring about an increase in market rates generally. Gold would flow into London, attracted by the higher rates to be earned there. Thus the link between Bank Rate and market rate was of crucial importance: without it, the maintenance of the Gold Standard may not have been possible.[14]

Open market operations of a sort had been utilised by the Bank for many years: the Daily Discount books show frequent transactions undertaken by Messrs. Mullens, the Bank's brokers, when the latter was operating in the

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[13] See footnote 59 in Chapter Five. Because of the distortion introduced by the transfer of advances on securities to the Discount Office, equations for the two types of advance were estimated separately.

[14] See Sayers (1976) Vol.I, pp.37-43 for an excellent discussion of this subject.

markets on behalf of the Bank.[15] If the Bank wanted to induce market rates to increase it would sell government stock on the market, in order to reduce the volume of funds remaining on the market that could be used by the banks and discount houses for bill financing.[16] Withers (1910) outlines the actions taken by the Bank of England in an attempt to make Bank Rate effective, and also comments that the reason why the mechanism linking Bank Rate with market rate was so indirect was due to the fact that the Bank of England was no longer so important in day-to-day market activity as it once had been. It was thus less influential and less able to enforce its will on a sometimes unwilling market.[17]

In order to see if Bank Rate was effective we have to look at additional data than that which is contained in the Daily Discount Books, since it is necessary to examine the pattern of market rates in addition to that of Bank Rate. If Bank Rate were effective, we would expect the difference between this and market rate to be positive, since the Bank would be charging a higher rate and thus leading all other

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[15] For Example:
August 4th 1902 - Mullens Marshall had £800,000 advanced to them (on securities) at Bank Rate (=3 per cent), and on August 8th 1902 they had £650,000 at 3 per cent.

[16] In fact, the Bank would "sell consols spot and buy for the account" (de Koch, 1974, pp.175): sell government stock for cash now and at the same time purchase them forward for the date of the monthly Stock Exchange settlement.

[17] For further details, see Chapter Three of this thesis and also Sayers (1936) and Gregory (1929).

rates.[18]

Thus in order to look at the effectiveness of Bank Rate we need to look at the relationship between it and market rate. Given that one of the Bank's roles was to manage the Gold Standard and that this necessarily involved the manipulation of domestic interest rates, it could be postulated that if the Bank failed to make Bank Rate effective, it also did not succeed in manipulating rates. However, with hindsight we know that there were no major crises of the international monetary system during this period, and therefore if the Bank was unable to make Bank Rate as effective as it might have wished, this did not seem to have been as problematic as it could have been, given the circumstances under which it was operating.

One point that must be made here is what we mean by "market" rate. During this period perhaps the best measure of market rates was the "prime bank bill" rate, the rate of interest charged on top quality bills held by the commercial banks, which was a three month rate. An alternative market rate representative would have been the money at call rate, but this was closely related to the deposit account rate, which in turn was fixed at between 1 and 1½ per cent below Bank Rate. Furthermore, there was no short term government debt at this time and so no default-

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[18] We have concentrated here on ways of forcing market rates upwards, rather than downwards, since that was the usual problem faced by the Bank. The option of increasing the supply of (low interest) loanable funds to the market was of course always there, and would be one method of engineering a fall in market rates.

free rate. Thus the prime bank bill rate was the most flexible of the available rates, since it reflected day-to-day activity in the markets.

Figures 6.0(a) and (b) overleaf depict Rdiff: the difference between Bank Rate and market rate for the period 1870 to 1914.[19] This gives some measure of the degree of effectiveness of Bank Rate, since if Rdiff was equal to zero for long periods Bank Rate and market rate would be equivalent, and thus Bank Rate would have been fairly "effective". However, as is obvious from the figures, Rdiff was rarely zero, and in general it was positive, occasionally reaching fairly large values. If Rdiff was positive for prolonged periods, the implication is that the Bank was attempting to force market rates upwards, but with little success. There are several points at which Rdiff is negative, implying that Bank Rate was slow to respond to an increase in market rates, but when this occurs it is not prolonged; Bank Rate is soon increased to a level more appropriate to the situation.

3.4 - Refusals

The final set of variables with which we are concerned is refusals.[20] Each package of bills that were presented for discount may have contained some bills which did not

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[19] The source of these data is Capie & Webber (1985), Table III.(10).

[20] The variables TVR and TNR refer to discount, not advance transactions.

FIGURE 6.0(a): RDIFF (BR – MKTR)

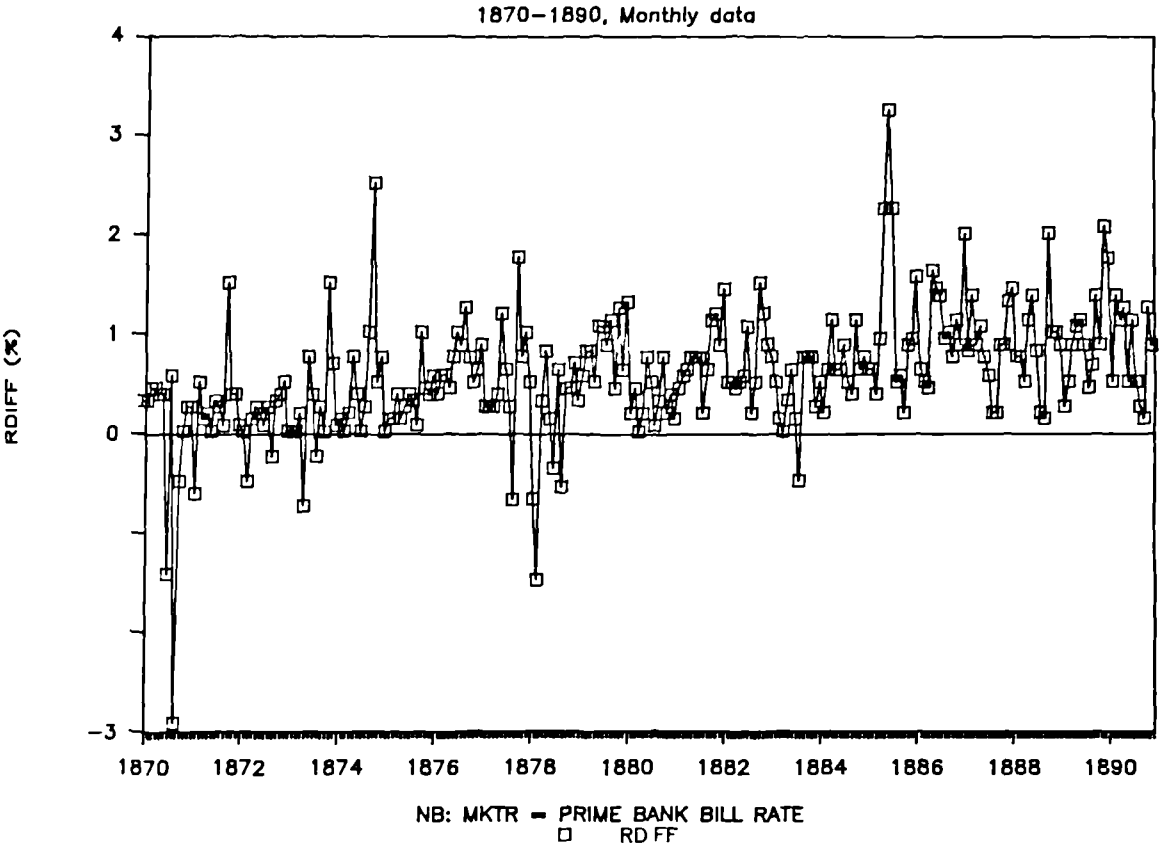
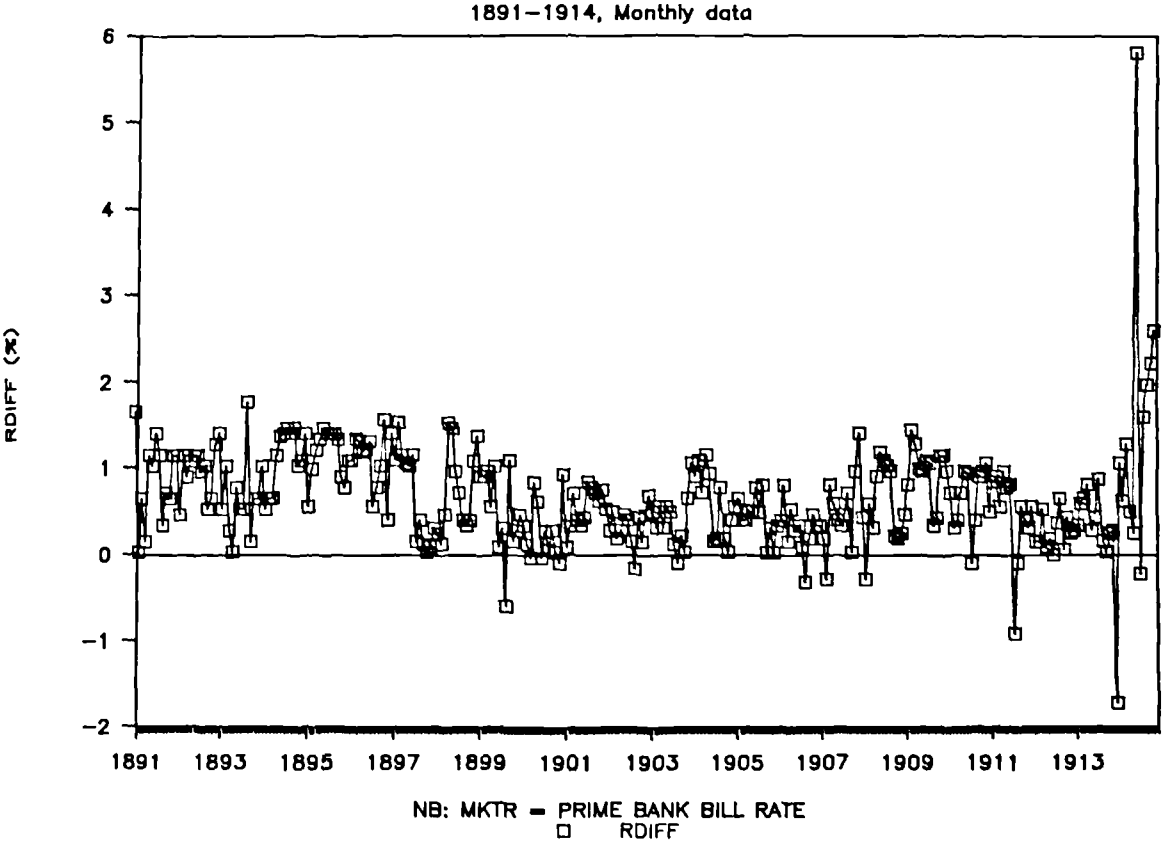


FIGURE 6.0(b): RDIFF (BR – MKTR)



meet the Bank's eligibility requirements referring to quality or length. These were refused, whilst the main body of the bills were discounted. Thus the variable TVR describes the volume of bills that were refused in the day (or average daily figure over a week if we are dealing with the aggregated data), and TNR describes the number of transactions that involved bills being refused. However, when people went to the Bank to ask for an advance it was either granted or refused, depending on the status of the person or company requesting the loan, and there seems to be no record of advances that were not granted.

During a crisis it would be expected that both the volume and the number of refusals would increase, since in desperation people would bring all sorts of bills into the Bank hoping to get them discounted, and only some of these would come up to the Bank's rather stringent requirements.[21] Conversely, given that the discount requirements were widely known, in periods when there was an absence of market pressure refusals would be fairly low since most people would only present bills for discount at the Bank that they knew were eligible: there was no pressure on them to obtain cash in any way that they could.

Did the Bank of England relax its eligibility requirements in times of crisis? If this occurred then it could be seen as being equivalent to the Bank helping some institutions more than others, in that it was no longer just discounting "good paper". Once the fixed discount

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[21] See Chapter Five.

regulations are dropped, we have no idea by what criteria the Bank decided on its discounting behaviour; it is possible that the Bank was actually giving preferential discounts to some customers.

We will now move on to a discussion of the empirical analysis.

4 - Empirical Analysis

In this section we will examine in greater detail the empirical analysis undertaken on the data, starting with the simplest analysis aimed at showing the existence of the LLR, and then continuing by looking at other ways of examining Bank of England behaviour on a slightly more sophisticated level.

4.1 - Indication of the presence of a LLR

At the simplest level, a simple positive correlation of the total amount of discount business at the Bank of England with Bank Rate would be enough to show that the LLR function existed, albeit at its most basic level. This is so since if financial institutions were utilising the Bank's discount and advance facilities solely in "normal" times,[22] we would expect there to be a negative relationship between the two variables. If a positive

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[22] That is, periods when there is no significant increase in financial tension.

relationship exists, then, even if the explanatory power of the regression is not very high, it is at least an indication of the presence of a LLR.

It is a relatively simple operation to carry out using annual data. There was a positive relationship, both between Bank Rate and the total volume of discounts and advances as separate variables, and when they were aggregated to form one "LLR facilities" variable.[23] These results suggest that the Bank of England was acting as a LLR during this period.[24] However, as already mentioned

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[23] The estimated equations were as follows:
Sample 1871 - 1914:

(1) $TVB_t = -29600024 + 14300205BR_t$
$(-1.78) \quad (2.98)$
$R^2 = 0.17 \quad R^2a = 0.15 \quad DW = 0.94$

(2) $TVA_t = -5342900 + 1266902BR_t$
$(-0.17) \quad (1.38)$
$R^2 = 0.04 \quad R^2a = 0.02 \quad DW = 0.50$

(3) $DIS+AD_t = -34942923 + 26970107BR_t$
$(-0.95) \quad (2.54)$
$R^2 = 0.13 \quad R^2a = 0.11 \quad DW = 0.66$
('t' statistics in parentheses)

[24] One problem with these estimations, as is obvious from the equations above, is that there is evidence of a high degree of autocorrellation in the residuals, as shown by the low Durbin Watson statistics. One remedy for this is to re-estimate the equations using the Cochrane-Orcutt technique, which includes an autoregressive term in the equation. The equations resulting from this estimation are as follows:

Sample 1871 - 1914:

(1) $TVB_t = 68434868 + 3529128BR_t$
$(0.16) \quad (0.83)$
$R^2 = 0.35 \quad R^2a = 0.31 \quad DW = 1.63$

(2) $TVA_t = 18098902 + 6144540BR_t$
$(0.63) \quad (0.95)$

(continued...)

any analysis carried out on annual data has a major disadvantage in that it loses a great deal of detail. Besides, most periods of tension are over in a matter of weeks, or even on occasions in days, and furthermore, it is possible that either the increase in discount and advance activity is not enough to increase significantly the annual totals, or that a period of high activity is followed by a period of low business, thus smoothing out the annual total. Thus, a period of greater activity may not necessarily show up in annually aggregated data. It is for this reason that any further work was, wherever possible, carried out using higher frequency data, normally the weekly aggregated series.

4.2 ARIMA Modelling

In considering the appropriate statistical analysis to apply to this data set it was important to remember that the initial aim of the analysis was to identify any moments

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[24](...continued)
$R^2 = 0.59$ $R^2a = 0.57$ DW = 1.93

(3) $DIS+AD_t = 29884429 + 11150744BR_t$
(0.77) (1.32)
$R^2 = 0.53$ $R^2a = 0.51$ DW = 1.97
('t' statistics in parentheses)

As is obvious from these results, although the inclusion of an AR term improves both the DW statistic and R^2, the 't' statistics become insignificant. Conclusions have to be "two-handed" therefore: Bank Rate is important as an explanatory variable in these regressions, (explaining between 30 and almost 60 per cent of the variability in the dependent variable) although it is not statistically significant.

of market pressure that had hitherto gone unnoticed. For this reason an attempt was made to estimate an ARIMA (Autoregressive Integrated Moving Average) model for the data. The aim here was to separate foreseen from unforeseen components of the Bank of England's behaviour: by definition, if a particular event was foreseen and thus accounted for in the Bank's actions it could not be a crisis, for a crisis by its very nature is unexpected.

Thus, the procedure was to estimate an ARIMA model for the whole time series[25] (45 years = 2340 observations) and then to split the sample and start a one step ahead forecast: to estimate the model for 1870 - 1879, obtain values for the autoregressive and moving average parameters, and then add a year at a time obtaining a forecast for the variable in each period. It would then be possible to compare actual and simulated values for the variables and the difference between the two series would therefore be an indication of the unexpected component of Bank of England policy.[26]

Although in theory this procedure seemed to be very promising, in practice there were many problems associated with it. These problems were in the main associated with the length of the time series: the estimation was being attempted using a time series of 2340 observations, a number far too high for most computer software packages to

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[25] For both discounts and advances.

[26] The actual process of estimating an ARIMA model for this data was a complicated process and one which was extremely time consuming, for reasons which are given below.

handle. In addition, the fact that the data were weekly caused further problems.[27]

Thus, this analysis did not get beyond the stage of determining the degree of stationarity of the data series. Any estimated equations were unacceptable due to the fact that the residuals themselves displayed autocorrellation.[28]

4.4: Polynomial Analysis

Because of the problems involved in estimating an ARIMA model of the time series, another approach was used in an attempt to identify moments of abnormal activity in the demand for discount and advance facilities at the Bank of England. This involved plotting the trend apparent in the data and then identifying deviations from this trend.

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[27] Initial Box-Jenkins estimations gave results displaying extremely high Q^2 statistics. The chi squared test tests the hypothesis that all the autocorrelations are equal to zero, that is, that the series consists of white noise. With a sample as large as this the test expects to find little or no serial correlation since the sample size should be approaching the population size. One way to reduce the extent of the serial correlation would be to include a large number of autoregressive (AR) lags, which since the data are weekly and consist of a large number of observations seems appropriate: a 52 period lag is only equivalent to one of four quarters when dealing with quarterly data. However, this need for a high number of AR lags introduces a further complication: the increase in serial correlation between the various orders of lags, and in addition computer packages do not in general have enough memory to deal with such a high number of lags. Because of these problems, any further estimation had to be undertaken with a reduced sample.

[28] As mentioned above, autocorrelation in the residuals is tested for by looking at the autocorrelation function of the residuals from the estimated model and performing a chi-squared test. See Pindyck & Rubinfeld (1981) pp.549-550 for further details on this test.

In effect, what we are doing here is de-trending the data.

In order to plot the trend in the data a polynomial was specified of the form:

$$Y_t = \beta_0 + \beta_1 T_t + \beta_2 T^2_t + \beta_3 T^3_t + \ldots + e_t$$

Where: Y_t = dependent variable (discounts or advances)
T_t = time variable
e_t = error term

Various specifications were estimated, the data deciding which one was used.[29] This method was particularly appropriate in this case because of two characteristics possessed by the data: they displayed no cycle, but there was a large degree of variation. Neither moving average nor straight regression methods were therefore appropriate, the former because it did not capture the best line representing trend, and the latter because the trend apparent in the data could not be represented by a straight line.

The data were split into four ten year and one five year sections: 1870-79, '80-'89, etc, and 1910-1914,[30] for

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[29] See Pindyck & Rubinfeld (1981), pp.108, and Granger & Newbold (1986),pp.33-36. In essence, the procedure followed was to estimate the polynomial using T, T^2,...T^8, retaining only those terms which had significant 't' statistics attached to them. T^8 was the highest time component used because of computer memory limitations: the large number of observations meant that the numbers involved (1-520 for most of the estimations) became too large for the computer to handle.

[30] Since Advances on Securities (VAOS) were not brought into the Discount Office until 1894, a polynomial covering the period 1894-1914 was estimated for this variable.

two reasons: firstly due to computer memory limitations,[31] and secondly because, as previously discussed, the trend effects of the data imply that comparison over ten-year periods is more efficient in recognising periods of unusual activity, since the standard deviation of the period 1870-1914 is greater than even two or three standard deviations of some of the sub periods.[32] Initially polynomials were estimated for advances and for discounts.[33]

The aim of this process is to identify unusually large outliers from trend. These could then be used as indicators of financial tension. The residuals were plotted against one, two and three standard deviations: one standard deviation represents the 68 per cent "confidence interval", two and three standard deviations represent 95 per cent and 99 per cent respectively. Thus, any residual that exceeds two or three standard deviations can be regarded as significantly different from the "trend" since the likelihood of it occurring is less than five or one per cent respectively. This then gives us an indication of points at which an unusually large amount of activity was taking place; it does so on a basis that is rather more rigorous than visually identifying the points.

Once the appropriate polynomial for each data set had

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[31] Most statistical packages are not capable of handling a time series of over 2000 observations.

[32] See below.

[33] See section 4.4.6.

been specified, graphs were produced of actual and fitted values, and residuals from the regression and standard deviations. These graphs (for discounts only) are shown in figures 6.1 to 6.10 respectively. Only residuals that exceeded three standard deviations in value were considered to be of interest.

Two things are immediately obvious from the graphs: firstly that some data periods exhibit a greater number of residuals exceeding the three standard deviation (SD) point than others, and secondly that the SDs themselves are very different in size, depending on the period concerned. The standard deviation and mean for the period as a whole and for each sub-period are given in Table 6.1 below:

Table 6.1: TVB - Mean & SD

1870 - 1914	SD =	190456
	3SD =	571368
	Mean =	60809
1870 - 1879	SD =	61465
	3SD =	184395
	Mean =	51400
1880 - 1889	SD =	17127
	3SD =	51381
	Mean =	17154
1890 - 1999	SD =	63021
	3SD =	189063
	Mean =	34412
1900 - 1909	SD =	113621
	3SD =	340863
	Mean =	69383
1910 - 1914	SD =	509833
	3SD =	1529499
	Mean =	203038

There are several points to notice about these summary statistics. Firstly, there are very obvious fluctuations in the mean and the standard deviation between the periods. The decades of the 1880s and 1890s display relatively low means, and it is only from 1900 onwards that the latter starts to increase. Both the mean and the standard deviation for the final period, 1910-1914, are biased upwards as a result of the effects of the crisis occurring in the summer of 1914.[34] In addition, it should be noted that in four out of five periods, and in the 1870-1914 figures, the standard deviation exceeds the mean. This is a reflection of the fact that there is a large degree of variation in the data: there were frequently days when there was a very low level of discounting, and less frequently, days when there was no discounting at all. Thus, there is a downward drag on the mean, and an upward one on the standard deviation.

The upward trend in the data is evident in the difference in the scales of the graphs: the maximum on the vertical axis (size of residual) in 1870-79 is £500,000, in 1880-89 £170,000, in 1890-99 £500,000, in 1900-09 £700,000 and in 1910-14 £4m.[35]

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[34] If we calculate the mean and standard deviation for 1910 to 1913 (ie missing out 1914), the effects of this bias are even more obvious: the mean is 127476 and the standard deviation is 193500, 63 and 38 per cent of their 1910-1914 values respectively. The bias is further accentuated because in this period we only have 260 observations, as opposed to 520 in the other four periods.

[35] This illustrates the earlier point about the efficiency of comparison over ten year periods.

4.4.1: 1870-1879 - Figures 6.1 and 6.2

The estimated polynomial fit equation for this period was as follows:[36]

$$TVB_t = \underset{}{52803} + \underset{(4.45)}{7.83T^2_t} - \underset{(-4.73)}{0.07T^3_t} + \underset{(4.66)}{0.0002T^4_t} - \underset{(-4.49)}{(1.42*10^{-7})T^5_t}$$

$$R^2 = 0.13 \quad R^2_a = 0.12$$ [37]

In this period twelve residuals exceed three standard deviations. However, some of these are very close or even subsequent to one another, and so can be treated as being one "episode". This leaves six episodes left to be considered, which are as follows:[38]

1870 - mid-end July

1871 - end February

1872 - mid February and end of March

1873 - February and March

1873 - August - September

1878/79 - end December and start of January.

These moments will be discussed in greater qualitative detail in the next chapter.

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[36] 't' statistics in parentheses.

[37] 'R^2_a' refers to the correlation coefficient adjusted for the degrees of freedom available in the regression.

[38] Residuals exceeding three standard deviations which occur during the two "window-dressing" points (the end of June and December) are omitted throughout this analysis, for the reason that the reason for the large residuals at these times is known and can be included as being part of the seasonal component of the data.

FIGURE 6.1: ACTUAL & FITTED COMPARED

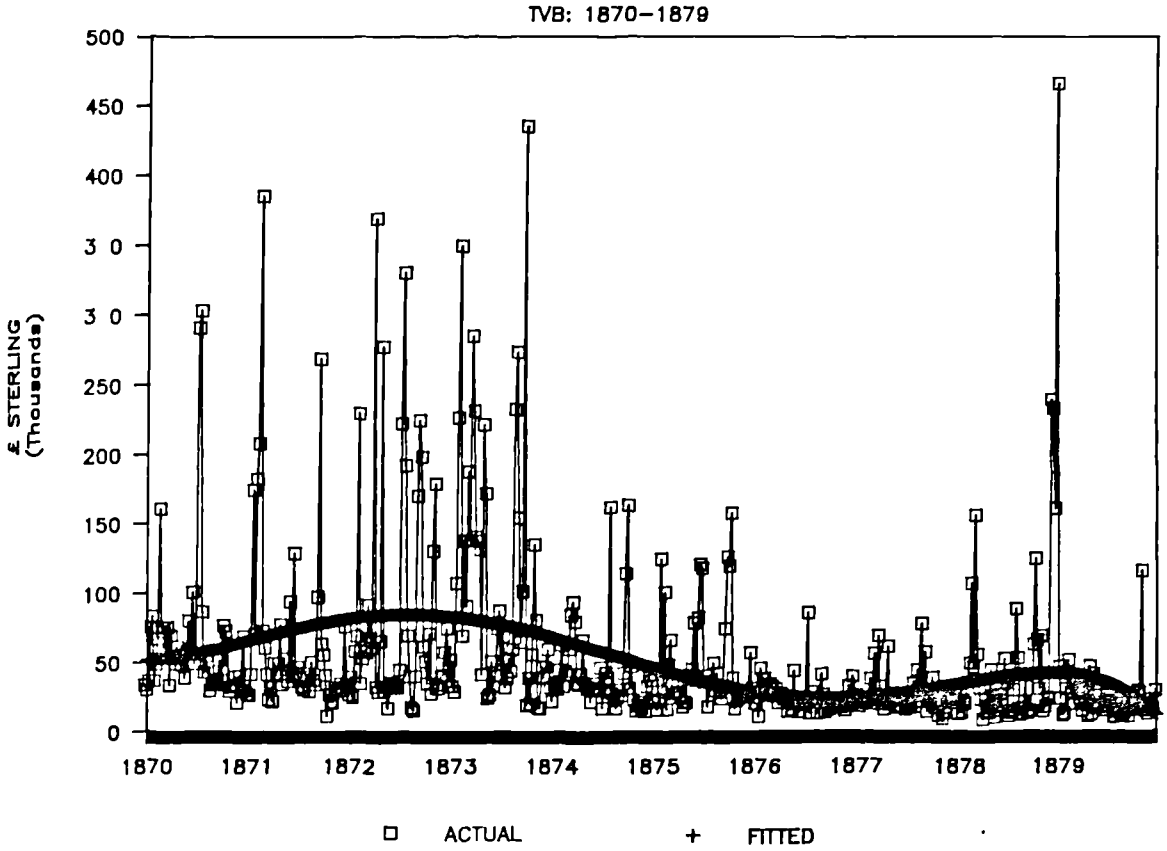
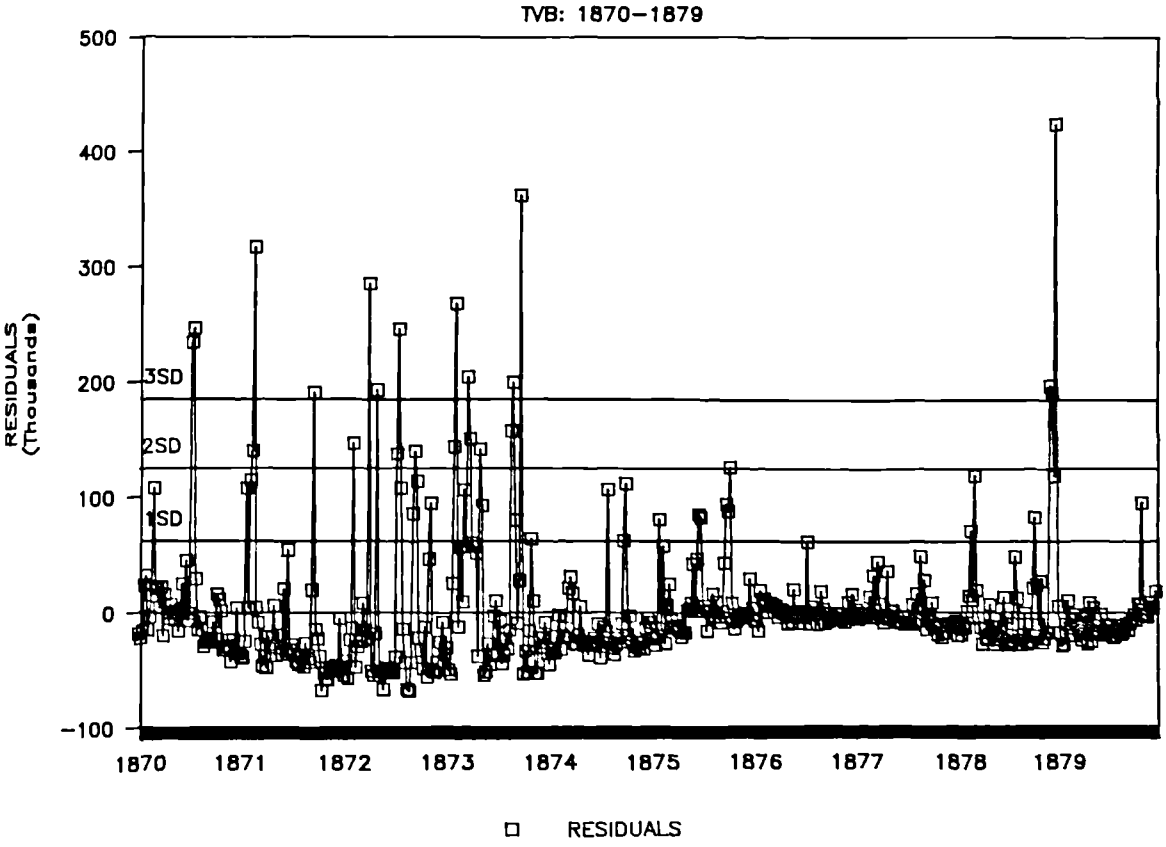


FIGURE 6.2: RESIDUALS & SD COMPARED



4.4.2: 1880-1889 - Figures 6.3 and 6.4

The estimated polynomial fit equation for this period is as follows:

$$TVB_t = \underset{}{29566} - \underset{(-2.31)}{396T_t} + \underset{(2.65)}{5.39T^2_t} - \underset{(-2.89)}{0.03T^3_t} + \underset{(2.97)}{(6.21*10^{-5})T^4_t} - \underset{(-2.96)}{(4.73*10^{-8})T^5_t}$$

$$R^2 = 0.074 \quad R^2_a = 0.065$$

At the following points the residuals exceed three standard deviations:

1880 - mid March

1881 - middle of August

1883 - mid March to mid May

1886 - end of April

1888 - end of April

1889 - mid August.

In general, this period displays a decreased volume of business over those immediately preceding and subsequent to it. This is obvious from the figure for the mean volume of discounts: £17154, less than a third of the average for 1870 - 1914 and significantly less than the mean for 1870-1879 or 1890 - 1899.

This decrease in the volume of discount business at the Bank of England in this period does not necessarily imply that there were no problems in the financial markets for the Bank to deal with, although this is a possibility. It is also possible that problems faced by the Bank were

simply smaller in magnitude than was previously or subsequently the case. In other words, when the financial markets were not generally short of liquidity, they were perhaps more able to help out one of their own members than at other times of greater stringency.

This will be discussed again at a later point, along with a further consideration of such pressure points as there were in the 1880 - 1889 period.

4.4.3: 1890-99 - Figures 6.5 and 6.6

The estimated polynomial fit equation for this period is as follows:

$$TVB_t = \underset{}{11699} + \underset{(2.17)}{1378T_t} - \underset{(-2.33)}{17.59T^2_t} + \underset{(2.31)}{0.09T^3_t} - \underset{(-2.29)}{0.0002T^4_t} + \underset{(2.31)}{(1.37*10^{-7})T^5_t}$$

$$R^2 = 0.059 \quad R^2_a = 0.050$$

In this decade the occasions when the residuals exceed three standard deviations are as follows:

1890 - mid November

1891 - mid March

1893 - April and May

1898 - start March

1899 - September.

One of these points (1890) is easily explainable. However, this, and the other points, will be discussed in the following chapter.

FIGURE 6.3 : ACTUAL & FITTED COMPARED

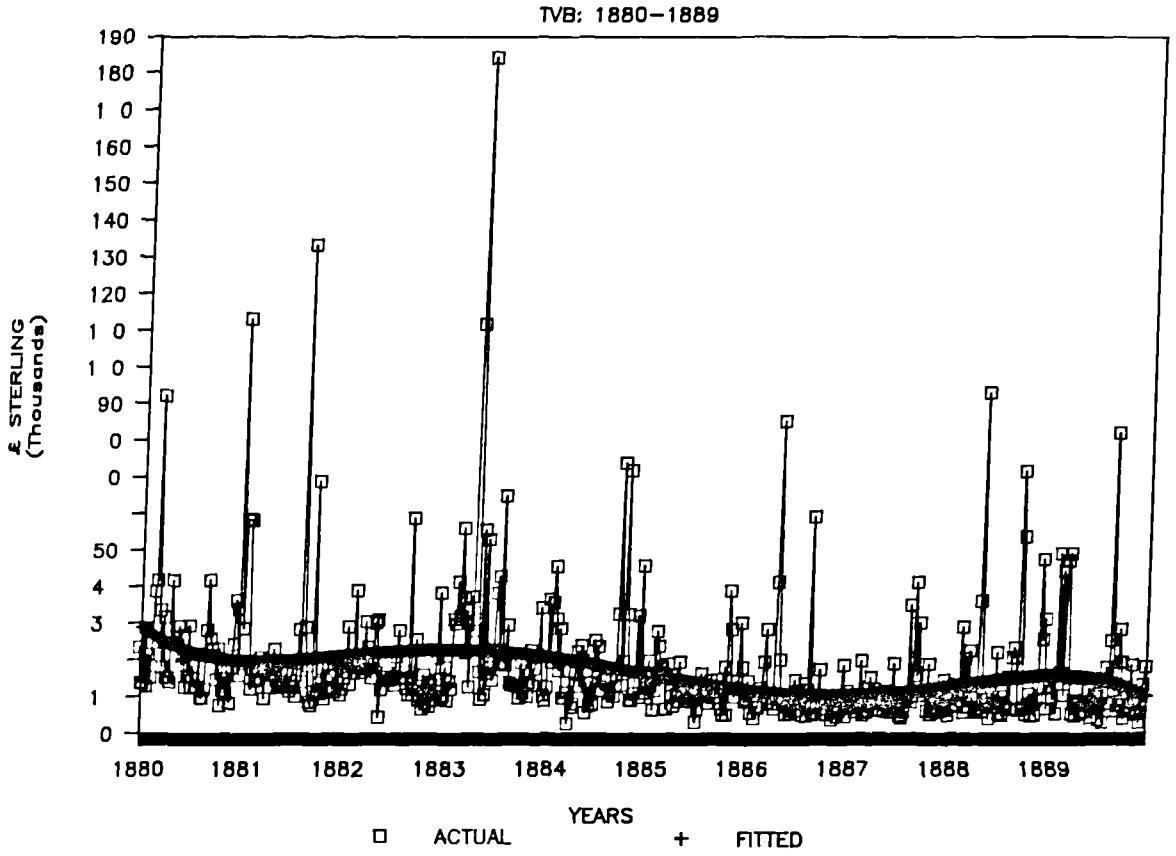


FIGURE 6.4 : RESIDUALS & SD COMPARED

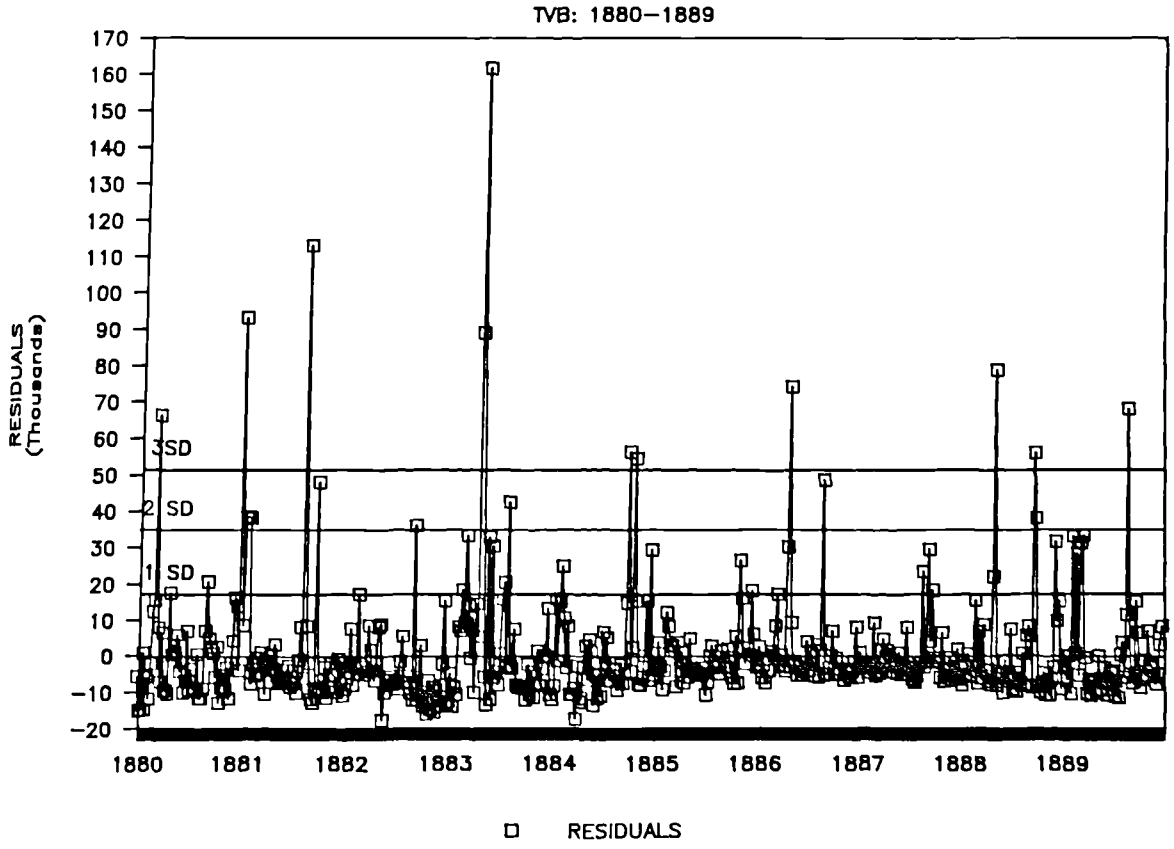


FIGURE 6.5: ACTUAL & FITTED COMPARED

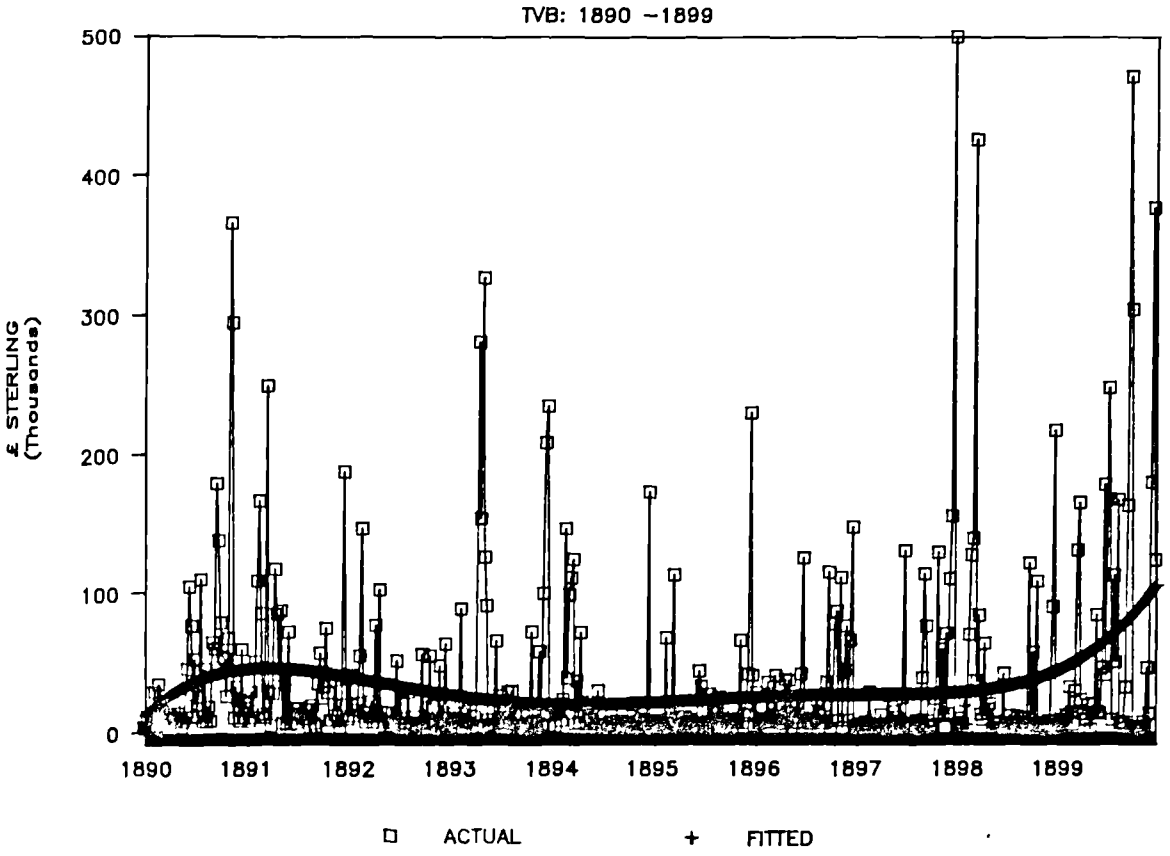
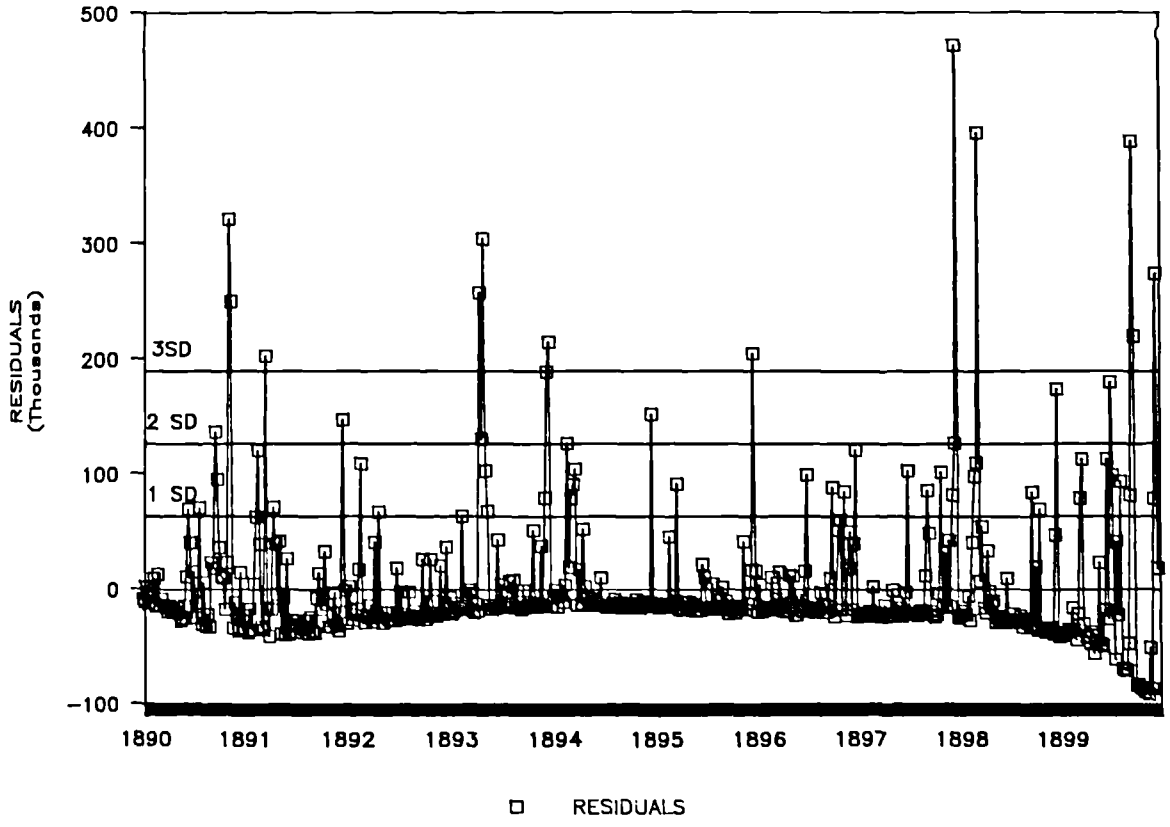


FIGURE 6.6: RESIDUALS & SD COMPARED



4.4.4: 1900-1909 - Figures 6.7 and 6.8

The estimated fit equation for this period was as follows:

$$TVB_t = 82753 - \underset{(-4.01)}{13.31T^2_t} + \underset{(3.97)}{0.10T^3_t} - \underset{(-3.68)}{0.0003T^4_t} + \underset{(3.33)}{(1.99*10^{-7})T^5_t}$$

$$R^2 = 0.085 \quad R^2_a = 0.078$$

In this sub-period the points when the residuals exceed three standard deviations are as follows:

1900 - start of April

1901 - mid February

1902 - mid September

1904 - end of November

1906 - September and October

1907 - start March

start August

mid/end October

There is a far higher volume of business carried out between 1900 and 1909 than there has been in the preceding two decades, as shown by the increase in the mean volume of discounts, and by the increase in the number of residuals exceeding three standard deviations in size.

FIGURE 6.7: ACTUAL & FITTED COMPARED

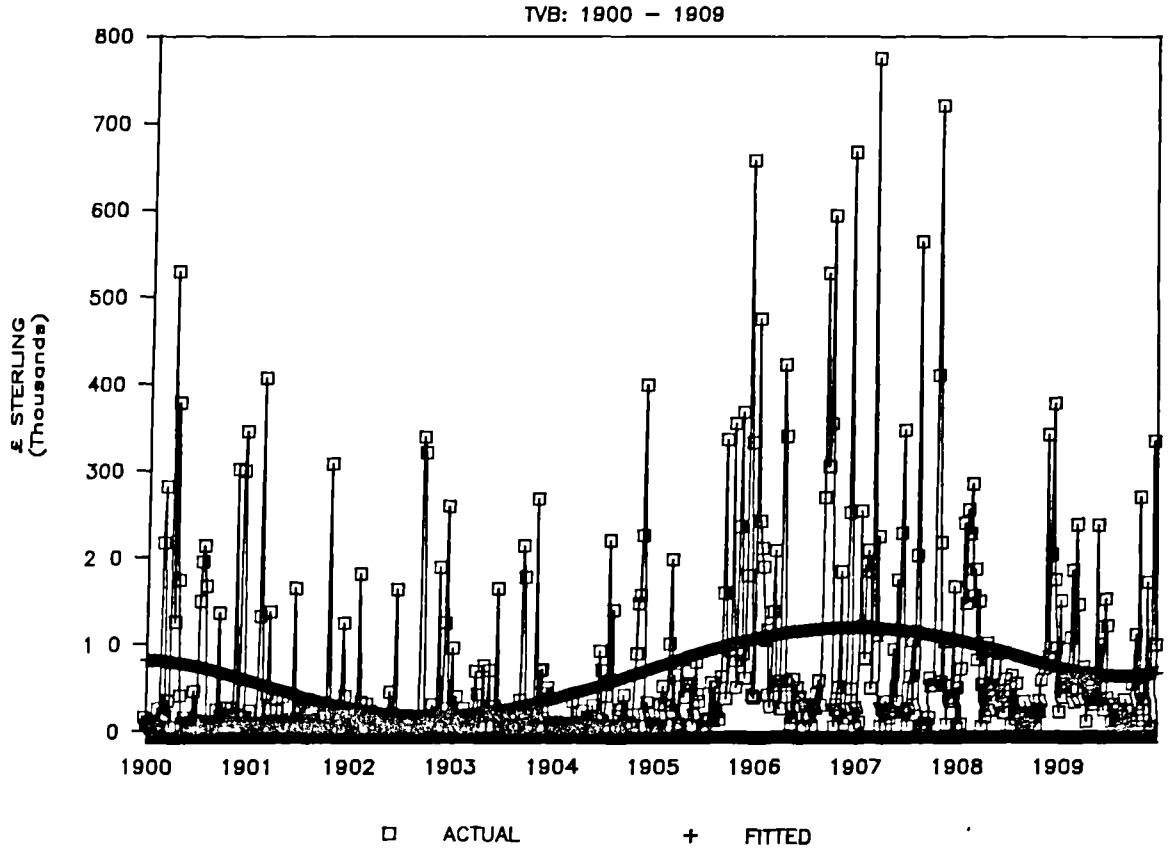
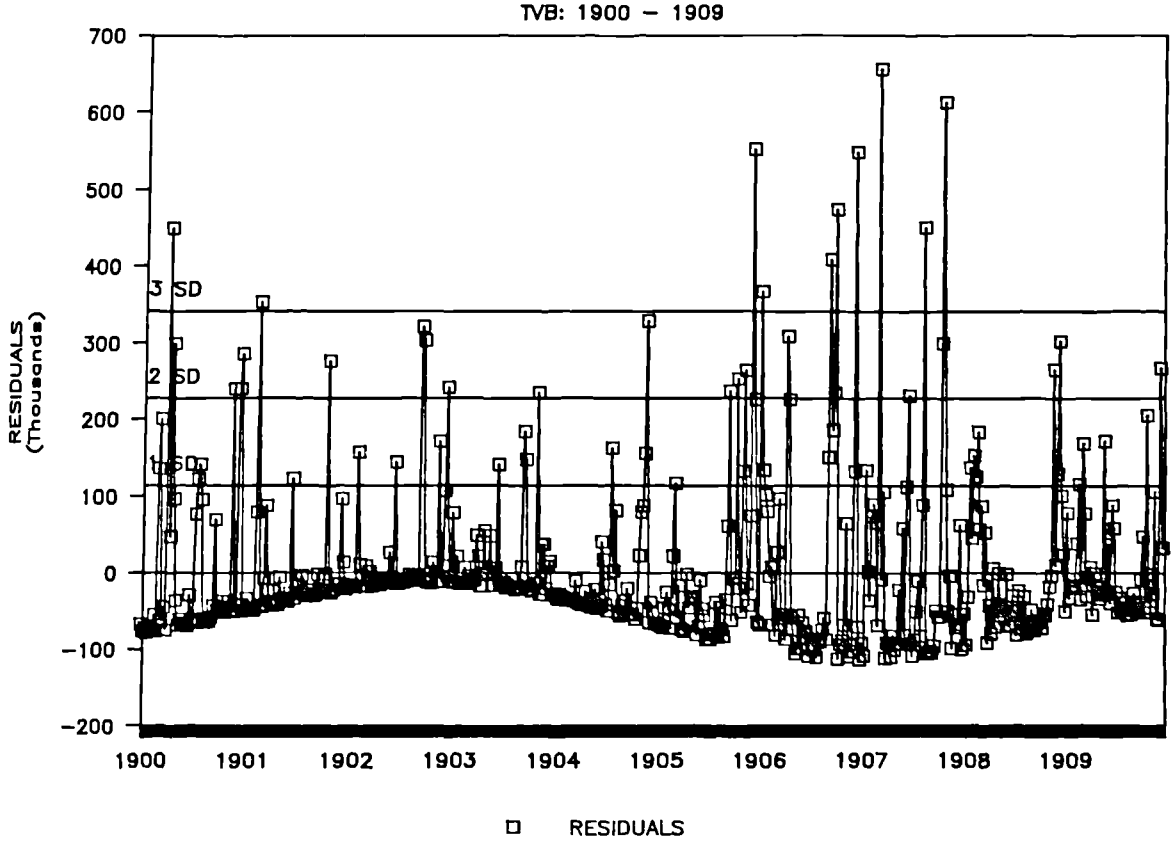


FIGURE 6.8: RESIDUALS & SD COMPARED



4.4.5: 1910-1914 - Figures 6.9 and 6.10

The situation in this period is rather more complicated than for the others, due to the bias introduced by the extremely high levels of discounting which occurred in July and August of 1914. The standard deviation for this period (= 509,833) is more than two and a half times greater than that of the 1870-1914 period as a whole (= 190,456), and so in this case we have to look not only at instances where the residuals exceed three standard deviations, but also at those between two and three and even one and two standard deviations.

The estimated fit equation for this period is as follows:

$$TVB_t = -58123 + \underset{(2.62)}{921T^2_t} - \underset{(-3.13)}{34.83T^3_t} + \underset{(3.60)}{0.51T^4_t} - \underset{(-4.02)}{0.004T^5_t} + \underset{(4.37)}{(1.14*10^{-5})T^6_t} - \underset{(-4.66)}{(1.42*10^{-8})T^7_t}$$

$$R^2 = 0.24 \quad R^2_a = 0.22$$

As would be expected the only instance here when the residuals exceed three standard deviations is in the summer of 1914. During this time, three residuals exceed this value, in all cases by a large margin: the three residuals are 3.08m, 3.85m and 2.49m.

In addition to two further points during July and August 1914, there is one other residual which lies between two and three standard deviations. This occurs in the middle of February 1911.

There are several periods where the residuals fall

between one and two standard deviations. These are:

1912 - May

1913 - February and March

1914 - Summer

These points will all be discussed in the next chapter.

4.4.6: Summary

This analysis has given us, for the volume of discounts variable, TVB, twenty-seven points identified as being of interest. Of these, five can be readily accounted for.[39] This leaves twenty-two where there is no obvious explanation for the increase in market activity.

In order to give a qualitative back up to the analysis, further investigation of events occurring at these particular moments was undertaken.[40] One of the sources used was the Bank of England archives, which fairly typically is not without its problems: the Bank is very sensitive about releasing information that is "customer sensitive" if it comes within their 100 Year Rule.[41] They are thus reluctant to release any information that might be detrimental to the reputation of particular customers. In

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[39] The Continental crisis in 1873, the City of Glasgow Bank failure in 1878, the near collapse of Barings in 1890, the American crisis in 1907 and the outbreak of World War One in the summer of 1914.

[40] The results of this will be reported later in the chapter.

[41] Anything less than 100 years old is subject to restricted access.

addition, sources other than the Daily Discount Books in the Bank are interestingly barren in their coverage of the financial markets in the late nineteenth century,[42] and so sources outside the Bank have to be utilised.[43] This qualitative evidence will be examined in section 5 later in the chapter.

The empirical analysis has so far concentrated on the volume of discounts variable, TVB. Polynomial analysis was carried out on the advances variable, but with limited success. This lack of success can be explained by the relatively low degree of trend apparent in the advances data. However, even with this limited success several moments of greater than normal activity were identified and will be discussed in the next section.

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[42] For example, as previously mentioned, the Minutes of the Committee of Treasury, which at the outset seemed to be a valuable source, soon proved not to be. The reason for this, as previously mentioned, can be found in Sayers (1976) Vol II,pp 630: the Secretary of the Bank of England acted as secretary to the Committee of Treasury, but did not attend meetings, and so the Minutes of the Committee consisted of what the Governor chose to record.

[43] Such as the commercial bank archives, the British Museum, etc.

FIGURE 6.9: ACTUAL & FITTED COMPARED

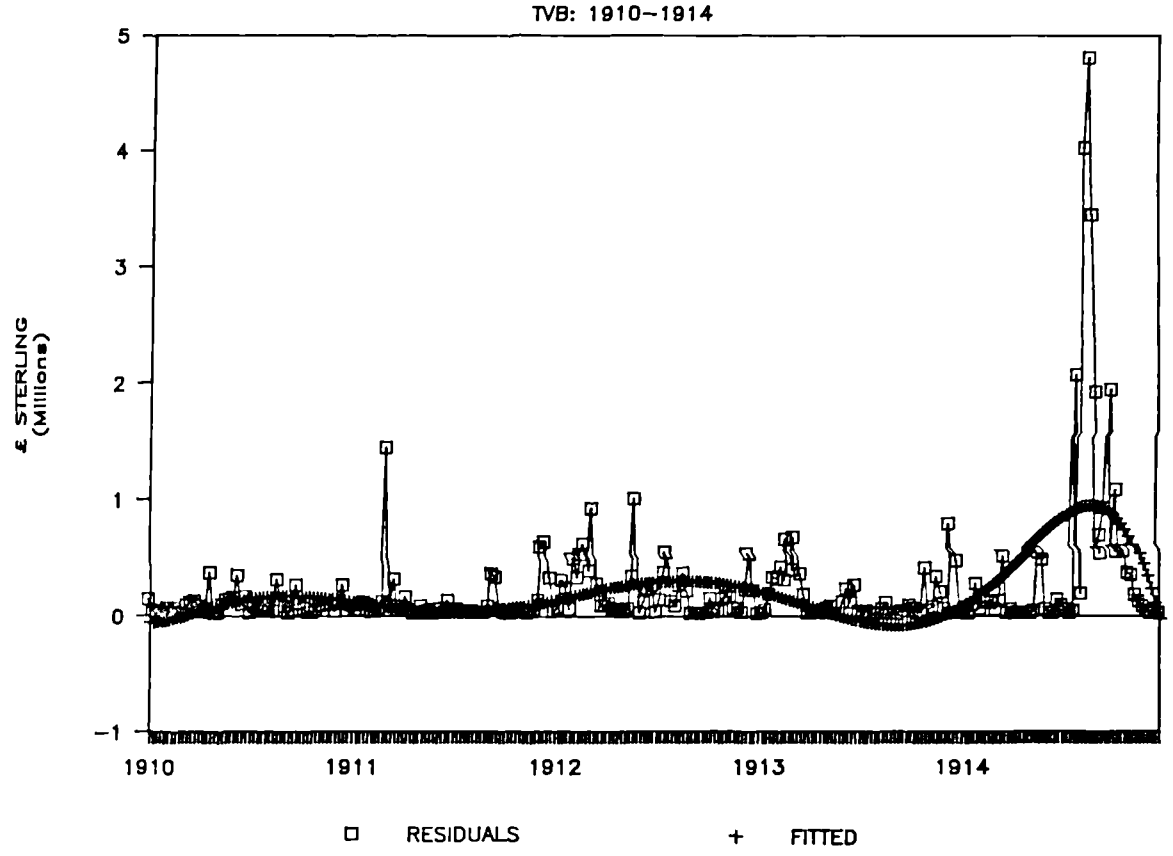
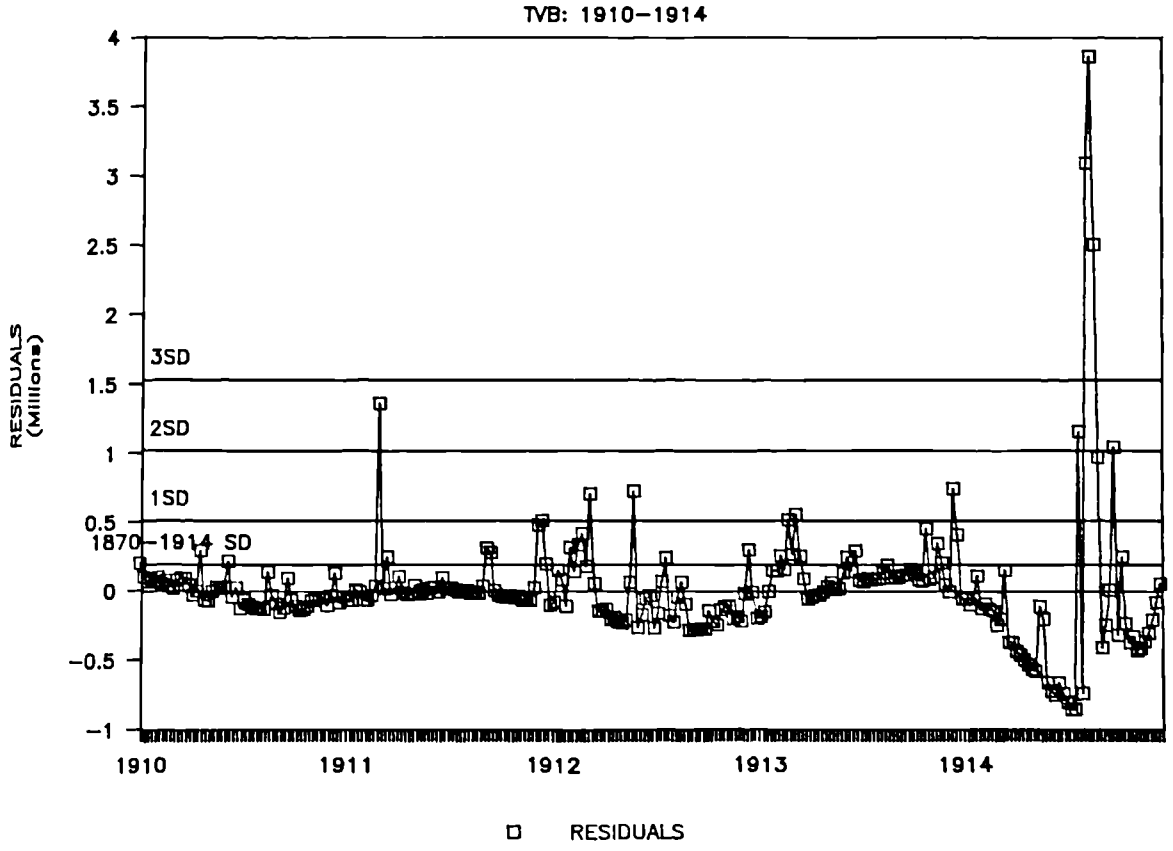


FIGURE 6.10: RESIDUALS & SD COMPARED



4.4.7: Advances Polynomials

Generating polynomials for advances was not as straightforward a task as for discounts, because the variable changes its composition halfway through the period. This has already been discussed in detail, but in brief: until the end of 1894, advances at the Bank of England referred simply to advances received at the Discount Office, secured on bills. However, from 1895 onwards the Discount Office took over the administration of so called "floaters", bills advanced on short term securities, which had previously been handled by the Chief Cashier's Office. This meant that from this point there were two advances variables: advances on bills and advances on securities.

Because of this complication, the splitting of the sample in order to produce the advances polynomial did not always occur at the same point as for discounts. One polynomial for advances was estimated for the period 1870-1879, and then a further one for 1880-1894. Thereafter, separate polynomials were estimated for the two types of advances, covering the period 1895-1904 and 1905-1914. The results of these are reported below, and the graphs are depicted in figures 6.11 to 6.22.

In general, there was less trend apparent in the advances data. This means that the polynomial produced a relatively poor degree of fit. Thus, in certain cases it is not advisable to undertake any further analysis on the

residuals from the polynomial, but better to consider the raw data themselves. These cases will be pointed out in due course.

The mean, standard deviation and the three standard deviation (SD) point for advances on bills and on securities are given below in Table 6.2:

Table 6.2: Advances Mean & SD.			
1870 - 1914	TVA	SD =	183658
		3SD =	550974
		Mean =	67442
1894 - 1914	VAOS	SD =	251651
		3SD =	754953
		Mean =	112168
1870 - 1879	TVA	SD =	85410
		3SD =	256230
		Mean =	49338
1880 - 1894	TVA	SD =	73901
		3SD =	221703
		Mean =	34431
1895 - 1904	TVA	SD =	180684
		3SD =	542052
		Mean =	92412
1895 - 1904	VAOS	SD =	319622
		3SD =	958866
		Mean =	175707
1905 - 1914	TVA	SD =	317521
		3SD =	952563
		Mean =	112486
1905 - 1914	VAOS	SD =	150427
		3SD =	451281
		Mean =	58682

We will now continue by discussing the sub-periods themselves, for both types of advance. The estimated equations, together with any moments of interest, are

pointed out below. In addition, we will also state whether any of these points of high residuals coincide with similar points in the polynomials for discounts. If and when this does occur, it will be discussed more fully at a later point.

4.4.7.1: 1870-1879 - Figures 6.11 and 6.12 (TVA)

The estimated equation resulting from the advances polynomial for the period 1870 - 1879 was as follows:

$$TVA_t = 87407 - \underset{(-4.34)}{(4.34*10^{-5})}T^4_t + \underset{(3.86)}{(1.72*10^{-7})}T^5_t - \underset{(-3.50)}{(1.74*10^{-10})}T^6_t$$

$$R^2 = 0.10 \quad R^2_a = 0.09$$

The above equation contains fewer terms than some of the other polynomial equations. This is due to the fact that none of the other time components carried significant 't' statistics, and is illustrated overleaf: there is very little trend apparent in the data, and thus the trend line is close to being horizontal.

Most of the points where the residuals from this regression exceed three standard deviations in size can be explained by seasonal pressure at either the end of June or the end of December. Those that occur at other points are as follows:

1870 - mid-end July

1871 - end September - start October

1872 - end March - start April

Both the 1870 and 1872 points coincide with high residuals from the discounts polynomial.

4.4.7.2: 1880-1894 - Figures 6.13 and 6.14 (TVA)

The estimated equation for this sub-period was as follows:

$$TVA_t = \underset{}{91661} - \underset{(-4.49)}{519T_t} + \underset{(3.71)}{1.27T^2_t} - \underset{(-3.30)}{0.001T^3_t}$$

$$R^2 = 0.043 \quad R^2_a = 0.040$$

There is even less trend here than in the previous decade,[44] aside from a slight downward movement at the beginning of the period. After 1882, the trend line lies approximately at the level of the mean for the period.

Since there is so little trend in the data, we would expect there to be a greater number of increased residuals. This is borne out by the results; points where the residuals exceed three standard deviations are as follows:

1880 - July start

1883 - April start - mid*

1886 - March end*

1888 - April start*; September end

1894 - April start.

All those dates above marked with an asterisk are points where advance and discount pressure coincide. They generally occur around the end of March or start of April.

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[44] As shown by the low number of significant terms in the regression and the very low 'R^2'.

FIGURE 6.11: ACTUAL & FITTED COMPARED

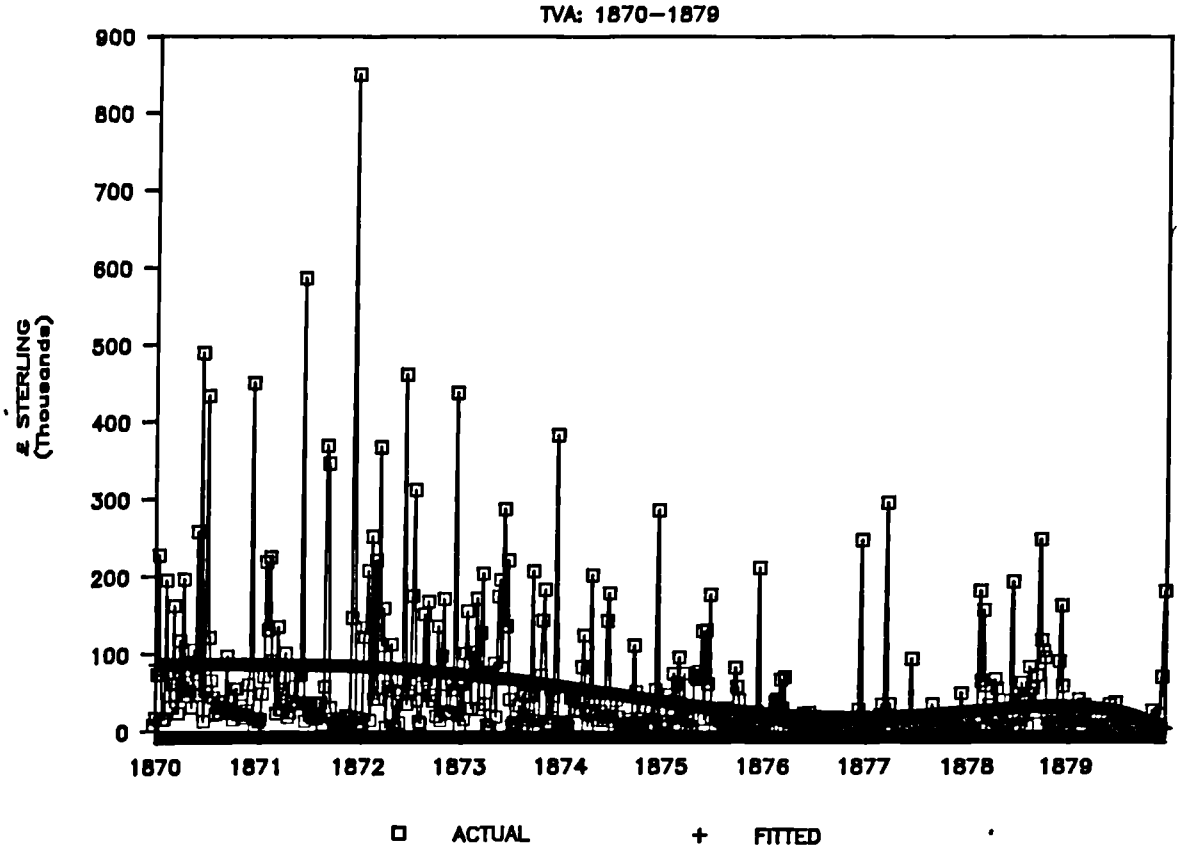


FIGURE 6.12: RESIDUALS & SD COMPARED

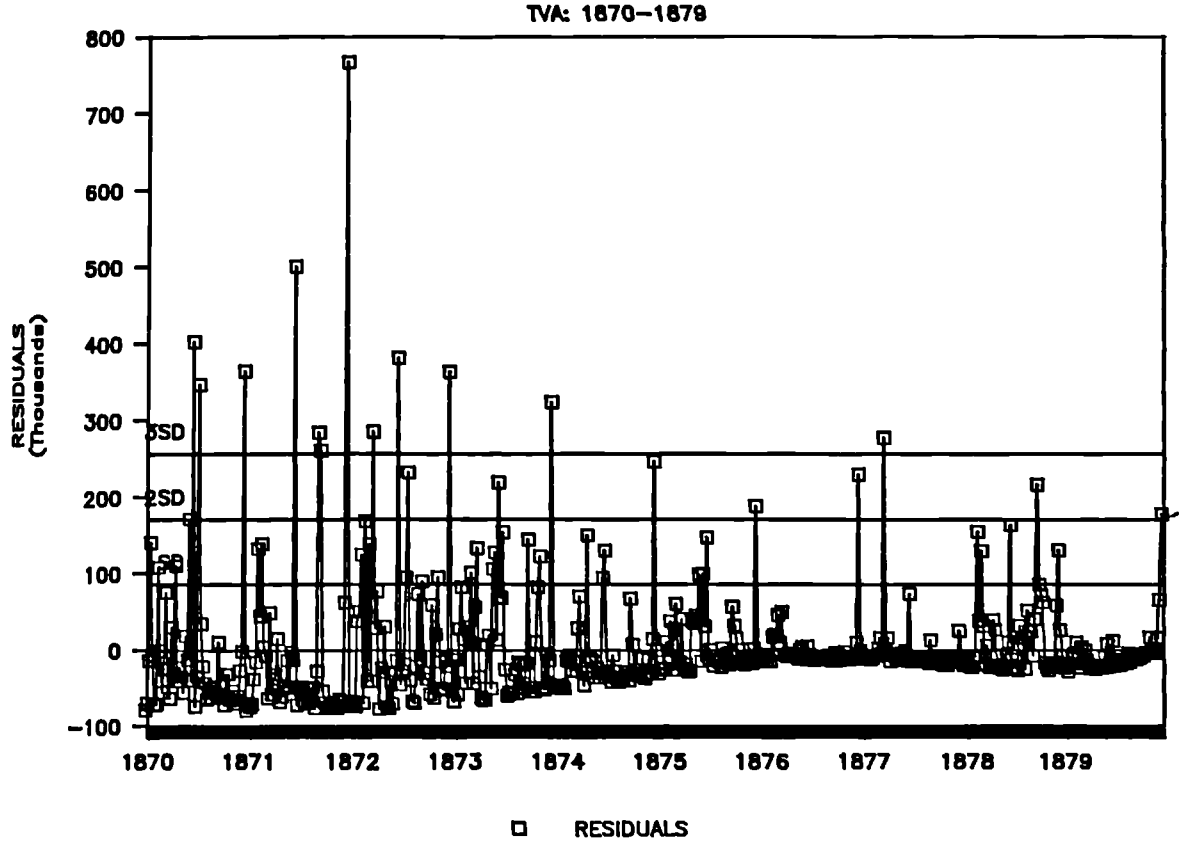


FIGURE 6.13: ACTUAL & FITTED COMPARED

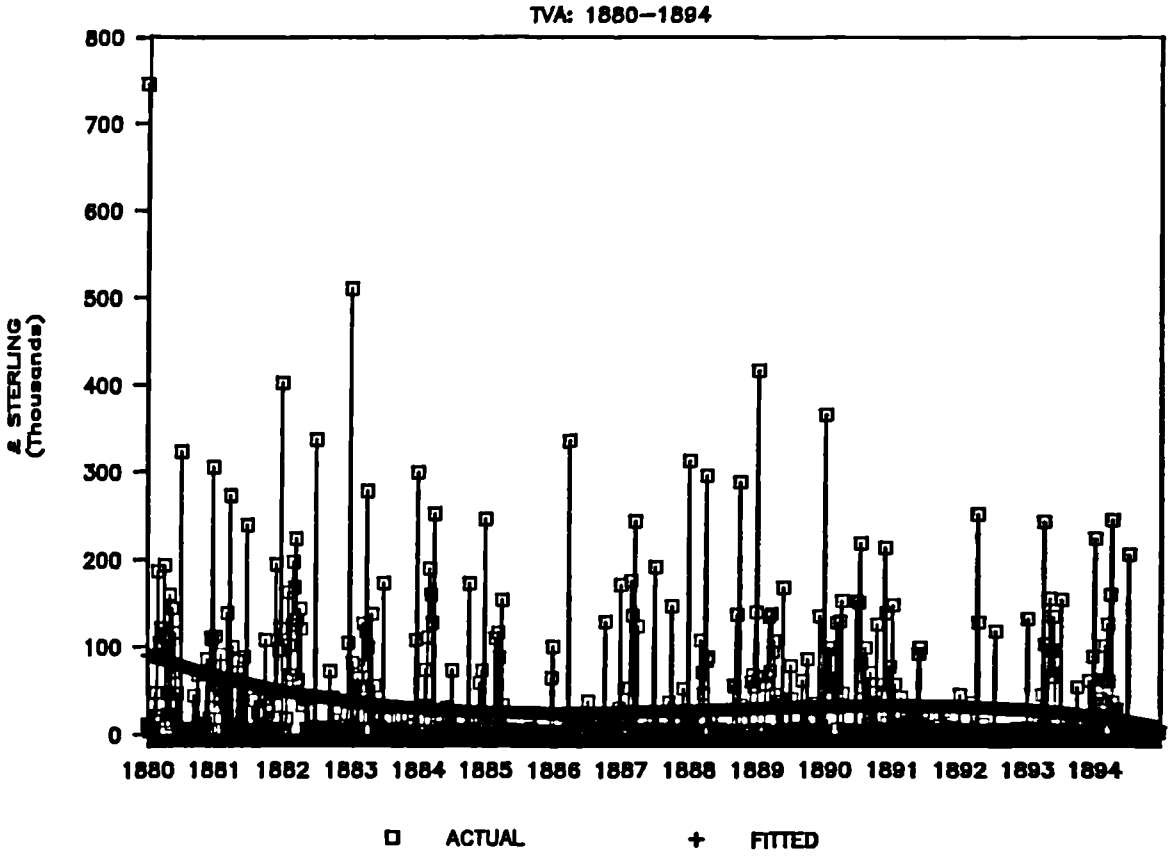
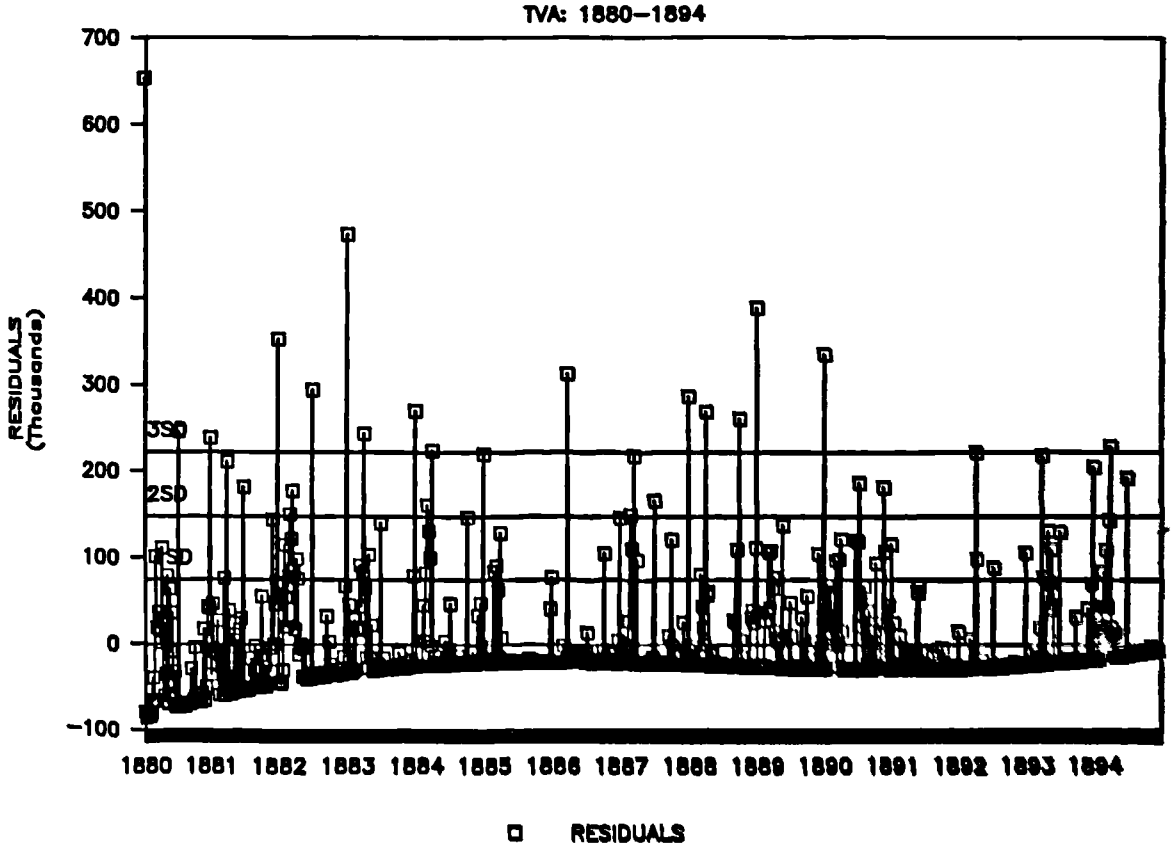


FIGURE 6.14: RESIDUALS & SD COMPARED



4.4.7.3: 1895-1904 - Figures 6.15 and 6.16 (TVA)

The estimated polynomial equation for this period is as follows:

$$TVA_t = \underset{}{13581} + \underset{(6.11)}{2.02T^2_t} - \underset{(-5.19)}{(7.08*10^{-6})T^4_t}$$

$$R^2 = 0.08 \quad R^2_a = 0.07$$

There is slightly more trend here than in the previous period. In addition, there is a significantly greater volume of advance business undertaken at the Bank: both the mean and the standard deviation are far higher here than for 1880 - 1894: the former by 168 per cent and the latter by 145 per cent. Although these figures show a large increase, they are to be higher still in the following period.

Residuals which exceed three standard deviations occur in only three years (excluding seasonal pressure). These are:

1900 - March end

1901 - April end

1903 - March start; May start.

The first of these coincides with a discount pressure point.

FIGURE 6.15: ACTUAL & FITTED COMPARED

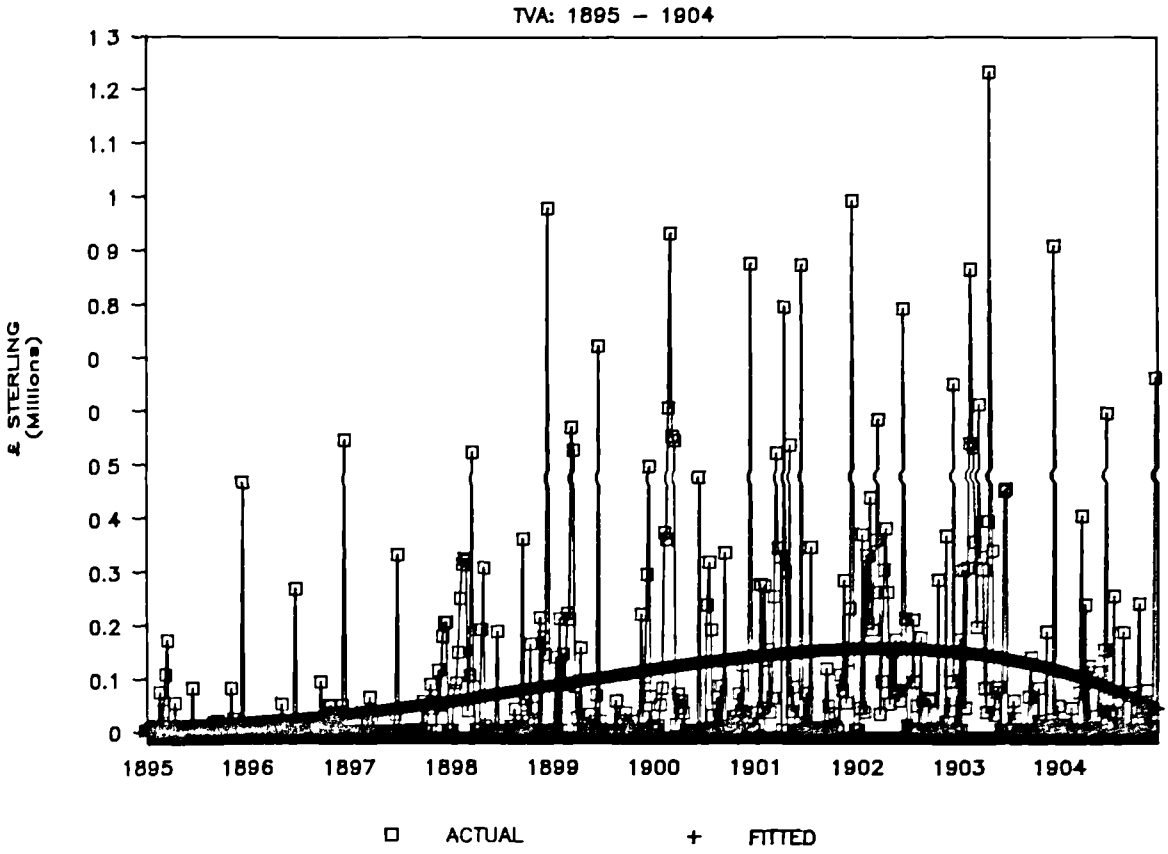
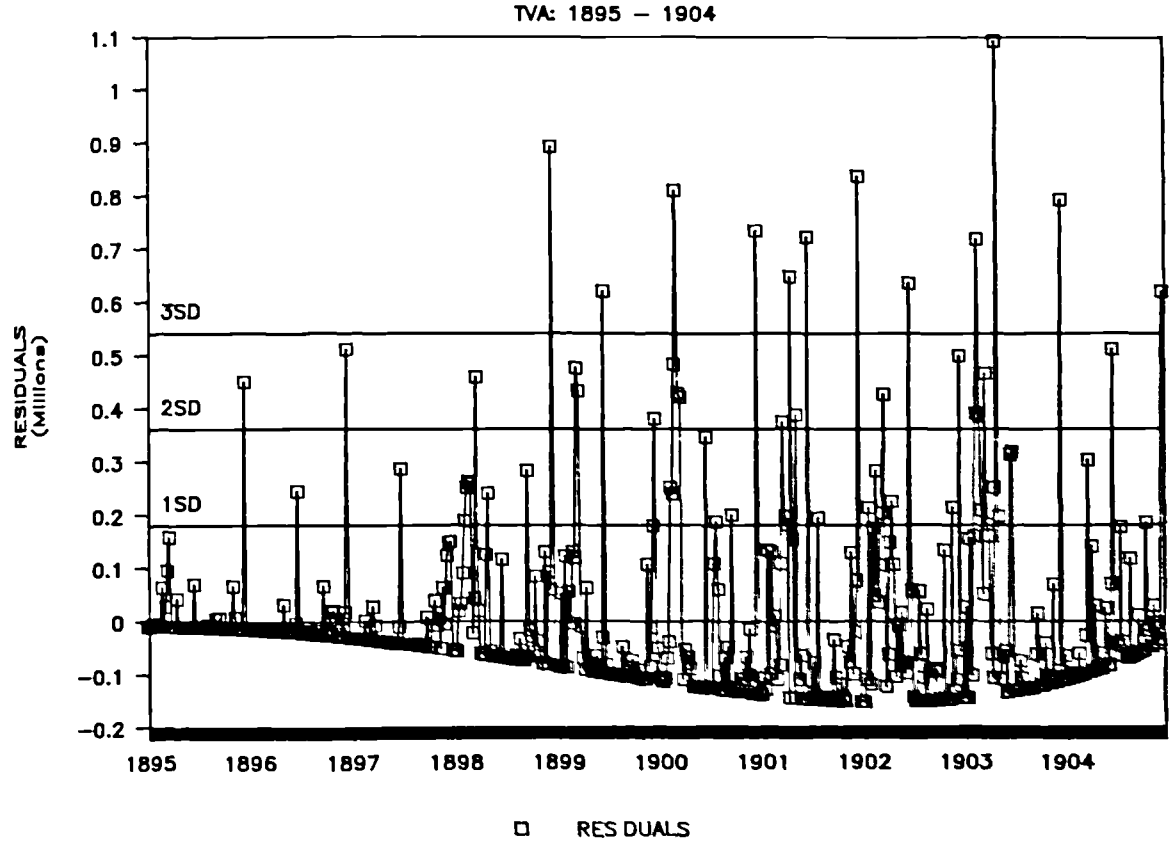


FIGURE 6.16: RESIDUALS & SD COMPARED



4.4.7.5: 1905-1914 - Figures 6.17 and 6.18 (TVA)

The estimated polynomial for this period is as follows:

$$TVA_t = \underset{}{44915} + \underset{(0.66)}{3472T_t} - \underset{(-0.69)}{61T^2_t} + \underset{(0.66)}{0.42T^3_t} - \underset{(-0.61)}{0.001T^4_t}$$

$$+ \underset{(0.56)}{(2.06*10^{-6})T^5_t} - \underset{(-0.51)}{(1.21*10^{-9})T^6_t}$$

$$R^2 = 0.006 \quad R^2_a = -0.005$$

This is one of the occasions where it was impossible to find a polynomial that produced significant 't' statistics on any of the time components. In addition, the value for R^2 was particularly bad, even by the standards of some of the other low trend periods. The line depicting the trend lies fairly close to the mean for most of the period.

As in the period 1880 - 1894, there are a large number of residuals exceeding three standard deviations, again as a reflection of the lack of trend. However, most of these tend to occur at the seasonal pressure points. Only in August 1914 is there a large residual that cannot be accounted for by "window-dressing". This phenonomen is illustrated in Figure 6.18 by the fact that most of the large residuals occur at equi-distant points, thus showing that they occur at the same time(s) each year.

FIGURE 6.17: ACTUAL & FITTED COMPARED

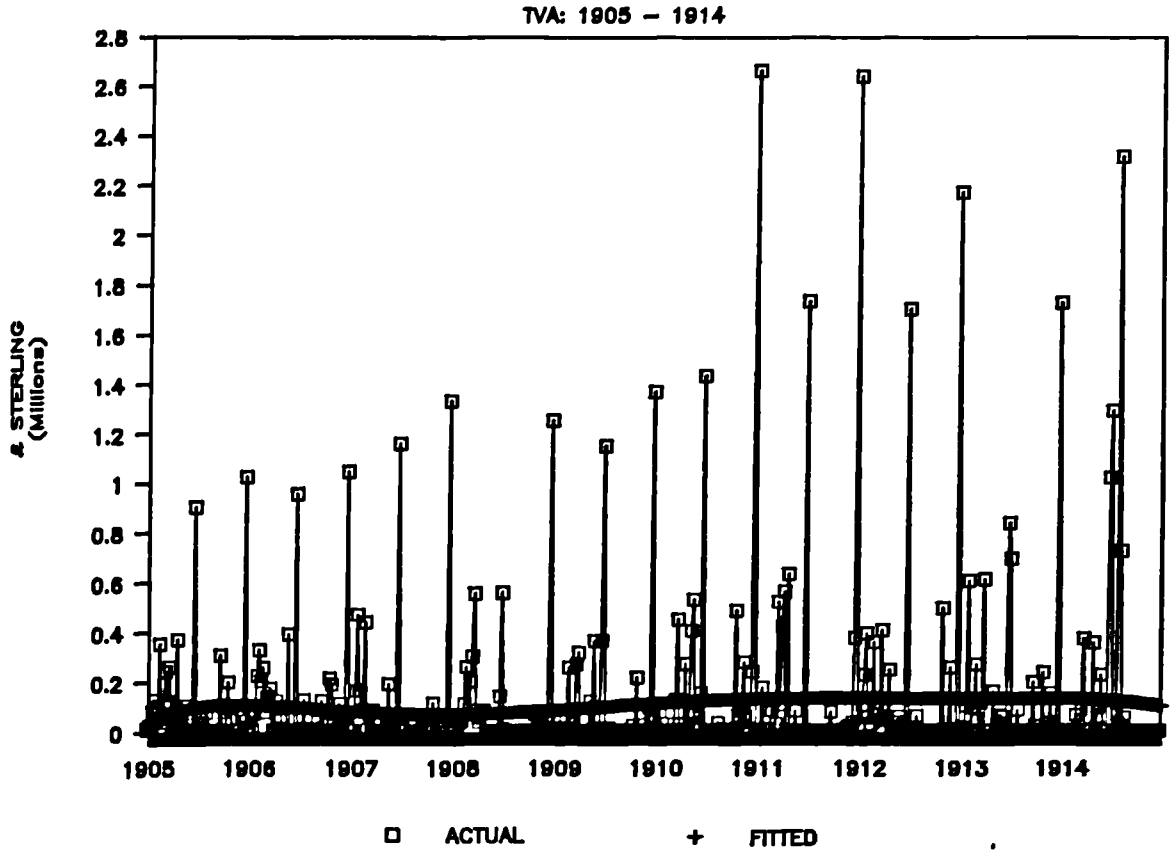
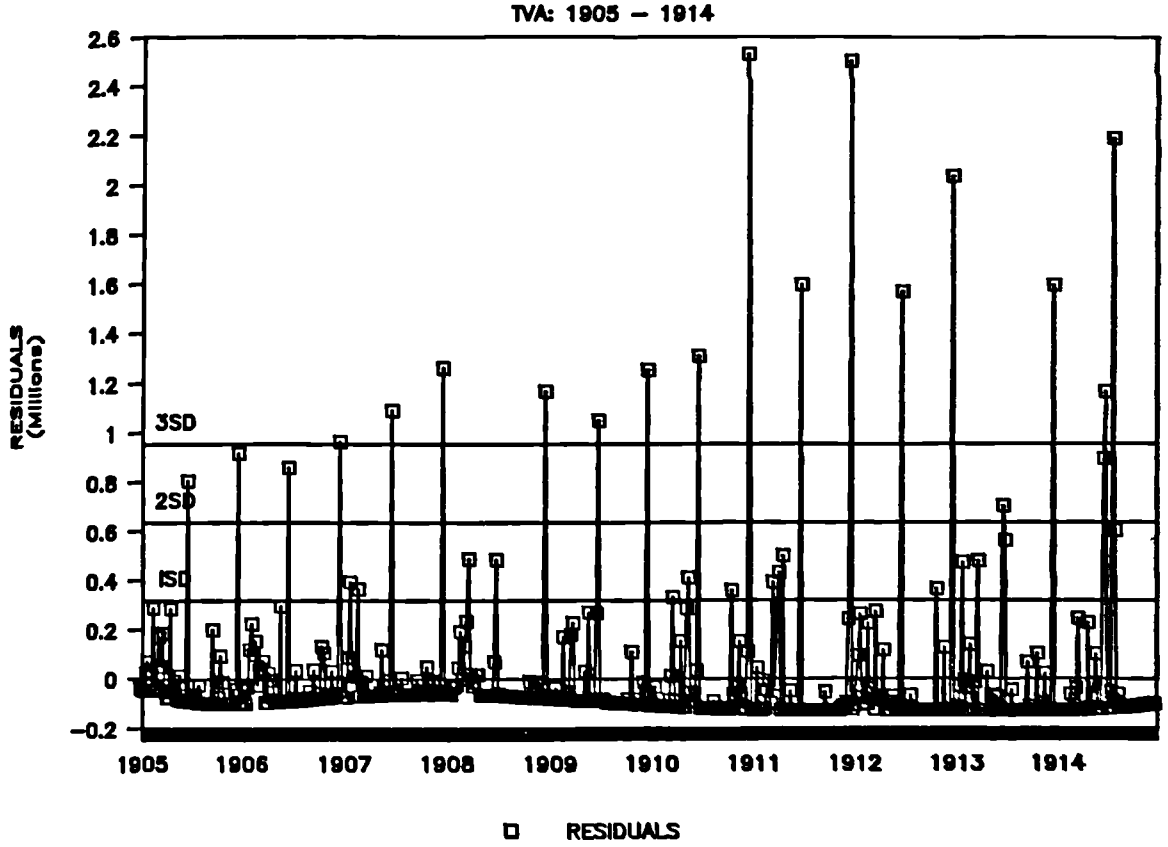


FIGURE 6.18: RESIDUALS & SD COMPARED



4.4.7.6: 1895-1904 - Figures 6.19 and 6.20 (VAOS)

This is the first polynomial which uses the volume of advances on securities, VAOS, as the dependent variable. The estimated polynomial was as follows:

$$VAOS_t = \underset{}{168519} - \underset{(-2.85)}{13430T_t} + \underset{(3.52)}{277T^2_t} - \underset{(-3.86)}{2.18T^3_t} + \underset{(4.03)}{0.01T^4_t}$$

$$- \underset{(-4.06)}{(1.34*10^{-5})T^5_t} + \underset{(3.99)}{(8.36*10^{-9})T^6_t}$$

$$R^2 = 0.22 \qquad R^2_a = 0.21$$

The results for this polynomial were noticeably better than for some of the others, displaying higher 't' statistics and several significant terms. The moments where the residuals exceeded three standard deviations are as follows:

1900 - March end

1903 - middle - end March; start - middle May

1903 saw a sudden increase in business, which was not reflected in the discount figures: the increase occurred solely in advances.

The first of these (1900) is coincident with a discount pressure point.

FIGURE 6.19: ACTUAL & FITTED COMPARED

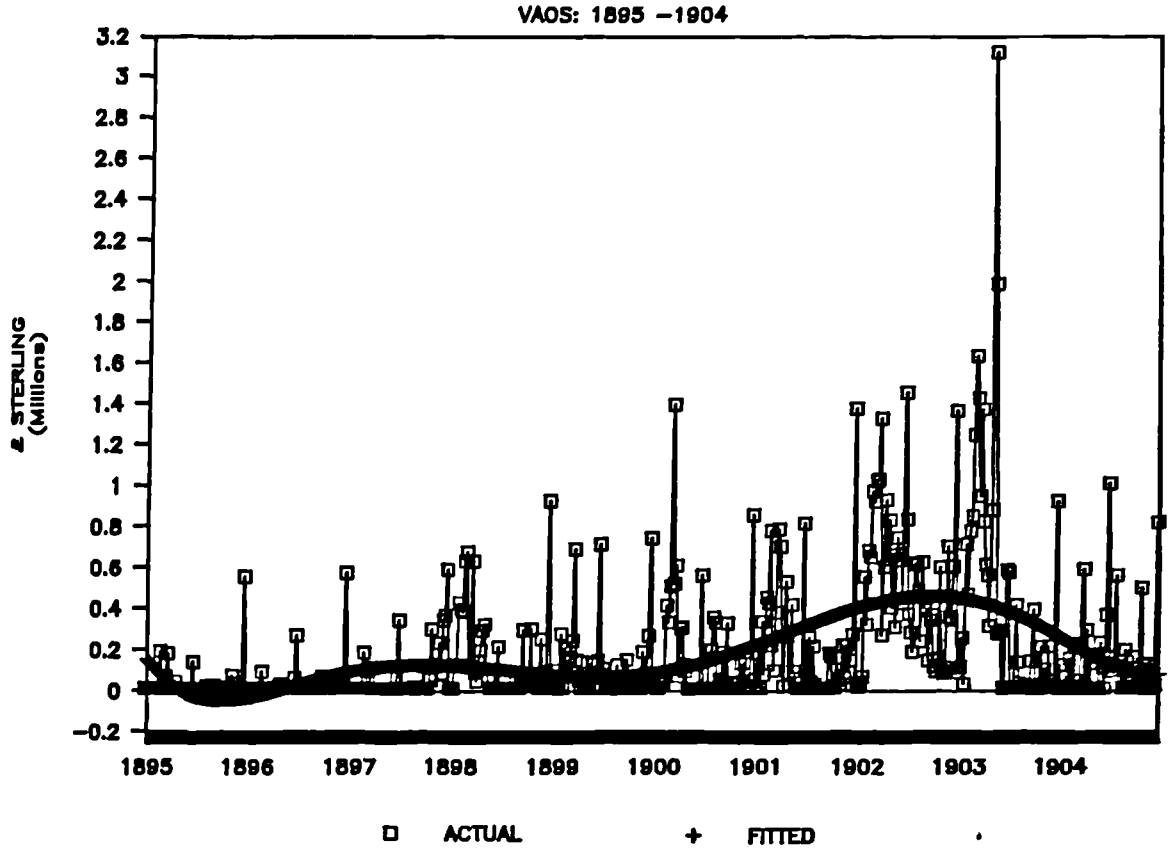
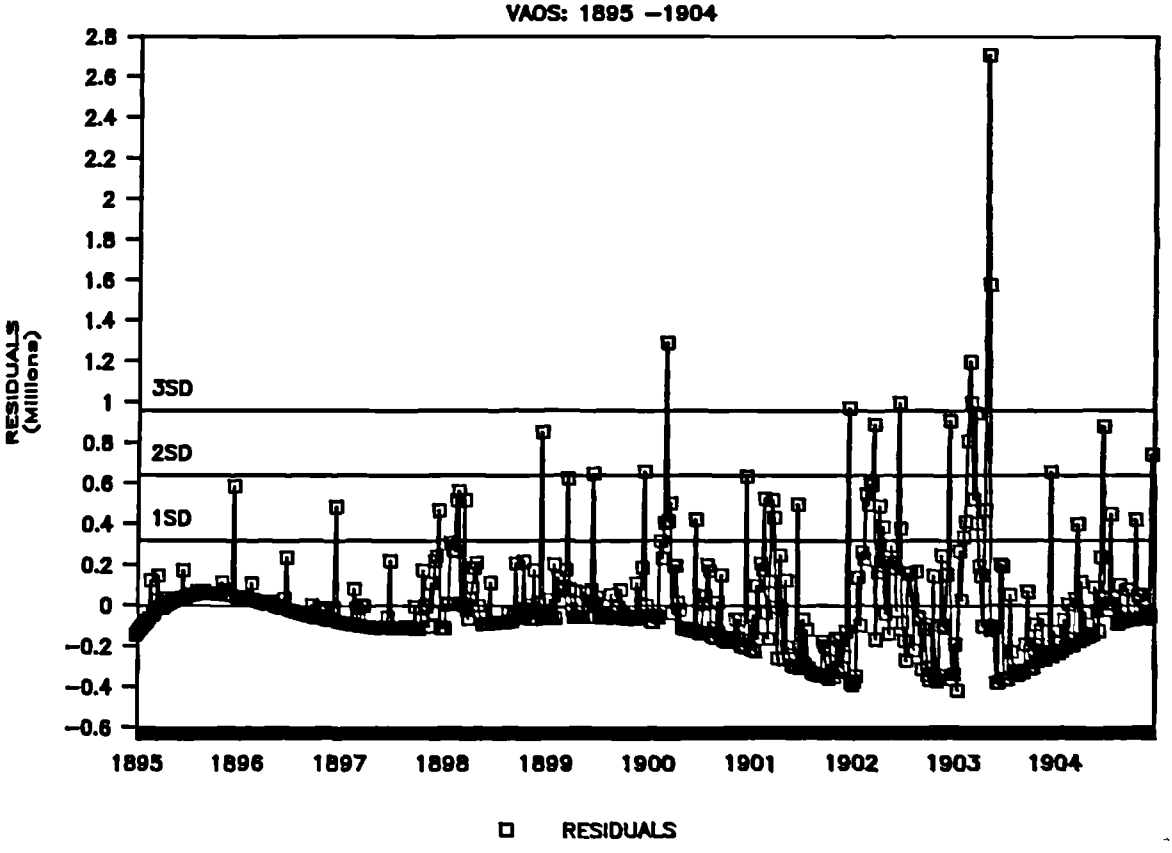


FIGURE 6.20: RESIDUALS & SD COMPARED



4.4.7.7: 1905 - 1914 (VAOS) - Figures 6.21 and 6.22

The estimated polynomial for this period was as follows:

$$VAOS_t = 176893 - \underset{(-3.00)}{1283T_t} + \underset{(2.22)}{4.24T^2_t} - \underset{(-1.96)}{0.01T^3_t}$$

$$R_2 = 0.07 \quad R^2_a = 0.06$$

The results here are much worse than for the previous period, perhaps because the volume of business fell off tremendously here, as displayed by the mean of only 58682, as opposed to 112168 for 1895 to 1914 as a whole. Aside from seasonal pressure points, there are two moments of interest here:

1905 - end February

1910 - mid March.

Neither of these coincide with pressure points on discounts.

FIGURE 6.21: ACTUAL & FITTED COMPARED

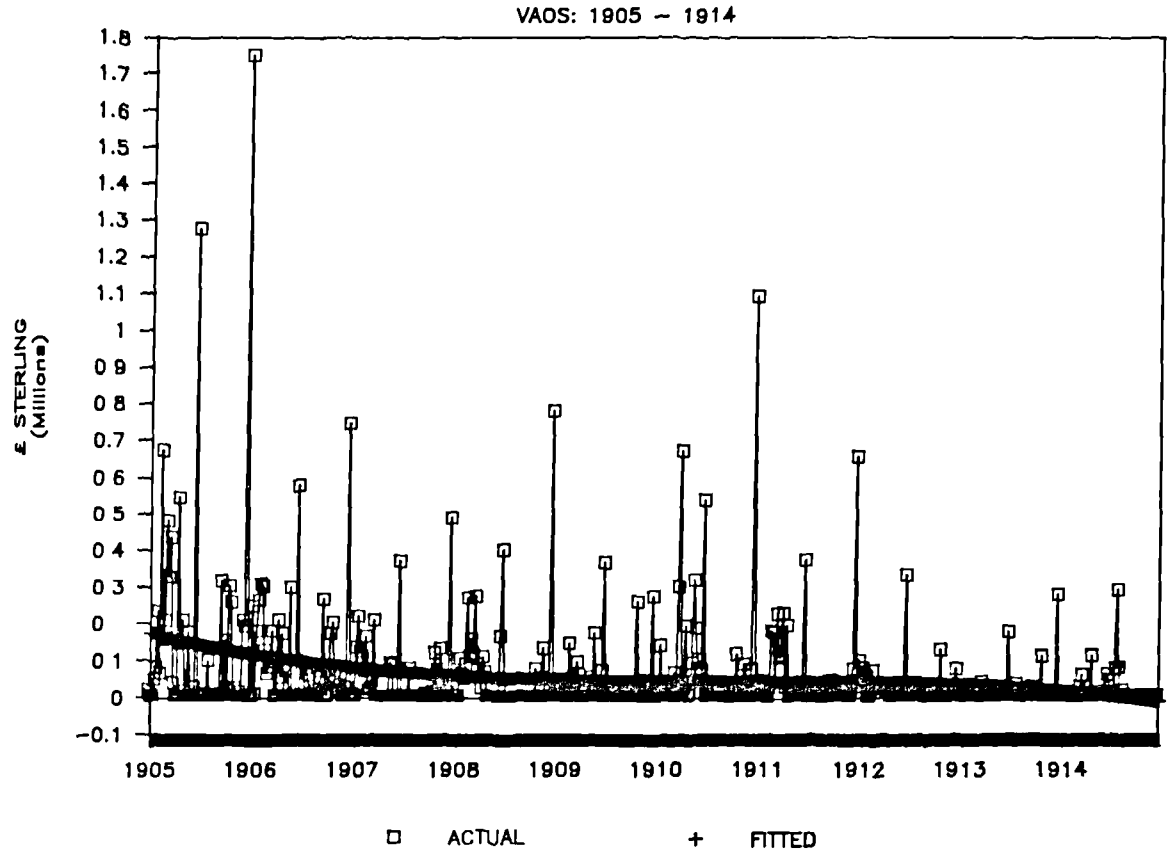
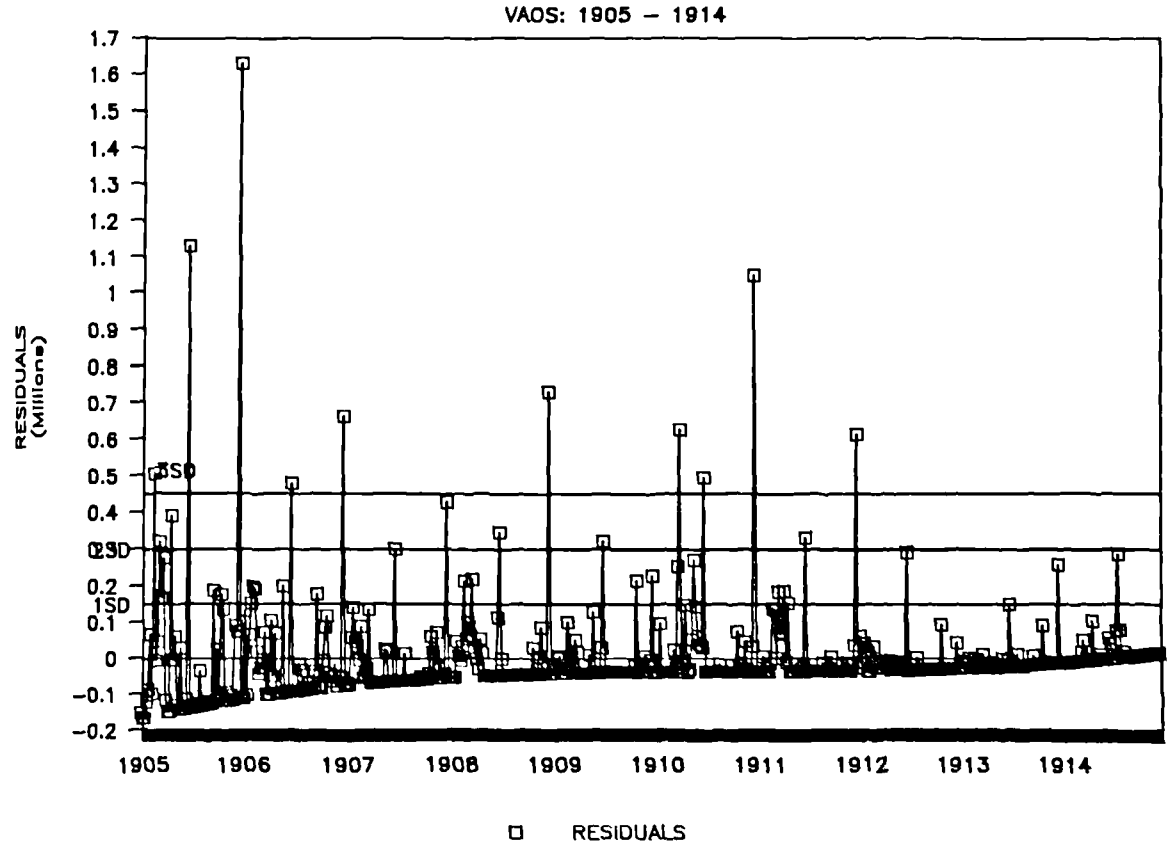


FIGURE 6.22: RESIDUALS & SD COMPARED



4.4.7.8: Summary

The results of the polynomials for advances are mixed. Some periods display a great deal of trend, and others not as much. Those periods with less trend have a greater number of residuals exceeding three standard deviations, and vice versa. In general, the volume of business increases up to 1905 and then falls, discounts becoming increasingly more important after this point. In addition, advances display a much higher standard deviation than discounts. Part of the reason for this can be explained by the fact that there was no steady flow of advances as there was for discounts; no group of Bank of England customers who used the Bank at all times, not just when they were illiquid.

Having carried out this analysis on both discounts and advances, we will now turn first to other tests undertaken on the residuals from the polynomial regressions, and then, in the next chapter, to a qualitative discussion of events occurring at the points which have been identified.

4.5 Tests for "Runs" and for Kurtosis

In addition to tests based on confidence intervals, the residuals from the polynomial regressions for both discounts and advances were subjected to a "runs" test and to tests for kurtosis (the "Tails" test). Both these test whether the residuals are normally distributed: the former tests for randomness in the signs of the residuals, and the latter for "peakedness" in the distribution of the residuals.

A runs test was carried out in order to determine whether there was an unusual number of runs of positive and negative residuals in the sample. Statistical analysis can give us an idea of the number of runs in the residuals that should occur if the sample is random. The occurrence of a smaller number of runs than this would indicate that there was prolonged negative or positive deviations from trend apparent in the data.

The null and alternative hypothesis for this test are as follows:

H_0: the order of the positive and negative residuals is random.

H_1: the order of the residuals is not random.

Z (the deviation of observed values from the population mean when the SD of the population is equal to one) is calculated according to the formula:

$$Z = \frac{r - \frac{(2n_1n_2 + 1)}{n_1 + n_2}}{\sqrt{\frac{2n_1n_2\,(2n_1n_2 - n_1 - n_2)}{(n_1 + n_2)^2\,(n_1 + n_2 - 1)}}}$$

where: r = number of runs
n_1 = number of negative residuals
n_2 = number of positive residuals.

The rejection region for this test consists of all values of Z which are so extreme that the probability of their occurrence under H_o is equal to or less than the significance level, 0.05,[45] and thus this rejection region includes all values of Z is greater than +/- 1.96.[46]

The procedure to carry out this test on the residuals from both the polynomials for discounts and for advances was thus simply to count the number of positive and negative runs occurring in the residuals and the number of positive and negative residuals themselves. These values could then be utilised in the above formula and the obtained 'Z' statistics be compared with the rejection region noted above.

The 'Z' statistics obtained for the various sample periods were as follows:

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[45] That is, 5 per cent.

[46] See Siegel, 1956, Table A, pp.247.

TVB

1870 - 79 : Z = -7.16

1880 - 89 : Z = -3.18

1890 - 99 : Z = -3.30

1900 - 09 : Z = -6.48

1910 - 14 : Z = -8.33

TVA

1870 - 79 : Z = -6.04

1880 - 94 : Z = -8.88

1895 - 04 : Z = -9.42

1905 - 14 : Z = -3.47

VAOS

1895 - 04 : Z = -8.54

1905 - 14 : Z = -5.59

In all cases, Z is greater than +/- 1.96, and thus the null hypothesis is rejected and we can conclude that in all the sub-periods between 1870 and 1914 the order of the negative and positive residuals is **not** random. This result comes as no great surprise given that we would expect that there would be a lower than normal number of runs in the sample.[47]

The test statistic for kurtosis indicates whether or not the distribution of the residuals is peaked: a normal distribution will not display kurtosis and thus the coefficient of kurtosis will be equal to three.

The kurtosis statistics were calculated using the computer package SPSS. The formula used by SPSS to calculate the coefficient of kurtosis, K, is:

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[47] Since this would indicate prolonged periods of discounts which are higher or lower than trend, and it is those residuals which are higher than trend that we are particularly interested in. One of the basic hypotheses on which this analysis is based is that the residuals that result from the polynomial regression should **not** display normality: if they did, the analysis itself would be fundamentally uninteresting.

$$K = \frac{\{[\sum_{i=1}^{N} X_i^4 - 4\bar{X}(\sum_{i=1}^{N} X_i^3) + 6\bar{X}^2(\sum_{i=1}^{N} X_i^2) - 4\bar{X}^3(\sum_{i=1}^{N} X_i)]/N\} + \bar{X}^4}{\{[(\sum_{i=1}^{N} X_i^2) - N\bar{X}^2]/(N-1)\}^2} - 3$$

Use of this formula and SPSS gave results for the 'K' statistic as follows:

TVB		TVA	
1870 - 1879	14.14	1870 - 1879	22.12
1880 - 1889	27.10	1880 - 1894	22.55
1890 - 1899	5.65	1895 - 1904	13.95
1900 - 1909	8.62	1905 - 1914	23.80
1910 - 1914	33.00		

VAOS

1895 - 1904	19.56
1905 - 1914	44.27

Most periods have a sample of 520, the only exceptions being 1910-14 for TVB and 1880-94 for TVA, which have 260 and 780 observations respectively. The critical values at the 5 per cent level are thus 3.37 for the 520 observation samples and 3.52 and 3.29 respectively for the other two. Since the kurtosis statistics for all sample periods are greater than these critical values, all periods fail a normality test indicating the presence of kurtosis.[48] Again, this is not a great surprise since we would also expect the distribution to show a marked degree of kurtosis, a hypothesis which was again borne out by the results.

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[48] See Pearson & Hartley (1970) Table 34 for further details.

5: Conclusions

This chapter has concentrated on presenting a discussion of the empirical analysis carried out on the Daily Discount data set. The most successful analysis involved estimating polynomial equations in order to separate unusual discount and advance activity of the Bank of England from that which was part of the secular trend. This has enabled the identification of a number of points which will be discussed in the following chapter.

What results have been produced from this analysis? Firstly, through estimating a relatively simple regression equation, we have established that there are strong indications that the Bank of England was acting as a LLR during the 1870-1914 period, in that there is a positive, statistically significant relationship between the volume of discounts and advances and the level of Bank Rate.[49] Secondly, we have compiled a list of moments when there was something unusual occurring in the financial markets, even if on some of these occasions the problems were relatively minor. These points have been derived from a statistical analysis of Daily Discount data, using a method which allows for the existence of trend in the data. We have in addition subjected the residuals from these regressions to normality tests, with the a priori expectation that they will **not** be normal, thus implying that the data do hold

[49] There are however reservations associated with this estimation, as expressed in section 4.1 earlier in this chapter.

some clues for further study of the Bank of England's behaviour. Not surprisingly, it was found that the residuals in all time periods failed both these tests, indicating non-normality, a characteristic we would expect given the nature of the data.[50]

In the following chapter we will consider the qualitative implications of the results of the statistical procedures for each of the periods concerned, utilising both primary and secondary sources in an attempt to present as complete a picture as possible of events occurring in the financial system during this period.

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[50] We are basically assuming from the outset that the values taken by the data are not random but are determined by other forces.

CHAPTER SEVEN

FURTHER QUALITATIVE ANALYSIS OF DAILY DISCOUNTS DATA

1: Introduction: Discussion of Identified Points

The method described in the previous chapter enabled the identification of thirty-two "points of interest", moments at which the residuals from the appropriate polynomial regression were unusually large. Five of these points can be accounted for by recognised "events" in the financial sector: 1873 (Continental crisis), 1878/9 (City of Glasgow Bank failure), 1890 (Barings), 1907 (American Crisis), and 1914 (outbreak of World War I). However, rather than looking at these moments about which we have more information first, we will look at all the points in chronological order, in order that a historical perspective is maintained.

In consideration of these points, the underlying aims are as set out in section two of the previous chapter. In brief, in all cases the following factors will be discussed:

- the pattern of transactions: was there concentration or diffusion of market pressure?
- the split of business between discounts and advances.
- the pattern of refusals at this point: did they too reach a peak?

All the above deal with quantitative aspects of the particular situation. However, there are also qualitative questions that have to be considered:

- were certain institutions receiving more accommodation (discounts or advances) than others?

- were the eligibility requirements for bills relaxed, either in general or for particular institutions?

These are all issues that have to be discussed in order to determine what the Bank of England was actually doing at certain times.

We will follow the same pattern of analysis for all points, which is as follows:

(a) How large the particular residual(s) is/are compared to the rest of the period. This is important in order that we can place the increase in activity in perspective.

(b) A consideration of the average size of transaction, for discounts and for advances, in order to determine the level of concentration of demand.[1]

(c) The split between discounts and advances: whether activity was concentrated on discounts or on advances. Since the type of customer for each facility was often different, this will enable us to get some indication of what sort of firm was short of liquidity.

(d) A description of what was happening to interest rates and to the volume of refusals. In order to be acting as a Bagehotian LLR the Bank of England should have been "lending freely at a high rate". It is thus important to be aware of the sort of rates at which

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[1] Discussion as to the average size of transactions obviously refers to the actual, as opposed to the residual, value.

these transactions were taking place. In addition, we need to look at the volume of refusals: we would expect the latter to *increase* as the volume of discounts increases, for reasons which have already been specified.[2]

(e) A qualitative account of what was occurring in the economy in general and in the financial markets in particular, in as much detail is as known, and a collation of the qualitative and quantitative information.

We will now continue with the discussion of all these points. In all the following discussion, reference should be made to Figures 6.1 to 6.22 in the previous chapter.

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[2] The volume of refusals applies to applications for discounts that were refused, and thus have no relevance for advance transactions.

2.1: 1870 - July (Discounts and Advances)

(a) There are two fairly large residuals for both variables at this time: for discounts the value is around 240,000 and for advances around 350-400,000. These are by no means the largest residuals for this decade however.

(b) The average size of discount transaction (**asdt**) at this point was around £8400, approximately twice the average for the decade of 1870-79. However, although the asdt increases here, the increase is not considerable when compared to other cases, which indicates a (relatively) wide demand for discount facilities. When we look at who was receiving discounts, we find that this is so; there are few large transactions, and the only institution receiving a large amount is involved in several transactions, which obviously does not exert the upward influence on the asdt as would occur if the whole sum discounted occurred in one transaction.[3]

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[3] In this instance the institution concerned was **Bischoffsheim & Goldschmidt**, who received almost £370,000 in discounts (six transactions) during ten days at the end of July. There is very little known about this institution, except that they were a German Bank who received large sums in discounts at the Bank of England on only three occasions: here, and once each in 1872 and 1873. They are mentioned in the history of **Deutsche Bank** (Seidenzahl, 1970): one of the senior partners of the London firm (Henry **Bischoffsheim**) became a Director of Deutsche Bank in Germany. At this point, Bischoffsheim & Goldschmitt were apparently at the "height of their glory". However, the London bank soon became the subject of an investigation into its rather dubious issues of European and American

(continued...)

The average size of advance transaction (asat) was around £86000, more than three times the 1870-79 average, and the highest level for the decade. These advances were in general being sought by Discount Houses such as **United Discount** and **Green Tomkinson**, which received £120,000 and £150,000 respectively.

(c) The split between advances and discounts is fairly even at this point, but with many more discount than advance transactions, hence the large differential in the average size of transactions. The two variables imply different things about the concentration of market pressure: for discounts, pressure was widely diffused: the average daily number of discount transactions here was over 30, but for advances pressure was far more concentrated.

(d) Interest rates in this period were moderately high: Bank Rate rose to 5 per cent on July 28th and 6 per cent on August 4th. Refusals were larger than normal: just over £4000, 30 per cent higher than the decade average. This of course is to be expected if there is a large volume of discounts and a high number of

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[3](...continued)
railway paper, which had been issued on behalf of both these railway companies and the Viceroy of Egypt, and thus Henry Bischoffsheim gave up his seat on the Board of Deutsche Bank in 1873. If the Bank of England had been giving advances to Bischoffsheim Goldschmidt, then we might have questioned its wisdom, since the latter's credit record cannot have been very good. However, since all the funds it received from the Bank were in the form of discounts, the regulations for the granting of which were fixed, it seems that these transactions were fairly safe for the Bank of England.

transactions, although as we will see at a later point this does not always occur.

(e) There is probably a fairly obvious explanation for this period of pressure on discounts and advances: the outbreak of the Franco-Prussian war in July 1870. Britain's role in this war was not known at the outset, and thus there was a precautionary rise in interest rates, and, it seems, an increased demand for liquidity, which was met by the Bank of England, albeit at higher rates. As soon as it became apparent that Britain was to be only a spectator in this conflict, the markets settled down once again and resumed normal activities.

What seems to have happened here is that many firms came to the Bank of England for discounts and advances as a precaution against Britain's involvement in the Franco-Prussian war. Indeed, on the announcement of the outbreak of hostilities there was a panic on the Stock Exchange and failures occurred on the settlement day. The Bank accommodated this extra demand, which was of course the correct course of action, since the problem was merely one of insufficient information as to the participants of the war, and thus the slight increase in tension passed without any more serious consequences.[4]

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[4] However, it should be noted here that eight discounters suspended payment in 1870, a relatively high number. (Chapter Five, Section 2.2)

2.2: 1871 - February (Discounts)

(a) Although there had been some slight increase in activity in the previous two or three weeks, there is only one residual which exceeds three standard deviations. This is however the third largest residual of the decade.

(b) The asdt here is twice the decade average, again, not an enormous increase when compared with other periods, since this still only gives a value of slightly over £10,000. Much of the increase in discounts went to banks or companies with foreign connections: **Agra Bank, Imperial Ottoman Bank, The Borneo Company Ltd.**

(c) There is some increase in advances in this period, but most of the pressure is concentrated on discounts.[5]

(d) Interest rates here are low: 2½ - 3 per cent. Refusals however are significantly above their decade average: £9105 as opposed to an average of £2972.[6] The average size of each refusal is slightly lower than the decade average.

(e) Both primary and secondary sources give us little clue as to any extraordinary event taking place at the time. However, the French had surrendered in

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[5] 60 per cent of total business is carried out on discounts.

[6] These figures refer to the average daily volume of refusals.

January, and so it is possible that there was a movement away from London. The increase in the demand for discounts was in any case accommodated by the Bank of England.

2.3: 1871: September and October (Advances)

(a) There are two consecutive weeks here of higher than normal activity on advances. Both residuals just exceed three standard deviations.

(b) The average size of advance transaction here is slightly higher than the decade average, but not significantly so. In each week there are eight transactions, averaging around £44,000 each, which is not an enormous sum for an advance transaction.[7] Again, it was mainly the Discount Houses, together with several foreign banks, who received facilities at the Bank.[8]

(c) There was an increase in the volume of discounts in the second of the two weeks, which took the form of a large increase in the number of discount transactions, and thus the asdt did not increase very

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[7] Advance transactions were often carried out in multiples of £50,000, with firms sometimes receiving several times that amount.

[8] Such as:
General Credit & Discount : £850,000
Sandersons : £675,000
Reeves Whitburn : £405,000
Chartered Mercantile Bank of India, London & China: £250,000
Chartered Bank of India, Australia & China : £200,000

much. Overall however, most of the increase in business was concentrated on advances.

(d) Interest rates were fairly high, lying between 4 and 5 per cent. Part of the explanation for these increased rates was probably due to the possibility of the occurrence of the normal autumnal reserve drain to the U.S.: high rates had the effect of reducing this slightly. Refusals are slightly higher than their period average.

(e) There is no clear explanation of this increase in activity, aside from the obvious one of an attempt to stem the drain to the U.S. If this was the reason for the increase in interest rates then it was a success, since the (slight) pressure on discounts was soon calmed and events returned quickly to normal. However, The Economist, in its **Economic Commentary and History and Review of 1870,** published in its issue of March 16th 1872, mentions that in September 1871 there was some uncertainty in the London money markets as to whether the Bank of England's reserve would be drawn upon since much of the disposal of German capital would be carried out in London. This uncertainty about movements in the Bank's reserve was apparently sufficient to bring about a precautionary rise in Bank Rate and an increase in the demand for advances at the Bank. In this case, the Bank acted in a completely correct manner: accommodating the increase in the demand for liquidity, whilst at the

same time increasing Bank Rate in order to attract gold to London and into the Bank.

2.4: Spring 1872 - Discounts and Advances

(a) This period of activity covers much of February, March and April of 1872. There is continual heavy business on discounts and on advances throughout this period, with several residuals exceeding three standard deviations on both variables, and many more between two and three SDs.

(b) The average size of discount transactions is higher than the decade average, although sometimes only slightly so. The only company involved in more than one large transaction is **Baker Duncombe**, who received £208,378 on discounts in April. For advances, the average size of transaction is not very much above the decade average, at between £30-40,000. Here there were two Discount Houses which received large sums in one transaction however: **Sandersons** had £300,000 and **General Credit & Discount** £350,000. These were the only large transactions.[9]

(c) Advances are in general slightly greater in volume than discounts: between weeks seven and nineteen of 1872 just over 70 per cent of total business was carried out on advances. This is slightly unusual for

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[9] **Bischoffsheim Goldschmitt** appear here again, receiving discounts of £100,650.

this period; discounts and advances followed a very similar time path until the early 1880s when advances began to dominate.

(d) Bank Rate stood at 3 per cent between December 1871 and April 1872, but there were then two ½ per cent moves in one week, to take it to 4 per cent. This was the beginning of the upward trend in interest rates which was to culminate in the very high rates experienced the following year. Refusals were higher during this period of increased activity, as would be expected when an expansion of discount business occurs.

(e) Again, there is little qualitative evidence explaining this increase in activity. Clapham (1948) talks about the "trade rush of the peace", and the Bank reported moderate business, but this provides no real explanation. There was an increase in economic activity in 1872 however, part of the boom taking place across Europe, especially in Germany, and which was to lead to the 1873 economic and financial crises.

2.5: 1873 - February/March and August/September (Discounts)

(a) For discounts, this is by far the busiest year of the decade: the total volume of discounts in 1873 is over £30m, a value which is not exceeded until 1893. Although discounts are active all year, there are two

main periods of concentrated activity: February/March and August/September, during both of which times there are two residuals greater than 3SDs and several more between two and three.

(b) The average size of discount transaction in both periods is generally around twice the decade average, although in occasional weeks, particularly in the early period, it is greater than this. In addition, the largest observation (£433,952 - occurring in September) is accompanied by an unusually high number of transactions - 69 - giving a relatively low asdt, indicating a widespread demand for discounts and a diffusion of pressure. When we turn to examine who was active in discounts at the Bank of England in the earlier period, we find many unfamiliar names receiving fairly large sums in discounts, together with others who were involved in more frequent business at the Bank. In the first category were **Seligman Brothers** (£118,176), **Jay Cooke** (£100,000), **The International Bank of Hamburg** (102,003), **Moses Levy & Co.** (101,705) and **A.Gibbs & Sons** (£80,655), none of whom was a regular discounter at the Bank, together with many other unfamiliar names who received much smaller amounts. In the second category (more frequent discounters) were **Raphaels** (£530,000- four transactions) and **Imperial Ottoman Bank** (£276,573 - three transactions). The Discount Houses were the most active institutions on advances: **Green,**

Tomkinson & Co. received £300,000 and **Reeves Whitburn** £240,000.[10]

In August and September the story is very much the same, with several of the firms who had received discounts in the earlier period returning for more: **The International Bank of Hamburg** had £155,295 (in three transactions), **Jay Cooke** £100,000, **Raphaels** £71,984. There were few transactions which exceeded £100,000 here; the demand for discounts was very diffused, even though it was high.

(c) Discounts are far more important than advances in this period. Although there is some slight increase in advances in certain weeks, especially at the end of the half years, overall there is steady, but not heavy, business throughout the year.

(d) Bank Rate starts and end the year at 5 per cent, but rises as high as 9 per cent in the intervening period. 9 per cent holds for two weeks in November, which in fact is not at the points where the demand for liquidity is at its greatest. The highest rates are preceded and followed by several weeks of 6 and 7 per cent. Refusals are high all year, peaking at over £50,000 in September (week 40), a week which also saw the peak in the volume of discounts. The average volume

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[10] The Discount Houses were not allowed to receive discounts at the Bank of England until 1890, when Lidderdale relaxed the 1858 rule which allowed them only advances, and these only at certain periods. This rule had been imposed after the 1858 crisis, for which the then bill brokers were held to be mainly responsible. See Table 4.2 in Chapter Four for a summary of discount regulations.

of refusals for the year as a whole is £7804, almost three times the decade average. This increase in the volume of refusals fits with the increase in the volume of discounts, especially since many of the firms discounting were not habitual discounters and thus perhaps were not very aware of the regulations governing discounts.

(e) 1873 was a year of widespread crisis in Europe and in the U.S. The European crisis commenced in Vienna in the early summer, and soon spread to the rest of Europe. It was at this stage that the first demands for liquidity began to be felt at the Bank of England. The second wave of the crisis gathered steam in the early autumn, when the American markets begin to contract, and it was during this stage that the very high levels of interest rates were seen at the Bank. However, these rates can, to a certain extent, be seen as an attempt to keep gold in Britain, since the internal demand for liquidity at the times when high rates prevailed was not excessive. What is clear from the Discount Data is how strong the demand for liquidity was from foreign firms, or firms with foreign connections. Although the facilities they received were not enormous, names such as **Bieber & Co., Frangofuito** and **Varliano Brothers** were obviously Continental, and were very rarely involved in business at the Bank. There was some internal demand for liquidity, which the Bank of England

accommodated, whilst at the same time trying to stem the drain abroad. This policy seemed to work: Bank Rate stood at 3½ per cent by the middle of January 1874, and the Bank had managed to survive the crisis and simultaneously increase its experience of dealing with such events.

2.6: November 1878 - January 1879 (Discounts)

(a) The pressure here is on discounts and occurs towards the end of 1878 and at the very beginning of 1879, although the later part of the period sees the greatest activity. The first week of 1879 has the largest residual of the whole decade (423,000), which is associated with an actual value of £465,000.

(b) The average size of discount transaction in the first week of 1879 is just over £50,000, more than 15 times the average for the decade. At this point there are only eight discount transactions.[11] Elsewhere, there are no noticeable increases in the asdt.

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[11] Although initially this enormous increase in the average size of transaction seems very odd, in fact there is an easy explanation for it: two large transactions which force up the weeks' total. The recipient of the discounts was the **Secretary of State for India in Council**, which received almost £1.6m in the first week of 1879. The "Indian business" had, according to Clapham (1944, pp.301), been expanding since the late 1860s and was "becoming more regular and formal". Thus, an instance to which our attention is immediately drawn turns out to have a simple and unambiguous explanation: loans to India were "sovereign" and thus presumably almost risk-free, and yet they provided a very useful source of business to the Bank in times when it was often hard-pressed to raise income.

(c) Advances here are not enormous: although they touch £200,000 once in November, this is a one-off increase.

(d) Interest rates reach 6 per cent in November, a level at which they remain for five weeks. Refusals too are high in November, not always coinciding with peaks in discounts: one week sees the value of refusals at a level which is twice that of discounts, thus of the bills presented for discount, twice as many were refused as were accepted.

(e) This of course was the period of the City of Glasgow Bank failure, one of the most interesting episodes of the decade. This bank failed as a result of gross mismanagement, some of its directors actually being imprisoned for fraud, and the Bank of England refused to grant it direct aid. The secondary effects of the crisis were severe but were in the most part confined to the provinces, London itself being almost unaffected. However, accounts of the English effects of this failure tell us that by the end of the year **"caution had become paralysis in the market"**, and talk of the **"terrible panic which overwhelmed the country"** and of the **"abatement of confidence being severely felt".**[12] In addition to the City of Glasgow

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[12] The sources of these comments are various accounts of the failure held in Commercial Bank Archives, for example, Lloyds Bank Archives, Notes and Reminicences of Lloyds Bank, 1862 to 1892 (Archive Reference 10/29). This (unpublished) book was written by Howard Lloyd, who was the General Manager of Lloyds between April 1871 and March

(continued...)

failure, there had been closures of the Caledonian Bank and of the West of England and South Wales District Bank in the first two weeks of December.

As already mentioned, compared with other points this incident does not show up to any great extent in the Daily Discount data, although there is a noticeable increase in both the currency:deposit and reserve:deposit ratios and a slight fall in the money supply.[13] This small fall in the money supply fits in with the notion that the crisis was severe outside London, since the share of the note issue outside London held by the provincial banks was still considerable at this time, although it was of course on the decline.

Even though there was no great surge in the volume of discounts in November 1878, there were two instances in November 1878 when firms, two of whom were severely affected by the City of Glasgow's failure, received discounts at the Bank of England which amounted to over £100,000: £140,000 to the Bank of New Zealand and £102,000 to the Yorkshire Banking

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[12](...continued)
1902. It was the result of a diary kept by him, and was eventually transcribed in 1917.

[13] C/D increased from 0.180 at the end of 1877 to 0.203 at the end of 1878, and R/D from 0.110 to 0.120. It should be noted however that the increase in the reserve-deposit ratio could be part of the general secular increase occurring in the period as a whole, as commercial banks increased reserves and started to publish balance sheets. The money supply (as measured by M3), fell by 7.73 per cent between June 1878 and June 1879.
Source: Capie & Weber (1985) Table 1(3), pp.82.

Company, which was itself experiencing a run on deposits. On November 9th the Clydesdale Bank received £315,000 in discounts.

Bank Rate at this point was 6 per cent, but advances were being charged at 7 or even 8 per cent. The policy of the Bank of England at this point seems to have been to charge high rates to choke off demand: or rather to force institutions to go elsewhere if it was possible to obtain accommodation at lower rates. High rates also had the advantage of drawing in gold from abroad, especially from France, and thus adding to the reserve. This does not explain however why there seemed to be no real pressure at the Bank of England, even though the country pressure was considerable: LLoyds Bank, based at this time in Birmingham, reported a decline in its liabilities on current and deposit accounts of 20 per cent,[14] and Collins (1987) writes that, in his opinion, "a general panic was but a hair's breadth away".[15]

Thus this incident is particularly interesting from the perspective of the Banks' actions as a LLR. In this case the Bank acted as a true LLR, lending to other institutions affected by the initial failure, but not to the failed institution itself, riddled as

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[14] Op cit, Howard Lloyds' Reminicences, pp.36.

[15] Collins (1987) pp.4.

it was with poor and fraudulent management.[16] In addition, it should be noted that the "crisis", if that is the best way to describe the problems resulting from the City of Glasgow's failure, were not centred on London, for almost the first time. This of course causes problems in defining these events as a "crisis": if the City of London was for the most part unaffected by these events, and yet London was by far the most important financial centre

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[16] In acting as a LLR and not intervening to save the City of Glasgow Bank, the Bank of England was following the precedent it had set with the Overend-Gurney affair. However, this policy was not to last: when Baring Brothers developed (self-inflicted) problems in 1890, the Bank acted to organise a rescue fund in order that Barings should be saved, as we shall see at a later point, thus retreating some way from their established policy position.
The Bank of England's policy of acting as a LLR in the Classical sense is reflected in the comments of Howard Lloyd, in a discussion of Lloyds Bank's actions in 1878. He says:

> "Even in the limited area that Lloyds then occupied, the counties of Warwickshire, Staffordshire, Worcestershire and Shropshire, the abatement of confidence was severely felt, and even affected at some of its centres the ordinary customer and the country depositor. And thus for the first time in the history of the bank there took place a continual drain of cash and a diminution of the total deposits lasting for many months. It thus became needful to recall loans and insist on a reduction of overdrawn balances to meet the heavy and continuous strain. But such an expedient at a time of distrust is always attended with difficulty and danger as giving emphasis to anxiety, and affords little real relief. Indeed, the true policy in times of panic and stringency is to shew a willingness to lend freely and generously within all limits of safety."
> (Notes and Reminicences, pp.35)

Here Lloyd is outlining the Bagehotian LLR principle of lending freely. It had obviously been understood and accepted by him by this point.

in the country, indeed, at this time, in the world, and, following the definition in Chapter One above, that there was certainly no threat to the means of payment, then how can events that leave these areas untouched be described as a financial crisis?[17]

Perhaps one possibility is to describe these problems as being a different type of crisis, one which threatened the fabric of English banking as it was then structured, but only at its country origins. This would fit with the numerous reports found of various country banks being severely affected by the initial failure and subsequent cash drains and reduction in the volume of deposits.

2.7: 1880 - Mid March (Discounts) and July (Advances)

The first thing to notice about all the points of interest in the 1880s is that the standard deviation in this period is, by comparison with other decades at least, very low,[18] and thus residuals which exceed three standard deviations are not particularly large on a comparative basis.

(a) Discounts: in March there is one residual which just exceeds three SDs, and this point is very much on its

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[17] However, Pressnell (1968, pp.189) states that this time the Bank considered suspending the 1844 Bank Act, an indication that perhaps the situation was more serious than other sources might suggest.

[18] 17127 on discounts and 73901 on advances. See Tables 6.1 and 6.2 for further details and comparisons.

own: there is very little happening in the weeks immediately preceding or following.

Advances: the pressure point here occurs in July, and again it is a point very much on its own, and is only just greater than the three SD level.

(b) For discounts, the average size of transaction (asdt) in March is 2½ times larger than the average asdt for the decade (which is equal to £2702). For advances in July, the average size of advance transaction (asat) is twice the period average. Neither of these asts really indicate concentration in the demand for discounts: the asdt appears always to increase when the volume of discounts increases, but by a greater or lesser amount, depending on the circumstances. In this case the diffusion in pressure is clear, especially on discounts, when we look at who was receiving discounts, since there were no transactions exceeding £70,000.[19]

(c) In the first period (March), when discounts are high, advances are also higher than the period average, although since the mean and the standard deviation for advances is greater than for discounts the increase in the volume of advances is not enough to push the residual over three SDs. However, in the second period (July), when advances are high, discounts are around their trend growth.

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[19] The largest sum in discounts went to Samuel Montagu (£69,517).

(d) Refusals increase slightly at the same time discounts increase, but are very low when advances are higher, as would be expected. Interest rates on the discount and advance transactions stand at 3 per cent for most of 1880, falling to 2 per cent for only a very short period. Bank Rate at this time stood at 3 per cent.

(e) Although there are two points in this year which exceed the relevant three SD mark (one each on discounts and advances), it is very tempting to ignore both of them because of their relatively small size: when the volume of business is greatly reduced, even a small increase, which could possibly be explained by a regular customer discounting a package of bills, can look as if it is a significant and important increase. Nevertheless, we must be careful not to do this completely, since in ignoring it is possible that we may miss something of importance; it can be argued that significant deviations from low trend are as important as deviations from a trend that involves a far greater volume of business.

However, in this case there is no qualitative evidence that suggests that anything important was occurring in the financial markets at this time. Interest rates (both Bank Rate and market rates) were low, the latter averaging 2 per cent for the year and the former changing only twice in the course of the

year,[20] and there are no other indications that anything unusual was happening in the economy. Thus, it seems that it is fairly safe to presume that these two points are unimportant as regards the role of the LLR.

2.8: 1881: Mid August - Discounts

(a) This point in mid August gives the second highest residual on discounts in the 1880-89 period, although as mentioned above, because of the low volume of business this still involves a residual of only £112,000. This is higher than the previous point, and is more than double the three SD value.

(b) The average size of transaction increases here, to approximately twice the decade average. This is a similar increase to that seen on previous occasions. There are no particularly large transactions taking place.

(c) Advances are fairly busy throughout the year, without ever increasing in size dramatically. The average weekly advances total is around £50,000 for 1881, only slightly greater than the mean for the 1880-1894 period. Although discount business too is steady throughout the year, the August peak is just high enough to make it noticeable.

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[20] Falling to 2½ per cent in June, and rising back to 3 per cent in December.

(d) Interest rates here are on an upward trend: the rate charged on advances and discounts starts the year at 3 per cent and ends it at 5 per cent, and Bank Rate follows a similar path. Refusals are low for most of the year, including during August, but increase enormously in week 40 (September), when the volume of refusals is almost as high as the volume of discounts: in that week 49.7 per cent of the bills presented for discount were refused, although there were only three refusal transactions, as opposed to eleven accepted discount transactions.

(e) This is another example of a point where there is little of interest happening in the financial markets: the 1880s were on the whole a very quiet period.

2.9: 1883 - Mid March to Mid May - Discounts and Advances

(a) This is a pressure point on both discounts and advances. The increase in advances occurs two weeks before that in discounts, but the increase in discount business is slightly more pronounced, with two residuals exceeding the three SD level, as opposed to only one on advances.

(b) The average size of transactions here is fairly high, especially on discounts, giving some indication of a concentrated demand, since the asdt is around three to four times the decade average, whilst the asat is

just over twice as large as its decade average. There is only one discount transaction here which exceeds £100,000: **Morton, Rose & Co.** received £103,787.

(c) Business is split relatively evenly between the two variables: 55 per cent of the business in the eight weeks covering mid March to mid May was carried out on advances, and the remainder on discounts. This means that there were more discount than advance transactions, since discount transactions were generally far smaller than advance transactions.

(d) The interest rate charged on these transactions was between 3 and 4 per cent, with Bank Rate standing at the same level. Refusals were low throughout the period, significantly lower than the decade average.

(e) At around this time, the Bank of England was attempting to increase its income in order to boost its dividend relative to those of the Joint Stock banks. This move came about as a direct result of the fall off in business that has recently been mentioned.[21] It is possible that the increase in discount and advance business that we are seeing in these months is the first indication of the Bank's new business generating ideas coming to fruition. Other than this, it is difficult to find other causes for this increase in activity, since the "**course of the money market**" in 1883 was described by The

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[21] The reaction of the provincial banks to this new source of competition will be discussed in the following chapter.

Economist as being "comparatively uneventful".[22]

2.10: 1886: March end (Advances) and April (Discounts)

(a) Here there is one residual each on discounts and advances which exceeds the three SD mark, although in neither case are they particularly large. Again this is typical of the period, as previously mentioned: the larger residuals occur as a one-off, with no surrounding increase in activity.

(b) The average size of transaction of discounts and of advances at the points of high residuals are between two and three times the period average. The only discount transaction which exceeds £60,000 is one to the **Chartered Bank of India** of £107,400. The usual names are receiving advances at the Bank, although the institutions receiving the greatest funds are slightly less frequent visitors to the Bank. Examples of the latter category are **Anglo-Foreign** (£360,000) and **Harwood, Knight & Allen** (£350,000).[23]

(c) At both points, activity in the other variable is low, that is, when there is a large discount residual, there is a low volume of advances, and vice versa. For the rest of the year business on both

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[22] Economic Commentary and History and Review of 1883, published in the issue of February 23rd 1884.

[23] Some of these names were to appear more frequently later in the period.

variables is steady.

(d) Interest rates are low: between 2 and 3 per cent for the first half of the year, although they increase slightly later in the year. Refusals are generally low throughout, especially at the points where discount activity increases. The volume of refusals does increase at certain points, even when advances are low, and in these cases there are generally a low number of refusal transactions[24]. Presumably at these points people came in with a large package of bills that were all, or almost all, found to be unacceptable.

(e) The same comments apply here as in 2.9 (e) above: that this slight increase in business has no obvious explanation, but that perhaps it does not require an explanation since aside from the (slight) increase in business, there was little else of interest occurring, apart from a slight efflux of gold which, according to The Economist, continued until May, and which the Bank was unable to stop because of its lack of control over the market. However, since Bank Rate fell by a full percentage point in the middle of February, and stayed at this level until May, it seems that the Bank itself was not really trying to take any preventative measures to stem these external gold flows.

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[24] For example, in week 35 of 1886, £42117 of bills offered for discount were refused. This was in fact a single transaction.

The Economist here makes one of its (fairly regular) complaints about the behaviour of the Bank of England. "The Bank Directors", it says, "are working on the principle that as long as the internal demand for gold is satisfactory, the external demand can be left unchecked."[25] Furthermore, it asserted that the Bank was never quick in taking preventive measures to prevent outflows, always leaving them until the last possible moment. It ended its comment by stating that:

> "The events of the last twelve months have shown that the Bank of England is unable to discharge the duties placed on it by the one reserve system."

Considering that this was written in 1887, fourteen years after the publication of Lombard Street, in which Bagehot had discussed the superior characteristics of the multi-reserve financial system, but had also noted that Britain's one-reserve system was too far advanced for major changes to be made, it is surprising that The Economist should still be making this sort of statement. However, it is probably best seen in the light of the latter's campaign to get both the Bank of England and the banking system to increase their reserve holdings, and for the Bank to strengthen its position in

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[25] The Economist, Economic Commentary... of 1886, February 19th 1887.

relation to the other financial institutions.[26]

2.11: 1888 - May (Discounts and Advances), September (Advances) and 1889 - August (Discounts)

These are three other cases very similar to the four previous instances, in that the residuals exceed three SDs, but not by a large amount, and there is nothing remarkable happening to interest rates or refusals: in short, except for the (slight) increase in discount and advance business, there is little occurring in the financial markets.

The above applies to all three moments: April and November 1888 and August 1889. The largest single discount transaction in May 1888 went to the **English Bank of The River Plate** (£121,090). In November 1888 advances increase quite suddenly, having been very quiet for most of the year.[27] However, the increase in business lasts for one week only; thereafter there is little advance activity until the end of year window dressing. The same circumstances surround the 1889 increase in discounts, except that in this case the interest rate charged at the Bank of England was 6 per cent. In addition, the average size of transaction here is large: more than five times the

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[26] We will discuss this issue again in the following chapter.

[27] Most of this increase in the volume of advances can be accounted for by one firm: **Corgialegno**, which between September 5th and 13th received advances of slightly over £1m. This firm is discussed at a later point.

1880-89 average.[28]

2.12: 1890 - November - Discounts

We now move back to a much busier period (in terms of the volume of business), with far higher decade mean and standard deviation.

(a) The residual in the relevant week[29] is over £300,000 here, which is the fourth highest of the decade. There is a steady volume of discount business taking place in the weeks prior to the this point, and the higher volume carries on for two weeks, thereafter becoming quieter, with no real increase due to seasonal pressure at the end of December.

(b) The average size of transaction here is very high, a definite indication that there was a high concentration in the demand for discounts.[30]

(c) There is also an increase in the volume of advance business carried out at the Bank, although not enough of an increase to take the residual above the three

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[28] We do in fact know the destination of these discounts: on the 27th and 28th August 1889 **R.Raphael & Sons** received £75000 and £64625 in discounted bills. In a busy time, these would not be large amounts, but because there was so little business around they show up rather more clearly than would otherwise be the case. Although the increase in the volume of discounts here was not enormous, there was apparently at this time a drain of gold to South America, and an expansion in the internal circulation. Bank Rate was high, but the Bank found it hard to make this rate effective.

[29] This is in fact week 46 - mid November.

[30] Recipients of discounts will be discussed below.

SD point. Having said this however, advances represented a significant portion of activity at the Bank: of the business carried out in November, 35 per cent was on advances.

(d) Interest rates charged on the advance and discount transactions increased to 7 per cent in the last week of November, but fell off fairly quickly after the tension was over. Bank Rate only reached 6 per cent, lower than the rate charged on discounts and advances. Refusals increased slightly, but only for one week.

This was of course the period of the Baring "crisis", when the Bank of England set up and led other financial institutions into a rescue operation in order to salvage one of the best known of City names. The story of Baring's problems and subsequent rehabilitation has been told many times elsewhere in the literature, and indeed in an earlier chapter here, but it is important to study some aspects of the episode again, paying particular attention to the role the Bank took on, as compared to what would have perhaps been the optimum policy at this time. In addition, it is useful to look once more at the (raw) Daily Discount data in order to see who was receiving facilities at the Bank during this time. It is the latter that we will undertake first.

The biggest borrowers from the Bank were the Discount

Houses:[31] **Union Discount** received a total of almost £530,000 in discounts and a further advance of £400,000; **R.Cunliffe & Sons Ltd.** almost £418,000 in discounts; **Harwood, Knight & Allen** £223,000 in discounts, etc. Several houses with South American connections also received facilities: the **English Bank of Rio de Janeiro** had discounts of £101,122, and **Muriettas** received a £35,000 advance. Some of these requests came before any formal announcement of Barings problems, giving some indication of the pressure the Bank of England was under.

Barings were in fact technically solvent at the time their problems were announced, even though it took four or five years for their affairs to show an excess of assets over liabilities.[32] They had however become very involved in railroad investment in South America, particularly in Argentina, and it was in this area that they had over-extended themselves. An appeal to the Bank of England was

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[31] The Discount Houses had of course only been re-admitted to discount facilities at the Bank some five months previously. This decision was taken by Lidderdale, in an attempt to increase the Bank's influence in the markets.

[32] This provides a good example of the difficulties inherent in distinguishing between illiquidity and insolvency. When Barings presented their problems to the Bank of England in November 1890 the Bank despatched two people to determine what state their business was in. The resulting report stated that there was in fact a surplus of assets over liabilities. It took until 1895 however for this surplus to materialise, and when it did it was not as high as had been expected. (Bank of England Archives, Baring Papers, G15/190, folio 177). It can be argued that in many cases the division between illiquidity and insolvency in many cases comes down to the length of time needed to regain liquidity.
See Chapter Two, section 4 for further discussion of this issue.

answered by the latter setting up a guarantee fund, which many of the major banks in the City subscribed to, and Barings were able to continue in business.

From the perspective of the role of the Bank of England as a LLR this is an extremely interesting event, because this "crisis" represented the Bank's major test in the 1870-1914 period. Its actions in rescuing Barings were well received by most contemporary writers and bankers, although with some exceptions. Howard Lloyd, a General Manager of Lloyds Bank, writing of the crisis said this:

> "Whether such intervention by the Bank of England was sound in principle was in some quarters held to be doubtful; but the danger of the situation was grave and urgent."[33]

However, Lloyd's own opinion on the matter was rather more favourable:

> "The failure or bankruptcy of Barings would have shaken English credit all over the world, and the result seemed to give full justification to Mr. Lidderdale's courageous action."[34]

Despite this view, which of course was held by many commentators, there are strong arguments suggesting that the Bank over-reacted at this point, and it is this possibility that we will now examine, in particular concentrating on the similarities and differences between this episode and the Overend-Gurney crisis that had occurred 24 years previously.

This moment in November 1890 shows up in the Daily Discount data, but it is not the most significant moment of

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[33] Howard Lloyd's Reminicences, op cit, pp.59.

[34] Op cit.

the decade: there are several larger residuals. We are faced therefore with two explanations for this absence of an enormous increase in the demand for discount facilities at the Bank: either the problem was dealt with so rapidly and efficiently that there was no need for any individual or institution to engage in a panic-stricken rush for cash, or that the Bank itself made, to coin a phrase, a "mountain out of a molehill".

What is certainly true is that the Bank did not act as a LLR in the classical "Bagehotian" sense: it did not react to the possibility of a financial crisis occurring by supplying liquidity to the markets. Instead, it did exactly what Bagehot, and Thornton before him, had said the LLR should **not** do: bailed-out one specific institution.

The reasons this policy was pursued, rather than one of simply providing large liquidity injections to the markets, are far from clear, especially since the precedent for letting institutions fail had already been set by the Overend-Gurney affair. Possibly the Bank felt that Barings was just too big and too important to be allowed to fail, or that their fear was that the possible repercussions made it of paramount importance that they intervene.[35] In any case, once it had been established that Barings were merely

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[35] Another possible explanation is provided by Batchelor (1986): that the Bank of England intervened to save Barings but let Overend-Gurney fail mainly because Barings had always supported the Bank, and had on frequent occasions acted as an intermediary between it and other central banks, whereas the relationship with Overends had never been on the same terms and was frequently negative rather than positive.

illiquid, not insolvent, the general feeling at the Bank was that "something had to be done".[36]

In order to try to determine whether the Bank was correct in its intervention, we need to find out what the mood in the City was at this time. A look at one contemporary account of the crisis tells us that the fear initially was that it was **C. de Murietta & Co.** who were experiencing problems.[37] Edward Walter Hamilton, who in 1890 was in the Finance Division of the Treasury, reports making several visits to the Bank of England during this period. The first was on November 7th (before Barings' appeal to the Bank), when he says that:

> **"there was a great deal of unease in the City... I asked the Governor how true the rumours were and he said he was frightened about one house - Muriettas."**[38]

On going to the Treasury three days later, he found that the Chancellor of the Exchequer had gone to the Bank. At

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[36] However, as mentioned in Chapter Four, six weeks after the initial investigation into Barings financial position had been undertaken (by Benjamin Bucke Greene and Bertram Currie), it transpired that there had been a mistake made in the calculation of Baring's liabilities, which had resulted in an underestimation of the latter to the extent of around £1m. Since the (paper) surplus was still considerable (estimated to be around £3.2m), this would probably not have made any difference to the Bank of England's decision to go ahead with the rescue. The eventual surplus was around £1m, a sum considerably less than was first thought, and was not achieved until 1895, over four years after the formation of the Guarantee Fund.

[37] There will be an extended discussion of the problems this institution caused for the Bank of England in the next chapter.

[38] Diaries of Edward Walter Hamilton, 7th November 1890. Held at the British Library, Department of Manuscripts, reference Add 48,654.

this point it seems that Hamilton realised that the problems were fairly serious, since **"Governors do not summon Chancellors of the Exchequer without due cause."**! On Goschen's return, Hamilton questioned him about the reasons for his visit:

> **"He said that things were very bad. I at once said 'I suppose you mean that Murrieta's are in difficulty?', to which he replied 'no, much worse than that: it is Barings.'"**

At this point, Hamilton felt that the Overend-Gurney crash of 1866 was **"nothing to that which is threatened"**. The following day, he reports that business in the City was at a complete standstill, even though the identity of the firm with problems was still not publicly known.

At this meeting, Lidderdale had managed to get Goschen's approval for the actions he wanted to take, and so proceeded to launch the Guarantee fund. Lidderdale had few problems raising support for the fund, although on November 15th Hamilton reports that he was **"sorry to hear that Rothschilds 'shillie-shallied' about joining the Guarantee"**; it was apparently not until Lidderdale let it be known that Rothschild's participation was not necessary that they agreed to contribute. Hamilton also tells of a conversation he had with N.Rothschild on November 12th, where the latter was fairly confident that the necessary funds for the Guarantee would obtained, but felt that the Bank of England might have difficulty justifying its actions to its shareholders, given the rather poor quality of Baring's securities, on the security of which huge

advances had been made.[39]

It therefore seems clear that the situation in the City at this point was one of apprehension,[40] made all the worse because of the lack of information from official sources as to the identity of the troubled institution and the nature of its problems. Following the argument discussed in Chapter 2, it can be argued that in cases of this type as much information should be released as possible, in order that the markets can make their decision as to the appropriate policy to follow. At the same time however, the central bank supplies (theoretically unlimited) liquidity to the financial markets, on the

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[39] Another comment on the quality of Baring's securities comes, again from Hamilton's Diaries, although this time from a different source. On December 18th 1890, after the successful completion of the Guarantee fund, Hamilton tells of a meeting with Goschen, the Chancellor of the Exchequer, at which the latter talks of his "cautious" brother, whose firm had committed £100m to the Guarantee. This firm had apparently already written off 25 per cent as a bad debt and had made this comment on the affair:

> **"It is clear that the best informed do not take a rosy view of the ultimate out-turn of Baring's estate."**

Thus, even in the immediate aftermath of the affair, before all the facts were known, the feeling, at least in some parts of the City, was not altogether positive about the whole affair.

[40] Another example of this feeling of apprehension, which was reflected in the desire not to engage in any business, comes again from Howard Lloyds Reminicences (op cit, pp.59). Lloyd tells how, when rumours of a major failure first started to circulate, his bank decided to liquidate £500,000 worth of Consols. With this in mind they:

> **"...sent an order to the Stock Exchange accordingly. The answer came back speedily that no dealer there would make a price and that reasonable quotations were not to be obtained."**

presentation of appropriate bills or securities to be discounted or to be used as security for an advance. Thus, according to this argument, the appropriate policy for the Bank of England to follow regarding Barings would have been first to have established the true state of their balance sheet (something that they did actually do), and then to have announced their position and the extent of their problems. However, in order to avoid panic, they would simultaneously announce the terms on which they would discount bills and make advances, which should have been as wide as possible, thus ensuring that institutions and individuals were able to generate sufficient liquidity to keep themselves afloat.

Under this scenario it is not clear that Barings would have survived, at least not in the form as they were at the time. It is not even certain that there would have been an absence of panic, since for this to be so the Bank of England's policy of non-intervention would have to have been believed: to have been **credible**. What is very possible however is that non-intervention would have helped reduce the incidence of moral hazard, in that institutions, especially large ones, who might have thought that they were too important to be allowed to fail, would not rely on the Bank of England to bail them out if they got into difficulty.[41]

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[41] One problem with this argument is that institutions tend to get affected by "fire-sale" asset prices. Attempts to liquidate assets in this type of situation may not pay off since the price obtained for them may be far lower than (continued...)

As mentioned earlier, another casualty of over-investment in South America on whom the Bank of England was not quite so lenient was **C. Murrieta & Co.** This merchant bank was experiencing problems with some of its South American investments, and received loans from the Bank to ease their liquidity problems. By September 1891 they owed more than half a million pounds. The correspondence between Murrieta's and the Bank commenced soon after the Baring crisis,[42] although the affair was not finally concluded until June 1895, when the Bank was paid off by the Official Receiver.

Various (secured) advances of anything up to £100,000 were given by the Bank to Murrietas between November 1890 and February 1891, at which point the Bank called a halt to further advances, in view of the **"...very large amount represented by securities of an unavailable character and consequent entire uncertainty as to the nature of our cash advance..."**.[43] Despite several appeals from José de Murietta, the Bank stood by its decision, and on March 18th 1891, after a particularly desperate plea, Lidderdale gave

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[41](...continued)
in normal circumstances. According to Hamilton, during the Baring's affair N.M.Rothschild had checked their own liability position and had found that their assets were twice their liabilities. However, had they needed to liquidate a large portion of these assets, the price obtained would have been "ruinous", and thus their realisation would probably in effect have been impossible. (See Hamilton Diaries, December 15th 1890, Add 48654).

[42] Bank of England Archives, Chief Cashier's Office, G15/156, letter from José de Murietta to Lidderdale, 1st December 1890.

[43] Lidderdale to J.de Murietta, 12th February 1891.

them this reply:

> "I have laid your application before such members of the Committee of Treasury as are at the moment within these walls, and regret that I am unable to accede to it. Even after allowing for the margin on the bills, the advances made by the Bank will exceed half a million, and the nature of the securities is not such as to warrant us reducing the cover."[44]

Murrietas were eventually merged with the South American & Mexican Co., but not before there was a protracted legal dispute as the Bank tried to reclaim its debt.

The way the Bank of England dealt with Murrietas is similar to its treatment of the City of Glasgow Bank. In this case, Murrietas did not fail, but were taken over by another institution, but the principle was the same: the bank was, if not quite insolvent, certainly experiencing problems which were verging on insolvency, and so the Bank was not prepared to help. It is important however to compare the Bank's treatment of Baring Brothers and C. Murrieta & Co. Both these institutions had been involved in similar types of South American investment, and both therefore were affected in similar ways when some of these investments turned sour. From this comparison, it is hard to escape the conclusion that the main reason Murrietas were not treated in the same way as Baring Brothers was due to the former's far smaller size and consequent reduced importance. There was no question of a major crisis resulting from the failure of C. de Murrieta, and so the Bank of England were content to accept their failure.

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[44] Bank of England Archive reference G15/156.

2.13: 1891 - End of March (Discounts)

(a) This is a far smaller residual peak than that which immediately preceded it. It comes during a period when business was steady: the trend in the volume of discounts, having increased up to the end of 1890, was by now fairly flat, before falling until the middle of the decade.

(b) The average size of discount transaction here is particularly large: more than five times the decade average. This can however be fairly easily explained by looking at who received funds. Most of the borrowers from the Bank were Discount Houses: Union Discount had over £370,000, Alexanders more than £350,000, and Samuel Montagu £230,000.

(c) Advances here were almost non-existent: there was an average of less than one advance transaction per day for the first 19 weeks of the year.

(d) Bank Rate in March 1891 stood at three per cent, having come down from the higher rates seen during the Baring crisis. Refusals were very quiet, perhaps because the recipients of discounts were mainly Discount Houses, who presumably were well aware of the Bank's rules and regulations governing discounts, and thus did not offer bills for discount which they knew were not acceptable.

(e) This moment of pressure is slightly more interesting than some of the 1880s peaks, in that it is possible

to see the Discount Houses coming to the Bank for funds when they were obviously pressed for liquidity. One aspect of the Baring affair now started to have an effect: the Bank started to take liquidity out of the market by asking the various guarantors to produce the cash to which they had committed themselves. Although some of the cash for the Guarantee came from the Discount Houses (approximately 5 per cent), the vast majority (65 per cent) came from the banks directly, particularly from the London Banks (around one third).[45] Thus although the Daily Discount data make it appear that it was the Discount Houses themselves who were short of liquidity, in fact this shortage was indirect; as in many such cases it was the commercial banks which needed cash, and they therefore called in loans from the discount market, which then had to resort to the Bank of England for aid.

2.14: 1893 - End of April an the start of May (Discounts)

(a) In comparison with other points in the decade, this is a medium size peak, with two residuals which exceed three standard deviations: one of slightly over 300,000 and another of 255,000. There are also

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[45] The remainder came from the Finance Houses and merchants, with a small amount (5 per cent) promised by individuals, and of course the initial contribution of £1m from the Bank of England. See Chapter Four, Table 4.1 for further details and source.

two other fairly high observations.

(b) The average size of transaction is very high: in the four weeks of high discounts, the asdt is respectively £46697, £21836, £32633 and £12492. When we consider that the asdt for 1890-99 is £7749, we can clearly see the concentration in the demand for discounts.

As on the previous occasion, the recipients of discounts are in the most part the Discount Houses: **Alexanders** and **National Discount** received £150,000 respectively; **Gilletts** over £200,000;[46] **Cunliffes** £100,000. In addition however, certain banks also received large amounts: **Anglo-Foreign** got £320,000, **Chartered Bank of India, Australia, & China** £316,000.[47] Merchant banks were also discounting

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[46] **Gilletts** too were mentioned in T.R.Hughes' Business Reports (see footnote 44 below: this time from his visit of 12-14th May 1897). **Smith**, from the **London & Westminster Bank** said of them:

> **"They are very respectable but small; and we take bills from them, but only in small lines. They fight shy when capital is talked about."**

However, Hohler, again from London & Westminster, was not so magnanimous:

> **"While things are smooth they will be all right, but in times of pressure (when you would like to know that you can have your money without delay) they might have difficulty in finding it."**

[47] **Anglo-Foreign** and **The Chartered Bank of India** were involved in four and five transactions respectively, some of which occurred on the same day.
Very little appears to be known about the first of these banks, although they received fairly large sums at the Bank, especially at times of increased activity. We do have one contemporary description of them however, emanating

(continued...)

bills at the Bank, with Lazards receiving £240,000.

(c) Advances were slightly higher in May 1893 than they had been previously, but the increase was not as great as it was on discounts. Of the institutions that received advances at the Bank at this point, only Anglo-Foreign received discounts as well.[48]

(d) Bank Rate here stood at 3-3½ per cent, rising to 4 per cent in the middle of May. It was to rise to 5 per cent in August. Refusals were slightly increased during the weeks of increased discount activity, but were quiet for the rest of the year.

(e) On the face of it there seems to be little or no explanation for the increase in activity in this period. Interest rates were not unusually high, and there is little in either primary or secondary records which gives us any indication of extra-ordinary events occurring. However, in early April

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[47](...continued)
from the Business Reports of T.R.Hughes (Midland Bank Archives, Reference M153/44). Hughes was the Manager of the Liverpool branch of the above bank, and was in the habit of making regular visits to London in order to talk to leading bankers and other financial commentators in order to gain their opinions as to financial matters in general and the credit worthiness of certain institutions in particular. After his visit of June 3-5th 1896 he reported that Whitburn, of the Discount House Reeves Whitburn, had this to say about Anglo-Foreign:

> **"It is practically a foreign Discount House, but their name is good for small amounts. They were at one time involved with the Imperial Ottoman Bank, and if the worst had happened in that case they would have gone down; but that is now a thing of the past."**

[48] This made Anglo-Foreign's total facilities amount to approximately £420,000.

there was a major banking crisis in Australia, commencing with the failure of the Commercial Bank of Australia, which was followed by the collapse of several other banks. According to The Economist of February 17th 1894, these failures set off a "spasm of stringency" in the London markets, after three months of comparative ease. Although London bankers and financiers were not directly affected by this crisis, they were keen to increase their liquidity by calling in loans and borrowing from the Bank of England. This caution was not without some justification: by the time of the Stock Exchange settlement day in mid May, there was, according to The Economist, "something approaching panic", and a large number of failures of firms in that market occurred.[49] The increase in activity had calmed by June however, to such an extent that there was little sign of window dressing at the end of June. The Bank's policy at this point seems to have been to provide the extra liquidity desired by the markets at relatively low rates. This policy appears to have been effective, since there were no failures, and the increase in tension calmed fairly rapidly.

There was one other event affecting the Bank of England in 1893, although this occurred later in the

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[49] This also coincided with a banking panic in the U.S., which occurred mainly as a result of the price deflation which had preceded it, although there had also been problems in the stock market (Friedman & Schwartz, 1963, pp.108)

year. This was the resignation in November of the Bank's Chief Cashier, **Frank May**, who was found to have been involved in dubious transactions with various companies over a period of several years. The announcement of his resignation caused a flutter in the markets, but this was soon calmed when the nature of the problem became clear and it was obvious that the Bank itself was in no danger.

2.15: 1894 - End March - Advances

(a) This is a relatively unimportant point in terms of size of residual, since there is only one residual which (just) exceeds three SDs. However, although there is no one moment of very high advances, there is an increased volume of advance business for most of February and March.[50]

(b) The average size of transaction here is fairly high, although since the amounts concerned are quite low, this is not surprising.[51]

(c) Discounts are fairly low: the majority of business is

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[50] "Increased" here is as compared to the year as a whole: the average figure of daily advances (excluding seasonal pressure) was only approximately £19,000, whereas the average for February and March was £75,400.

[51] Since advances are often given in multiples of £50,000, when we are dealing with totals of £50-100,000 it would not be unusual to have only two transactions, thus giving an inflated average size of transaction. However, the reason why the average size of transaction is lower overall is that there are frequently no advances occurring for days or even weeks on end.

carried out on advances.

(d) Interest rates are very low, and furthermore they are relatively constant for an exceptionally long period: Bank Rate stands at 2 per cent between February 1894 and September 1896, and market rates are almost as steady and are even lower.

(e) This was the "cheap money" period, when the Bank of England reserve reached its highest recorded level:£22.6m. However, low interest rates also implied a reduced income for the Bank, which was to be a recurrent problem for the next few years, and was to lead to serious problems with respect to bankers' rather antagonistic feelings towards the Bank of England, especially in the provinces.[52]

Compared to some of the other moments where there was increased pressure on advances and discounts, March 1894 was not one of the more important ones as regards the Bank's role as a LLR.

2.16: 1898 - March (Discounts)

(a) The highest residual[53] of the 1890-99 decade falls in March 1899. It is preceded by two weeks of higher than normal discounts, but in terms of size it is a very obvious peak.

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[52] See the following chapter for further discussion of this problem.

[53] Excluding seasonal pressure

(b) The average size of transaction is approximately four times the decade average, at around £35,000. The destination of these discounts was in the main to Discount Houses: £400,000 to **Union Discount**, £200,00 to **National Discount**. Of the banks, **Anglo-Foreign** were again one of the most active, receiving almost £310,000 of discounts.[54]

(c) In addition to this discount activity, there was also an increased volume of advance business, although not enough to show up when compared to the (rather large) standard deviation for the period. When studied in conjunction with discounts however, the extent of the accommodation made available to the discount market in particular becomes very clear. **Vaile Allen & Co.**, for example, in the period between March 1st and 15th, received over £1.6m in advances, in addition to over £100,000 in discounts. Other Discount Houses too received large amounts in advances, in particular **Brunton Bourke & Co.**, which had £2.65m.[55]

(d) Bank Rate stood at three per cent: it had not moved since the previous October. Refusals too were low, which is surprising given the volume of discounts.

(e) There is no obvious reason for this large surge in

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[54] These discounts were received in a series of small transactions: on March 15th the bank was involved in six different discount transactions averaging only £26,000 each. In every case the number of bills in each package discounted was equal to 55.

[55] Some of this was presumably a "roll-over" of previous advances.

activity. The "cheap money" period had ended, and economic activity in general was picking up. The Bank had succeeded in its quest for new business, and although there was no increase in its number of customers there was a definite increase in its income, which had seen a rise of over 50 per cent since the low point of 1886-7. Much of this increase had occurred at the Branches, where stringent efforts had been made to attract more business.[56]

None of this explains this (relatively) sudden increase in business, nor does it explain why certain firms were receiving such huge sums of cash from the Bank of England, particularly in the form of advances. It is possible that it can be explained simply in terms of the general increase in market business.

2.17: 1899: September (Discounts)

(a) This is a similar peak in the data to the previous one, with residuals of just under 400,000. Week 39 is the second largest observation (and residual) of the decade.

(b) The average size of transaction is quite large in weeks 38 to 40, at three to four times the decade average. **Anglo-Foreign** was again one of the more

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[56] Provincial reactions to this search for more business will be examined at a later point.

active institutions, receiving £313,000 of discounts in seven transactions. Of the Discount Houses, Union had over £300,000 in discounts, and Alexanders £170,000. Corgialegno received £250,966.[57]

(c) Advances are very active in the first part of the year, but by September they have quietened down significantly, and thus form only 20 per cent of the

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[57] When data collection was being undertaken, it became obvious that one particular firm, the name of which is n t well known, was receiving huge amounts in discounts and advances. This firm - Corgialegno - was active at the Bank between 1881 and 1904: after 1904 there is no further mention of them in the Daily Discount books. For example, betw en 20th March and 4th April 1882 the firm received advances totalling in excess of £2m, with transactions occurring almost every day.

None of the standard references has any mention of this firm. However, information from the Bank of England tells us that they were a firm of bill brokers with offices in George Yard, and that the Directors of the firm were Marino Corgialegno, Herman Schmidt and Edward Temple Rose. In addition, there are two further mentions of them in the Midland Bank Archives, contained in the Business Reports of T.R.Hughes (reference earlier cited). One of these is unfortunately not very illuminating: all that is said is that "They have a capital of £300,000 in and out of the business." However, the other is rather more detailed. Hughes reports a conversation he had with Simpson, from the Bank of Liverpool, about which Discount Houses the North & South Wales Bank did business with. Their conversation after Simpson had seen Corgialegno's name was as follows:

Simpson: "Do you do business with them?"
Hughes : "Yes, but only of recent times"
Simpson: "I also used to do with them, but had to close the account because it was not satisfactory."
Hughes : "At first, Corgialegno sent us the best paper we got from London, but latterly they have fallen off badly, so much so that I have not only had to remonstrate with them but recently to return paper which they sent us."

It seems strange that a firm that was very active in the market between in the 1880s and 1890s, although seemingly without a good reputation, should so completely disappear without trace, without there being any indication as to the reason for their demise.

business carried out. This is in marked contrast to other instances of increased pressure at this time, since overall advances were far more important in terms of volume than discounts in this period.

(d) Interest rates were on a rising trend in the second half of 1899: starting at 3½ per cent in July, Bank Rate rises to 4½ per cent on October 3rd, and 5 per cent two days later, finally reaching 6 at the end of November. Refusals meanwhile are very quiet throughout the year.

(e) This is an interesting episode, for two main reasons. Firstly, this is a drain of liquidity from the Bank of England which is concentrated solely on discounts: whereas the Discount Houses had become used to utilising discount and especially advance facilities at the Bank **at all times**, at this point they were less active than some of the banks. Many of the banks which received discounts were had some foreign connection: **Anglo-Foreign, Chartered Bank of India Australia & China, London & Brazilian Bank, Anglo-Egyptian, National Bank of India**, and others besides. This strongly suggests that this was an overseas rather than an internal drain. There were apparently spreading rumours of a forthcoming war.

The second reason why this episode is interesting is because it occurred at one of the points at which there was a (known) seasonal drain of gold, in this case in the direction of the U.S. and

South America. Sayers (1936) identifies two policies the Bank was pursuing in order to make Bank Rate effective: firstly it raised its advances rate above Bank Rate (to 3½ per cent), and secondly it refused to accept bills of a longer currency for discount at Bank Rate, thus forcing market rates to increase to a level above Bank Rate.

Sayers also states that earlier in 1899 the Bank had kept Bank Rate at 3 per cent but had granted very large sums in advances, on both bills and securities, and thus its gold reserve had fallen substantially. It therefore had to recover its position, which explains its actions to force up Bank Rate.[58]

The Bank's behaviour at this point was not very consistent. At first it allowed the discount market into the Bank and granted them large sums in advances, then, apparently having realised that this policy *might later* cause problems, attempted to cover itself by utilising rather unusual measures. On this occasion it succeeded in avoiding any major problems, but at the cost of huge increases in the volume of discounts and eventually a rather high level of Bank Rate.

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[58] One of the methods it used was so-called Gold Devices: interest-free advances offered to gold importers in return for an agreement to repay the loan in gold. The advantage of this for the Bank was that it was able to obtain gold to supplement its reserve without increasing Bank Rate. For further details see Chapter Four, section 4.7, and Sayers (1936), pp.74-101.

2.18: 1900 - March and April (Discounts and Advances)

(a) On this occasion there is pressure on all three variables: discounts, advances on bills and advances on securities. However, although there are residuals on all three variables which exceed three standard deviations, by this point advances had become far more important than discounts in terms of volume, especially since the 1894 ruling that brought "floaters" (advances on securities) under the jurisdiction of the Discount Office. Thus the largest residuals on discounts are of the order of £0.45m, on advances on bills of £0.8m and on advances on securities of £1.3m.

(b) From this point onwards there is a significant increase in the average size of discount transaction. The decade asdt for this period is just over £20,000, far higher than in previous periods. Thus, although at first sight the April/May figures for the asdt of around £40-50,000 seem rather large, in fact, when compared to the decade average, they are not, implying a relatively diluted demand for discount facilities. For advances, the average size of transaction is lower, sometimes significantly so, than the decade average, which is surprising, since normally the average size of transaction (discount or advance) is larger than the decade average during a

period of increased activity.[59]

The largest players in the market at this point were the discount houses: **Corgialegno** received in total £3.3m of cash (£600,000 in discounts, £1.97m in advances on bills and £0.79m on securities); **Cunliffes** had £2.74m (£1.12m in discounts and £1.62m in advances on bills); **Gilletts** received £1.95m (£400,000 on discounts, £1.45m on bills and £100,000 on securities); **Union Discount** received a total of £1.843m (£1.143m in discounts, £600,000 on bills and £100,000 on securities). In addition, several other institutions received over £1m: **Mullens Marshall, Hitchens Harrison** and **Reeves & Whitburn.**

(c) As stated above, in volume terms advances far exceeded discounts, although all three variables are busy.

(d) Between January 25th and May 24th 1900, Bank Rate stood at 4 per cent, a moderate rate. Again, refusals were very low: for the first six months of the year they average out at less than £30 per day.

(e) This is a good example of how well-established the Bank of England's discount market business was by this point. Most of this vast increase in the demand for discounts and advances came from the Discount

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[59] Since data was only collected on the **total number** of advance transactions, rather than the number of transactions on advances on bills and on securities, the average size of transaction here refers to the average of all advance transactions, not that of the separate advances variables.

Houses, even though there seems to have been no indication that the market, or any one institution in particular, was particularly short of liquidity. It should be noted however that the Bank's position at this point was complicated by the fact that the Boer war was still in progress, and therefore governmental demands for finance were still of paramount importance. This implies that the Bank would do its utmost not to increase its discount rate, and instead would utilise other demand-side measures to limit the demand for liquidity. In addition, the Bank, and the markets, were never sure as to what the governmental demands for finance would be, which causes a certain amount of uncertainty in the markets.

2.19: 1901 - February (Discounts)

(a) Here one residual from the discount polynomial just exceeds three standard deviations. This represents rather a sudden increase in discount activity, since the demand for discounts at this time was in fact on a downwards trend.

(b) The average size of discount transaction was around two and a half times its period average in week nine of 1901. In previous and subsequent weeks the asdt was below the average. Given this (relatively) low asdt, and the fact that no institutions seem to be receiving huge amounts in discounts, it seems that

discount demand was not concentrated. Again, it was the Discount Houses which were most active at the Bank: **Union, Samuel Montagu** and **Cunliffes** all received fairly large amounts in several transactions.[60] However, there were other companies who came to the Bank, some of whom were either less frequent discounters or slightly lesser known names: in the first category, **Lyon & Tucker** received £127,550 and **King Foa** £122,872, and in the second **Corgialegno** received almost £175,000.

(c) Throughout this period there was also very active business being done on advances, especially on advances on bills. In terms of volumes, the advances business was far larger than that on discounts, since the individual transactions were so much bigger. Many of the names receiving discounts also received advances, as was the usual case, Aside from those

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[60] One of the descriptions of banks in T.R.Hughes' Business Reports gives an indication of the extent of anti-semitism which existed in the City at that time (1896). Whitburn, of Reeves Whitburn, had this to say about Samuel Montagu:

> **"They are quite good, but are not highly principled and must be closely watched in everything you do with them, and do not rely on anything they <u>say</u> but get everything down in black and white. They are dirty Jews."**
>
> Source: op cit.

Another source gives further proof of this anti-semitism. when writing about the Baring crisis, Edward Walter Hamilton notes in his diary:

> **"There is a feeling that not a few are sorry to think that the downfall of Baring Brothers means the undisputed supremacy of Jews in the commercial world."**
>
> (Hamilton Diaries, op cit, November 16th 1890.)

names already mentioned, the companies particularly active on advances were **Brunton Bourke & Co.** (£2.35m), **Mullens Marshall** (£950,000) and the **National Bank of India** (£760,000).

(d) Interest rates here were on a downward time path, although at the end of February they still stood at 4 per cent. Refusals were at very low levels, although this was typical of the years between 1901 and 1909, when the volume of refusals was almost insignificant.

(e) At this point the Bank of England was still feeling the governmental pressures of the financing of the Boer war. Already in 1901 it had experienced a drain of gold, forcing it to increase Bank Rate to 5 per cent, but this increase was only very temporary (one month). The most interesting aspect of this situation was the relatively low average size of discount transaction: there is no one company receiving a large amount of discounts, although certain companies did receive huge advances. In general however, as stated at the beginning of this section, the increase in discount business is not enormous here, when it is compared to other, especially later, points.

2.20: 1903 - March and May (Advances)

(a) For both types of advances, this is the largest residual of the whole 1870-1914 period. There is more or less constant pressure on the two variables from the beginning of February through to the end of May, with only occasional weeks when there was less activity. Daily advance totals of over £1m were not uncommon, especially on securities. The peak values were reached in week 19 on both bills and securities, with £1.23m and £3.11m respectively.[61] Other records in the Bank of England archives state that in the period up to 1914, the highest amount advanced and discounted in one day occurred on May 8th 1903, when the figure was almost £12m.[62] However, examination of the Daily Discount data tells us that of this sum, only 3 per cent was granted in discounts; the vast majority was in advances, 65 per cent of the total amount being advances on securities.

(b) In March, the average size of advance transaction is around its decade average. In May however it is above average, especially in week 20. Many institutions were borrowing at the Bank of England at this time,

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[61] It should be remembered here that the data were initially aggregated into weeks and then averaged to give a daily average. Thus, here we are dealing with an average daily advance total of over £4m. The annual total for 1903 for advances on securities was close to £200m and on bills close to £10m, enormous sums of money by any standards.

[62] Source: Bank of England Archives Reference C29/2, Folio 14 (Discount Office Accounts: Ancillary Records).

often in very large amounts, but by far the largest sums went to **Mullens Marshall**, who were the Government's broker. This institution received advances totalling over £7m in February, March and April 1903, in transactions averaging over £0.5m each. In addition, in May they received a further £11m, which included advances on securities of £5.3m on May 12th, out of the days' total of £6.92m. These amounts dwarf the business other institutions were involved in, although by comparison with other periods it is still considerable: **Brunton Bourke** received over £5.5m, **Corgialegno** over £3m in the earlier period, followed by £1.1m and £2m respectively in May. These advances were probably somewhat different from those received by Mullens Marshall however, for reasons which we will examine below.

(c) Discounts in this period were relatively quiet, at around their trend levels. There is some seasonal increase at the end of June, but little at the end of December.

(d) Bank Rate was constant until the end of this period of increased advance activity, standing at 4 per cent between October 1902 and the end of May 1903, and which point it increased to 3½ per cent. Refusals are literally non-existent for the first thirteen weeks of the year, and even after this point they are very low.

(e) There is no indication in the literature as to what may be causing this extra-ordinary demand for discounts and advances. In addition, careful searching in the financial magazines of the time, such as The Economist reveal little of interest. The main financial event of the spring of 1903 was the issue of the **Transvaal Loan**, which occurred in the second week of May.[63] There were apparently a huge volume of applications for this loan, many of which were unsuccessful. However, the applicants did borrow massively at the Bank (The Economist estimated the figure to be around £10m), and so many people who were unsuccessful in the issue were able to pay off their loan at the end of the ten day term without raising the cash elsewhere.

Of additional interest is the activities of **Mullens Marshall**, who were presumably acting on behalf of the Bank itself. What they seem to have been doing was to borrow large sums at the Bank, thus increasing the liquidity of the markets, perhaps a further method of aiding the markets when they were tight. Alternatively, it is possible that this was the method in which transactions aimed at making Bank Rate "effective", which have been referred to by several writers, were recorded at the Bank.[64] Another

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[63] The Economist, 2nd, 9th, 16th and 23rd May 1903.

[64] These actions were part of the Bank's attempts to make Bank Rate "effective" and are referred to frequently (continued...)

possible explanation is that Mullens were in effect "lead-managing" or underwriting a government debt issue, and that the Bank of England was providing funds to enable them to do this. It should be noted however that these large borrowings did not take place at a preferential rate; they all attracted whatever was the current rate as charged on other transactions.

2.21: 1905 - February end (VAOS)

(a) There is one residual here which just exceeds three standard deviations, at slightly over 0.5m. It stands on its own: most of the other residuals at this point lie between one and two standard deviations. Advances on securities are above trend here, but not significantly so.

(b) The average size of advance transaction here is actually slightly below the 1905-1914 average, a rather rare occurrence.

(c) From 1905 onwards, discounts are starting to increase

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[64](...continued)
by Clapham (1944) and Sayers (1936). In brief, the Bank would take funds off the market in order to reduce the supply of funds and thus increase market rates. It would therefore borrow funds, through Marshall Mullens, using Consols as security.
Here however, if what appears in the Daily Discount Books is correct, the Bank is lending cash to Mullens, instead of the other way around, thus increasing the supply of market liquidity. It thus seems that the Bank was certainly not operating here in such a way as to make Bank Rate effective, since it was certainly not attempting to take funds off the market.

A more likely explanation for the increase in Mullens' activity is their involvement in the second stage of Goschen's Debt Conversion, the initial stage having been carried out in 1888. This would have required the Bank to support the market, more especially since the gilts market was fairly weak at this time.

in importance: at this point they are fairly high in the week before the increase in advances, but then tail off.

(d) Bank Rate is low for the whole of 1905: it stood at 3 per cent between April 1904 and March 1905, when it was reduced to 2½ per cent. Refusals, as we would expect since this is an increase in the volume of advances, are non-existent.

(e) There is little explanation for this increase in advances. The increase itself is slight, and there is little else happening to any of the other variables, and thus it is probably safe to conclude that this represents simply a desire by certain institutions to increase their liquidity.

2.22: 1906 - September/October (Discounts)

(a) This was the start of a very busy period on discounts: from the autumn of 1906 until the end of March 1908 there was a great deal of activity. In late September and early October of 1906 there are two residuals which exceed three standard deviations, separated by two weeks which are in themselves quite busy. These residuals are amongst the largest of the decade.

(b) The average size of transaction indicates a certain degree of concentration in the demand for discounts, since it is between three and four times the decade

average. Many of the usual institutions appeared as recipients of these discounts, most of them Discount Houses, although there were a few new names. One of these, the **Canadian Banking Corporation**, received a total of almost £900,000, in average transactions of £128,000. **Barings** were the recipient of the single largest transaction: a package of discounts worth £499,360 on October 3rd.

Samuel Montagu received a large sum in discounts: £871,773 in five transactions.

(c) Advances are relatively quiet: the only real increases in advance activity in 1906 occurs at the two seasonal *pressure point. From 1905 onwards,* advances are on the decline.

(d) Bank Rate was increased from 3½ to 4 per cent on September 13th, to 5 per cent on October 11th and then to 6 per cent on October 19th, which was high enough to arouse suspicion that the Bank had a certain problems on its hands. Refusals are particularly quiet throughout the year, totalling only £32,142 for 1906 as a whole.

(e) The reserve drain that the Bank was encountering were in fact the start of the problems which were to culminate in the American crisis in the following year. The American economy was over-heating at this point, and it was the U.S. that was the destination

of much of the gold that was leaving the Bank.[65] Besides increasing Bank Rate to a level which had only been seen once in the twenty-six years since the Baring crisis, the Bank also (unofficially) kept its advances rate at 1 per cent higher than its official discount rate. This presumably explains why the liquidity demand at the Bank was for discounts rather than for advances: in the two weeks when the demand for discounts was at its peak, the demand for advances was negligeable.

In the weeks of increased pressure the Bank seemed to handle its reserve, and the markets, very well. Whilst keen to stem the overseas flow of gold, and thus ready to increase the discount rate when necessary, it was also aware of the needs of domestic industry and trade, and thus was anxious to decrease Bank Rate as soon as was practicable.[66] At the same

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[65] Clapham (1944,pp.388) states that in September 1906 almost £5m of gold was shipped to the United States.

[66] After the Overend-Gurney crisis in 1866, Bank Rate had remained at the historically high level of 10 per cent for over three months. The Bank was severely censured for this, since it was felt that the domestic economy had been greatly harmed. This is illustrated by a supplement to a report prepared by the **Association of Chambers of Commerce** in July 1866 (the initial report was presented in February 1866) discussing the disparity in discount rates between the Bank of England and the Banque de France. During the Overend-Gurney crisis, and even at the point the supplement to the Report was written, Bank Rate stood at 10 per cent, whilst the discount rate of the Banque de France was only 4 per cent, at which level it was able to attract bullion into its coffers. According to the writers of the Report, these high rates were extremely detrimental to English merchants and manufacturers, and the reason for the failure of the Bank of England to attract gold was the distrust of

(continued...)

time however, it lent, particularly to the Discount Market, as freely as was necessary, in order to prevent major problems among financial firms.

2.23: 1907 - March, August and October (Discounts)

(a) Although the pressure on discounts was particularly severe in the above mentioned months, in actual fact discount business was very brisk all through the year. There are three residuals which exceed the three standard deviation mark, in general by large amounts. However, the annual total for discounts is lower in 1907 than it had been in 1906,[67] although the figures for both years are significantly larger than the preceding or subsequent years.[68]

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[66](...continued)
English securities abroad, because of the panic and failures. The Report concludes by stating that:

> **"All the traditional policy and action of the Bank of England at critical periods are hereby called into question. The screw, as it is technically called, no longer acts, and the very foundation of the Bank Charter Act is jeopardized."**

(National Westminster Bank Archives, Association of English Country Bankers, Reference 4532.)

[67] £36.2m in 1907 as against £38.5m in 1906.

[68] Besides being busy in terms of the volume of business, 1907 was also an extremely profitable year for the Bank of England: on two days it earned interest of over £10,000 (£10,923 on November 1st and £10,738 on March 13th). These two were the second and third highest interest earning days respectively between 1878 and 1915 (the highest earning day occurred in March 1912).
Source: Bank of England Archive Reference C29/2, Folio 14 (Discount Office Accounts: Ancillary Records).

(b) The average size of discount transaction is above average, sometimes well above, for much of the year.[69] However, although it is frequently above average, at the points where discounts are particularly high there is not as great an indication of concentration in the demand for discounts as one might imagine: the asdt is two to three times its decade average. The Discount Houses were not as active here as they were on previous occasions, especially in the spring, although **National Discount** still received well over £1m during the three periods. Amongst the most active institutions was **Lubbock Schmidt**, which received £640,000 in discounts in March and a further £300,000 later in the year. There are several examples of the lack of market concentration: on March 14th 1907 there is a total of over £1m given in discounts, only 40 per cent of which were in transactions of £80,000 or more. The other 60 per cent were small transactions involving various institutions, such as **Fisher King & Co.** (£5634), **Megaw & Morton** (£9640) and **The German Bank of London** (£25,140).

(c) Advances were **very** high at the end of June and December, the seasonal pressure points, but aside from this were fairly quiet for the rest of the year, except between weeks 4 and 13, when there was more

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[69] Although only three residuals exceed three standard deviations, in 30 weeks of the year the asdt exceeds the decade average.

activity, especially on advances on bills.

(d) Bank Rate commenced the year at 6 per cent, still at a high level after the problems of the previous autumn, and then fell in stages to 4 per cent before rising back up to 5½ per cent on October 31st, 6 four days later and finally 7 per cent three days after that, a level at which it remained for the following eight weeks. Refusals were low, and this is illustrated by the fact that in 1907 the ratio of the value of discounts accepted to discounts refused was 852:1, as compared to 231:1 for the decade 1900-09 and 31:1 for the 1870-1914 period as a whole. This shows the remarkable decline in refusals over the whole period. Although there were changes in the regulations governing bills that were acceptable for re-discount at the Bank of England, as earlier discussed, these changes were not fundamental, and thus we cannot explain the fall in the volume of refusals by regulatory changes which made it easier to receive discounts. One possible explanation is that knowledge of the existing regulations had become more widespread, and so "sub-standard" bills were not presented for discount since it was known in advance that they would be refused.[70]

(e) This is a very important episode as regards the Bank

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[70] The sudden increase in the volume of refusals in the summer of 1914 can perhaps still be accounted for by the rather desperate nature of the situation: people were willing to submit any bills to the Bank in the hope that some or all of them would be accepted.

of England's role as a LLR, since it was this type of situation which could so easily have led to widescale financial distress, or even crisis, in Britain, but which was somehow contained. The increase in the volume of discounts in 1907 was a continuation of the problems experienced throughout 1906, and the American economy was reaching the point where a crisis of some sort was inevitable. The various stages of what were to be rather drawn out problems occurred at similar times to the large increases in the volume of discounts at the Bank of England. The first stage occurred in March, when there was a panic on the New York Stock Exchange. This was contained however, and the situation calmed until the late summer, when there were widespread rumours of new troubles ahead.[71] The final crisis arrived in October, with the failure of the Knickerbocker Trust, and this set in motion a panic which swept across America. In the States it was a true financial crisis in the sense that the means of payment was actually threatened, something which had last occurred in England during the crisis following the Overend-Gurney failure in 1866.

Although the crisis in the U.S. was very severe, the U.K. escaped relatively unscathed. Industry and commerce were affected to a certain extent by the

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[71] This again coincides with the next peak in the volume of discounts.

high interest rates, and as has already been discussed the Bank discounted heavily to both the discount market and to other financial institutions, but there were few serious problems: the high Bank Rate had the desired effect of bringing in gold from abroad, especially from France and Germany, which substantially strengthened the Bank's position.[72] Again, it had acted as a LLR and had ridden the storm intact, and had this time avoided problems which at one point threatened to become extremely serious.[73]

2.24: 1911 - February and March. (Discounts)

(a) This is a very unusual instance of a large residual, because the increase in the volume of discounts is vast and occurs for one week only. In week 9 of 1911 there are discounts of just over £100,000, in week 10 £1.4m and week 11 £240,000.[74] Even though this residual is enormous by comparison with other periods, because of the upward bias here it does not

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[72] The role of the Governor of the Bank at this time, W.M.Campbell, will be discussed in the following chapter.

[73] The Economist suggested that the main reason for England's escape was the existence of the Bank of England. The U.S. at this point did not have a central bank, something that was to change after the reports of the American Monetary Commission in 1910. See Chapter Three for further discussion.

[74] It should be noted here that as previously mentioned, the summary statistics for the data on discounts for the 1910-1914 period contain an upward bias due to the effects of the enormous discounting that occurred in the summer of 1914.

exceed three standard deviations, although it is clearly a peak. Most of the remainder of the year is quiet.

(b) Since this is such a sudden increase in the volume of discounts, it is no surprise to find that the average size of transaction in week 10 is extremely large.[75] In the previous and subsequent weeks the asdt is slightly above the decade average, but in week 10 itself we find that it is almost seven times the decade average. This results from there being an average of only six transactions per day, a very low number when we are dealing with such large volumes of discounts.

When we look directly at which institutions were receiving discounts we find that it is almost exclusively the Discount Houses: **Union** received over £1.5m, **Blydenstein, Hohlers** and **Baker Duncombe** over £500,000 and **Alexanders** just under £500,000. They were receiving discounts not only in week 9 but also in the two previous weeks, although on a much smaller scale, but which still forced up the asdt slightly.

(c) Both advances on bills and on securities are negligeable at this point, the two variables together representing less than 25 per cent of the total sum discounted and advanced.

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[75] If there had been a more gradual increase in pressure, which might reflect news of problems being disseminated around the markets, we might have expected there to be more institutions wanting discounts and thus the asdt would be lower.

(d) In the first half of 1911 there were **no** refusals. Bank Rate was on a downwards trend: it stood at 4 per cent in January, was reduced to 3½ per cent on February 16th and then 3 per cent on March 9th, a level which held until September.

(e) What can explain this sudden rush into the Bank by the Discount Houses at a time when Bank Rate was both low and falling and when general economic conditions seemed to be fairly healthy? Neither secondary sources nor sources at the Bank of England give any indication of possible causes of this enormous increase.[76] The only episode of note that seems to have occurred in 1911 as the failure, and subsequent rescue, of the **Yorkshire Penny Bank**, a Leeds based savings bank which had 700,000 accounts held in branches all over Yorkshire.[77] This bank got into difficulty in July 1911, at which point it held deposits of £18.5m. It was not allowed to fail however: a guarantee was organised by **Edward** Holden, of the **London City and Midland Bank**, with the co-operation of the Bank of England, which was one of

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[76] On March 10th, the third highest discount figure for the pre-war period was recorded: £2,458,290. According to the Bank's records, 1422 bills were discounted on this day, which required the services of three "fixed" men and nine assistants, and the Discount Office closed at 11pm. Source: Bank of England Archive Reference C28/2, Folio 14 (Discount Office Accounts: Ancillary Records).

[77] Daily Discount data at this point however shows no movement away from trend: in general, the volume of discounts during the time the YPB's future was in doubt is less than £15,000 per day.

the first guarantors with £250,000. The bank was reconstituted and continued to operate under the name Yorkshire Penny Bank Limited.[78]

2.25: 1912 - May (Discounts)

(a) At the start of May 1912 there is a peak in the discount data, which although fairly large by the standard of other periods, in the 1910-14 period lies between two and three standard deviations. The residual in week 22 of 1912 is over 700,000, which if it had occurred in the middle of the period under study would have been equal to more than eleven times the standard deviation! This large residual is somewhat on its own, although there is another observation of a similar magnitude occurring some eleven weeks previously (ie the middle of March).

(b) The average size of transaction at both of these points was up on the average, but the May point displays a greater tendency towards concentration than that of February, since the asdt at the later point is almost three times the half-decade average, as opposed to only twice for the earlier one. Discounting in late February and early March was very much geared towards the Discount Houses, with all the usual names present and discounting large volumes of

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[78] For a more detailed discussion of the rescue of the Yorkshire Penny Bank, see Chapter Four, section 9.

bills.[79]

(c) Advances are quieter than discounts for much of the year, with the exception of the half-yearly pressure points when there is a sharp increase in the volume of advances on bills. At the points where discounts are high there is little business on advances.

(d) Interest rates are low here: Bank Rate stands at 3½ per cent in February, falling to 3 per cent in May, and market rates[80] are slightly lower still. Refusals, as has become usual, are very small, both in volume and in the number of transactions, although there is some (very) slight increase at the points where the volume of bills discounted peaks.

(e) There are few indications here that there is any real tension, even though there is a large increase in the volume of discounts.[81] There was concern about the Bank of England's situation around this time, but it was more to do with the long term reserve position, and whether the commercial banks should themselves hold an increased gold reserve, or indeed in some cases a gold reserve at all, than with any immediate

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[79] For example, **Union** discounted over £2m of bills (and received a further half million as an advance on bills), **Alexanders** £900,000, **Hohlers** over £800,000, **King Foa** £800,000. In addition, certain banks were also active; **Hong Kong and Shanghai** had over £800,000, and the **National Bank of India** £700,000 and **Chartered Bank of India** over £600,000.

[80] As measured by the Prime Bank Bill Rate.

[81] Towards the end of the year there was also concern about the Balkan wars, which caused tension in the financial markets.

worries as to the financial situation.[82]

2.26: 1913 - February and March (Discounts)

(a) This is another occasion when the residuals from the polynomials peak, but do not in fact exceed three standard deviations. In this case they lie between one and two SDs, slightly smaller than in the previous one. Looking at the raw data however, it is clear that there is a significant increase in the volume of bills discounted over a period of several weeks (weeks 7 to 12). The maximum residual occurs in week 11 (541,912), and the average residual over these weeks is equal to almost £320,000. In all other periods these figures would definitely be worthy of further investigation, which is why we are relaxing the three standard deviation rule here.

(b) The average size of transaction is only slightly up on its decade average, at a maximum of twice the latter figure. This occurs in week 10, one week

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[82] **Edward Holden**, Chairman of the **London City & Midland Bank** between 1908 and 1919, called independently at the start of 1914 not only for the joint stock banks to include their gold holdings in their (published) balance sheets, but also for these gold holdings to make up 6 per cent of their liabilities.
Many banks at this point did not hold a gold reserve, and most of those which did had only recently commenced doing so. However, in 1897 **Whitburn** reported to **T.R. Hughes** that the **London & Westminster Bank** held a reserve of £500,000 in gold, and that they had been doing so for years. Of this bank, Whitburn said **"It is the first bank in London after the Bank of England."** (Business Reports of T.R.Hughes, 12-14th May 1897; Midland Bank Archive Reference M153/47/4.)

before the peak value is reached. This indicates a fairly widespread demand for discounts, a view that is borne out when we look at who was receiving discounts, although in a slightly different way than at other points, since there are frequent occasions when the same institution was involved in several transactions. For example, on February 25th the **National Bank of India** received a total of slightly over £400,000 in four transactions ranging from £30,000 to £240,000. On February 26th, **Alexanders** and **Union Discount** were involved *in three* transactions each; the former totalling £203,100 and the latter £313,000.The largest single transaction was to **Brightwen & Co.**, who received almost £350,000 on February 26th.

(c) Advances on bills were also fairly active at around this time, although the major part of the business occurs just before and just after the increases in discounts, reaching a maximum of around £600,000 in week 5.

(d) Refusals are slightly higher here than they have been previously, increasing at the points when discounts increase. Bank Rate was quite high: it stood at 5 per cent between October 1912 and April 1913.

(e) It is not clear what is happening here. As in the previous case, there is an increase in the demand for discounts, and, to a lesser extent, in the demand for advances on bills. However in this case interest

rates are rather higher than previously, indicating perhaps an inclination on the Bank's part to ration discounts through the use of the price mechanism. Although its gold reserve was high (by the standards of the period, at least), the agitation about the size of gold reserves in general was continuing, with Holden remonstrating as to the need for larger reserves. In addition, fears of war were starting to mount, and had been accentuated by the coup d'etat in Constantinople in January.

2.27: The summer of 1914

(a) The months of July and August, indeed much of the second half of the year, represent by far the peak values for discounts during the 1870-1914 period. The largest sums discounted occur in weeks 31 to 36, when the peak average daily volumes of discounts were £2.05m, £0.17m, £4.79m, £3.44m and £1.90m respectively.[83] Advances were also busy, peaking at around £2.4m in week 31, although after this point there was little activity. Any extra demand was for advances on bills, not on securities: the average

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[83] The monthly discount totals for the last seven months of 1914 were as follows:

June	£ 1,132,028	September	£28,155,834
July	12,227,471	October	18,193,620
August	78,458,571	November	3,987,469
		December	£210,090

Note the almost complete absence of seasonal pressure due to window dressing at the end of the year.

value for VAOS for 1914 was less than £15,000.

(b) This is a classic example of a period of pressure where the demand for discounts is extremely diffused. Although the average size of transaction does increase above its decade average,[84] this increase is not substantial when compared to other occasions. In general many institutions were coming to the Bank for last resort aid in smaller amounts. However, the Discount Houses did receive large sums of cash, but much of this was allocated in several transactions, thus not increasing the asdt to the same extent as would have occurred if the discounts had been given in large transactions.[85]

One of the interesting aspects of this increase in the demand for discounts is that it is possible to see the commercial banks coming in to the Bank of England to obtain discounts on behalf of their customers and also for other branches. For example, on August 19th the **London County & Westminster** Bank received discounts totalling £378,782, which were divided as follows:

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[84] The highest value of the average size of discount transaction is slightly over £100,000, occurring in week 33. This represents three times the decade average. However, with the exception of this value, the asdt only exceeds twice the decade average on two occasions between the end of July and the end of December.

[85] Because of the vast volume of business occurring, it is difficult to pick out the individual institutions receiving the greatest sums.

London County & Westminster Bank (Lothbury)	£ 54 493
	146 393
a/c John Batt & Co.	9225
a/c C.& E. Morton & Co.	2562
a/c Southwark Branch	11 882
a/c George Wills & Sons Ltd	20 573
Lothbury	133 654

This is the only time when discounts of this sort appear in the Discount books, although of course it is possible that on other occasions the destination of the discounts was simply not stated.

(c) As stated above, most of the increase in pressure on the Bank here took the form of a demand for vast volumes of discounts, rather than of advances: in 1914 (total) advances accounted for only 22.25 per cent of discount and advance business, as compared to 94.58 per cent in 1902.[86]

(d) Because of the nature of this crisis, Bank Rate moved in a somewhat unusual fashion, increasing in relatively large jumps. On July 30th it increased from 3 to 4 per cent, after the first fears of war and its consequences for international finance were felt. The following day it doubled - an unprecedented move - and then increased by a further 2 per cent the day after, to stand at 10 per cent on August 1st. This rate held throughout the extended Bank Holiday which lasted until Friday August 7th, before falling

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[86] There was a reason for this concentration of business on discounts: an agreement between the government and the Bank of England had been made allowing the latter to discount any approved bill of exchange that had been accepted before August 14th 1914. Once this guarantee came into effect there was almost no business on advances. For further details see Chapter Five, section 3.4.1.

to 8 and then 5 per cent, which held until the middle of 1916. As we would expect when there is such a large increase in the volume of bills discounted, the volume of refusals is also significantly higher in 1914 than in preceding years: the total for 1914 is in fact over 17 times greater than the annual average for the 1870-1913 period. Thus institutions were bringing in bills for discount at the Bank that did not meet the Bank's requirements on eligibility or acceptances, perhaps hoping that the latter's conditions would be relaxed given the unusual circumstances.[87]

(e) This was a major crisis, in every sense, totally different from any other event that we have studied in this period in that it was caused by external, non-financial factors. When we are considering the role of the LLR we normally differentiate between the latter's role during crises that are financial in origin, such as the aftermath of the failure of a major financial institution, and its role during and after a worldwide catastrophe, such as famine or, as in this case, world war. However, even given this distinction, the policy prescription for both types

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[87] As far as is known, the Bank's eligibility conditions were not relaxed: bills still needed to be accepted by two English names and to have less than 90 days until maturity in order to qualify for discount. What the Bank did do however to make it easier for institutions to increase their liquidity, in addition to agreeing to discount bills accepted before August 14th, was to lend money to the acceptor of the bills if the latter were not in a position to pay when they fell due.

of crisis is more or less the same: to inject liquidity into the financial system, without giving special treatment to particular institutions. This the Bank of England appeared to do in 1914: it lent freely at high interest rates, abandoning any intention it may have had of limiting its discounting in accord with the 1844 Bank Charter Act. In its actions it was backed by a government clearly keen to re-establish a certain degree of calm in the financial markets, presumably partly in order that their demands for war finance would be more easily dealt with. In short, the Bank of England acted as a LLR, especially since it concentrated its activities on discounts, which had quantitative guidelines attached to them[88] and were therefore non-discriminatory, rather than advances, which were more easily granted in large volumes to specific institutions.

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[88] In terms of length to maturity, acceptances, etc.

3: Conclusions

This chapter has seen an attempt to examine the way in which the Bank of England used its power to grant discounts and advances to financial institutions in order to fulfil its role as a Lender of Last Resort. We have looked at the Bank's behaviour at times when there were known problems occurring in the financial markets, and at times when the Daily Discount data tell us that there was tension in the markets, as shown by increases in the demand for discounts and advances, but about which the existing secondary literature has little to say.

Additional information about these other, less well known moments is difficult to come by, since many sources seem to be very short of the qualitative evidence that is required. However, what information is available has been pieced together in order to present (at least) a partially complete picture of events occurring in the financial markets, as concerns the demand for discounts and advances and the role of the Bank, between 1870 and 1914. This chapter has been a continuation of the previous one in that we have looked at qualitative evidence from the period to establish what was occurring at each previously identified point, and also looked at other quantitative indicators as to what was occurring, such as the average size of transaction, whether the pressure occurred on discounts, advances or both, the level of both market interest rates and Bank Rate, and the volume of discount

refusals.

In the following chapter, we will examine both the existence of moral suasion in the 1870-1914 period, and the importance of the Governor of the Bank of England in shaping the Bank's actions. This will enable us in the final, concluding chapter, to draw together all the aspects of the Bank's behaviour and draw some conclusions about the degree of harmonisation of both the Bank's discount and advance behaviour in particular, and its regulatory behaviour in general.

CHAPTER EIGHT

MORAL SUASION AND THE IMPACT OF THE BANK OF ENGLAND GOVERNOR ON BANK POLICY

1: Introduction

In the previous chapter we saw how the volume of discounts and advances granted by the Bank of England to the discount market and associated financial institutions fluctuated over time, and discussed possible explanations for this phenomenon. In this chapter we will be looking at two other qualitative aspects of the Bank's behaviour: firstly, the extent of the Bank's regulatory control over the financial markets, and secondly more specifically at th influence that the Bank's Governor had on the actions of the Bank itself.

The structure of this chapter is as follows. We will first look at the relationship between the Bank of England and the financial markets and at the links between the Bank and City institutions. This is basically a study of the effectiveness of **moral suasion** in the pre-World War One period. It will encompass an examination of the way institutions viewed the Bank, both in London and in the provinces, especially during the 1890s when the Bank was expanding its provincial activities in order to increase its income. We will follow this with a specific analysis of the role of the Governor in Bank policy making, which will include both the qualitative and the quantitative aspects of the issue.

2: Moral Suasion - Methods of Influencing the Markets

One of the issues that is always addressed when considering the Lender of Last Resort in a contemporary context, but is frequently overlooked in historical studies, is the regulatory environment in which that lender (normally, but not exclusively, a central bank) operates. This is important since it involves the **prevention** of problems before they arise, rather than their later cure.

Formal bank regulation is a comparatively recent development, and followed the advent of the increasingly sophisticated financial systems of the late 1960s and early 197 s. In policy terms it is often associated with the implementation of monetary policy. However, the Bank of England has for many decades used the informal powers it possessed to influence the behaviour of the financial sector, through the use of **moral suasion**: the exertion of influence on the commercial banks and other institutions in order to persuade them that their best course of action is to follow the Bank's "advice" and behave in the indicated manner. In this section we will firstly examine this concept in a present-day context, and then discuss its relevance and effectiveness in the 1870-1914 period.

2.1: Contemporary Aspects of Moral Suasion

According to a Select Committee Report on the Bank of England, after the Second World war the practice evolved whereby the Bank would:

> "...issue requests to the banks, specifying in greater or lesser detail the wishes of the Treasury and the Bank, originally about bank lending exclusively, but increasingly about the lending by virtually every financial institution. These requests concern two aspects of lending, the qualitative and the quantitative, and here the banks, as the leading institutions involved in the monetary sphere, are the main concern."[1]

The Bank of England would use its powers of persuasion not just in purely central banking matters, but also concerning the destination of lending: at certain times, the Government of the day, and thus the Bank, was keen for finance to be directed towards particular industries or particular geographical areas. Qualitative controls were therefore used to influence the type of bank lending, and quantitative controls the amount of such lending. However, both sorts of controls were essentially informal, in that they were not backed by statutory powers, as opposed to some of the other policy instruments utilised by the Bank of England at that time.

There is no doubt that by the early 1970s moral suasion had become very important as one method of implementing monetary policy. In the view of the 1969-70

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[1] First Report from the Select Committee on Nationalised Industries, Session 1969-70: The Bank of England, Para.70.

Select Committee, moral suasion formed:

> **"...much the most important control exercised by the Bank over the monetary system... moral suasion is unquestionably a major means by which the Bank of England seeks to implement policy."[2]**

In addition to being widely used, moral suasion seems to have functioned effectively in the post second world war period, with banks and other financial institutions treating these calls emanating from the Bank for policy changes as being more or less commands.[3]

The evidence to the Select Committee also mentions the crucial importance of the relationships between the Bank of England and the other financial institutions.[4] It was possible to exploit these relationships in the post 1945 period only because of their development in the earlier period, and thus in the next section we will examine the development of these institutions, focussing especially on nineteenth century experience.

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[2] Op cit, Para. 69.

[3] The Treasury apparently assured the Select Committee that **"no institution receiving a request from the Bank of England has ever refused to obey it"**. (Op cit, Para.75)

[4] Op cit, Para. 69.

2.2: The Historical Development

To a limited extent, moral suasion must have existed as soon as the Bank of England started to dominate the financial world around the middle of the nineteenth century. Although still a private institution, it was firmly established both as the Government's banker and as the regulator, however informal, of the financial institutions which helped maintain London's dominance, and thus it must have utilised informal channels in order to achieve its objectives.[5] A (negative) example of this occurred in the years following the withdrawal of the bill brokers' discount facilities at the Bank of England in 1858: one of the problems the Bank experienced during these years was that in withdrawing from the discount market it also suffered a loss of much of the day-to-day contact it had previously enjoyed, and therefore saw its influence

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[5] One way in which the Bank utilised quantitative controls in its late nineteenth-early twentieth century discount and advance activities was in its regulations for the types of bills which it would accept. If banks knew that they would be unable to get certain bills discounted at the Bank of England, or that they were unsuitable for use as security for an advance, presumably the banks themselves would be less keen to accept these bills, given that at the outset they had no way of knowing if they would need to liquidate them quickly. Obviously, there would be certain circumstances where the increased risks, in terms of reduced liquidity etc, associated with holding such "second-class" bills would be acceptable, but presumably on other occasions liquidity would be of primary importance, and thus bills which were unacceptable to the Bank of England would be very unpopular.
Another informal avenue open to the Bank towards the end of this period was the establishment in 1911 of the Committee of Bankers' Clearing House. This committee held quarterly meetings at the Bank to discuss matters of interest to both the commercial banks and the Bank of England.

wane, in terms both of regulation and of its ability to affect desired changes in market interest rates.

In order to study the extent to which moral suasion was operative in the 1870-1914 period, we first have to address the issue of whether the Bank of England was able to exert its influence on sometimes unwilling, even hostile ma kets.[6] For the Bank to be able to execute this function efficiently, it had to be able to command respect for its abilities to discharge its regulatory functions effectively. This it appears not to have achieved, especially before 1900, since it seems that its behaviour was regarded in a somewhat unfavourable way in many parts of the City. When looking at primary source material it is difficult to find any praise for the Bank of England as an institution: "lazy Old Lady" was one phrase that was used. Bank Directors seemed generally (with some notable exceptions) to be viewed as being somewhat inept, and until well into the twentieth century there was little continuity in its management since Governors were appointed for a

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[6] It can be argued that one way in which the Bank of England aimed to increase its powers of moral suasion was in its tacit acceptance of the amalgamation movement, which gathered steam after 1900, although had commenced before that date. Capie & Bali (1982) estimated that the ten largest banks in England and Wales held 46 per cent of deposits in 1900, rising to 97 per cent by 1920. This move towards concentration in banking implied that informal control of the system by the Bank of England would become easier, since the Bank would have fewer institutions to influence, although conversely it is possible that these new, larger institutions may have been more able to take on the Bank and to refuse to accept its "advice". However, since we know that moral suasion increased in importance after the first, and especially the second, world war, it seems that the Bank of England was right to encourage the amalgamation movement.

fixed term of only two years.[7]

It seems clear that there was a feeling in the City that the behaviour of the Bank of England left much to be desired. How widespread this view was however is not clear, although there are many examples of negative contemporary views of the Bank's policies and management, and particularly, as we shall see at a later point, of the role of the Governor in general, and of certain Governors in particular.

One of the clearest statements of discontent with the Bank comes from **Whitburn**, of the Discount Company Reeves Whitburn.[8] He states that:

> **"The feeling is general in the City that there is a want of competency in the management of the Bank of England. What they require is a strong man with a large salary who would be above suspicion. They do some very queer things there, for instance, the other day they agreed to an advance against the Debentures of a Colliery with a guarantee of Lord Masham."[9]**

In some ways this lack of confidence in the Bank's management is no surprise, given the way that the Governor,

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[7] There is a cross-over between this material and the later section on the role on the Governor of the Bank, although the latter will concentrate more on testing whether specific Governors contributed very much to Bank of England policy.

[8] Whitburn is quoted extensively in Hughes' Business Reports. This could either be because he was one of the leading financial commentators in the City at this time, or possibly simply because he was a particular friend of Hughes'!

[9] Midland Bank Group, Archive Reference M153/47/4. (Business Reports of the Liverpool Manager of the North & South Wales Bank, T.R. Hughes, 12-14th May 1897.)

in particular, was selected.[10] However, most of the Directors, from among whom the Governor and Deputy Governor were chosen, were themselves involved in City firms in some way, and thus unless the Bank was choosing the inept personnel from City firms as Directors, this comment on the Bank's management can be seen as a reflection of the standard of management in the City as a whole.

Whitburn also commented on the Bank of England's discount policy in 1900, in connection with competition between the former and the country banks:

> "Unless a person deals with them (the Bank) exclusively, they decline to discount below the official minimum here in London. This is not so however at their branches in the country. I hear from all sides that at the branches they have adopted an aggressive and irritating policy. I suppose they have too much respect for the power of the London bankers to go along the same lines here."[11]

The above comment is interesting because it implies a difference in Bank policy between the provincial banks and the London based banks. The latter of course had far more direct contact with the Bank of England, and were not in general in direct competition with them in the same way as were the country banks at certain times, since the Bank of England was the only bank allowed to issue notes in the

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[10] See below.

[11] Midland Bank Group Archives Reference M153/62. (Op cit, 9-11th May 1900.)

London area.[12]

In summary therefore, it seems that there were few people in the City with any favourable statements to make about the behaviour of the Bank of England in general, as opposed to about certain personalities, notably Lidderdale, in particular. In the next section we will look in detail at one particular dispute between the Bank of England and oth r banks, before turning more specifically to the role and position of the Governor.

2.2.1: Specific Complaints about the Bank of England's Behaviour - Competition with the Country Banks

One of the most serious of the specific disputes between the Bank of England and the provincial banks concerned the "touting" for business by Bank Agents at the Branches in the mid 1890s. The Bank was making strenuous efforts to increase its income in order that its dividend did not fall too far behind those of the joint stock banks,

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[12] Evidence from an earlier period confirms that in many provincial areas country bank notes were preferred to those issued by the Bank of England. Howard Lloyd, writing in 1907 about the early 1860s, commented that:

> "...the bank issued its own notes within the statutory maximum as fixed by the Act of 1844. It was customary to offer customers Bank of England notes if they preferred them, but it was a curious fact that farmers and country people, who were numerous among the bank's customers and connections, preferred the Lloyd's notes, and were uncomfortable if supplied with those of the Bank of England."

(Notes and Reminicences of Lloyds Bank, 1862-92, pp.2, Lloyds Bank Archives)

and the bulk of these efforts was concentrated in the provinces at the branches, much to the dismay of country bankers.

Contemporary accounts give evidence of this, much of it coming from reports of meetings of the Country Bankers Association, one purpose of which seemed to be a forum at which the provincial bankers laid down their complaints about the policies of the Bank of England. In addition, the meetings of the Central Association of Bankers were also used to air grievances. The main body of evidence found comes from 1896, a year when the Bank of England's actions at the branches were apparently particularly competitive. In letters and speeches to several meetings of the various banking associations in May and June 1896, Faber, of Faber, Beckett & Co.,Leeds, made strong complaints about the Bank's discount policies. In a letter dated May 14th 1896, he first identified the difficult position that the country bankers were in, different as it was from that faced by London banks. This was because their customers often treated money left on deposit at their bank as an investment, rather than as an alternative to using cash, and only went to the bank once a year to collect the interest paid on their deposit. From the banks' point of view, this was a very satisfactory situation since the deposits left with them could then be re-lent. However, once the Bank of England started competing for business it was no longer as easy to find willing borrowers for the re-lent deposits, because the Bank was able to offer

potential borrowers lower rates than the country banks. According to Faber, the Bank's instructions to its Leeds Agent appeared to be "Get business at fair rates if you can, but get business".[13] Faber's complaints were thus:

> "We do not complain about fair competition but this is fostered by free money costing the lender nothing at all. How can we country bankers who pay well for our deposits meet such competition as this? Our loans are taken from us; our bills no longer exist in our cases and our current accounts are 'touted' for."[14]

He went on to prophesy that:

> "The time is already arriving, if it has not already arrived, when the Bank of England must choose whether to be the banker for the Government or a commercial bank. It cannot be both, and if it will not choose the remedy it would appear to be in the adoption of the American plan."[15]

Faber then continued by discussing the present means by which the way banks kept their reserves, and improvements that could be made to this system. His primary question was why London bankers kept such large (non-interest bearing)

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[13] Quoted in a letter from Faber of Faber, Beckett & Co., Leeds, to the Central Association of Bankers, 14th May 1896. (Midland Bank Group Archives, reference M222/2: George Rae's Papers).

[14] Op cit.

[15] Op cit. There is no clue given in the letter as to the nature of the "American plan" referred to. However, Friedman & Schwartz (1963, pp.117) mention a "Baltimore Plan" proposed by the American Bankers Association in October 1894, aimed at reforming the American note issue. The main proposal was to have an asset-backed currency which would be guaranteed by the federal government, such that national banks would be able to issue notes as long as they were limited to the amount of the bank's capital, and were backed by a fund of "legal tenders". It is possible that it was this scheme that Faber was referring to, since it would appear to fit with the idea of the Bank of England choosing to be a commercial rather than central bank.

sums at the Bank of England, and he postulated three (non-mutually exclusive) answers. Firstly, he stated that the banking environment was currently too competitive for there to be sufficient co-operation between bankers, in order that an new system with an alternative reserve could be set up. Secondly, he said that it was thought that:

> **"..in times of panic the Bank of England (with the government behind it) would alone be able to give help and advance money against good securities which at the moment might be unrealisable"**

He is suggesting here that it is only the Bank of England which is in a position to act as a LLR. His third point was that balances were kept at the Bank of England because the latter "clears".

He continued by adding his own comments to these answers. He opinion on the first point was that these days **"jealousy among bankers is quite out of place"**, and thus more co-operation between bankers would be desirable. Secondly, he commented that (even without a central bank) New York had survived through panics which were equally serious as any in London,[16] and on the final point he proposed that the commercial banks should set up their own clearing house, and thus keep their own reserves,

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[16] New York banks had survived, Faber said, by issuing Cash Certificates against good securities which were guaranteed by all the banks and thus circulated as cash. With hindsight, however it seemed at the time, it is unlikely that the crises Faber was referring to were as serious as the worst of the nineteenth century British ones. One result of the American problems of 1907 was the establishment of the Federal Reserve, because it was felt that it was the lack of a central bank which had accentuated the problems of the banking system. See section 8 of Chapter Four for further details.

independently of the Bank of England.

Faber's letter was discussed at the meeting of the Central Association of Bankers four days after it had been written (May 18th 1896), and **Simpson**, from the Bank of Liverpool, commented that Faber's proposal to form a new clearing bank to hold surplus deposits as reserves would **"leave the Bank of England out in the cold".**[17] The proposal received some support at the meeting, although it was too revolutionary for most people, and thus there was a move from **Wade, Tritton** and **Schuster,**[18] in favour of a more mo erate course of action. Before any action was taken towards the formation of an alternative clearing house, they wanted a deputation to be sent to the Bank of England to discuss the matter with them. Finally however, in best committee tradition, a decision about what course of action to take was postponed for several weeks until the decision of the **Northern Bankers** was known.[19]

The next piece of evidence we have on this subject is a letter from **R.H.Inglis Palgrave** to **George Rae,**[20] giving

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[17] Midland Bank Group Archives Reference M222/3 (T.R.Hughes' report of the meeting).

[18] From the **National Provincial Bank, Brightwen & Co.,** and the **Union of London and Smiths Bank,** respectively.

[19] We do not know what the decision of this body was, but it appeared not to matter since the deputation to the Bank of England took place anyway (see below).

[20] Midland Bank Group Archive Reference M222/4. Rae was the author of The Country Banker: His Clients, Cares and Work, published in 1885. He was General Manager of the North & South Wales Bank for many years, and a well known commentator on financial matters. Palgrave, author of Bank Rate and the Money Market, published in 1903, was also editor of The Economist for many years.

evidence supporting Faber's points about the Bank of England's behaviour in the provinces. According to Palgrave, although the Bank did not actually allow interest on deposits, they were prepared to place customer's money on the Stock Exchange, the profit from the investment going to the customer. In addition, bills, not necessarily first class, could be discounted at the Bank's branches at very low rates, and the latter had "sent to customers of other banks and said they would do business there"; in effect, "touting" for business.[21] The Bank was also guilty of undercutting other banks in the issuing of Municipal loans, offering to issue the same loans at lower rates than had already been agreed.

Although, as noted above, Faber did not receive much support from many quarters, Palgrave noted that at one

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[21] Further evidence of this occurring at a later date comes from another source. There are reports in the records of **Lambton & Co.**, held at Lloyds Bank Archives (reference 4351), concerning the Bank of England offering very good terms for the discount of bills. The **Sunderland Shipping Co. Ltd.** opened an account with the Bank of England Branch (presumably at Newcastle) in 1906 for the purpose of bill discounting, much to the annoyance of their bankers, Lambton & Co., who were left only with the (low profit) transactions of withdrawing cash for wage paying etc. Lambton & Co. were unable to match the Bank of England's terms for bill discounting, and were pleased when the shipping company closed their account with them altogether.

The favourable terms offered by the Bank apparently caused some local surprise, since many of the ship-building companies in the area were in decline at that point. It seems that the Bank was taking on business here that could possibly have been fairly risky, at a time when its revenue pressures had eased. This could however be explained simply in terms of an over-zealous Bank of England Agent who was keen to increase his business in any possible way, rather than as the result of a policy directive from Head Office aimed at increasing Branch business across the whole country.

meeting support was more forthcoming,[22] and he had this to say about the meeting's general attitude towards the role of the Bank of England as a LLR if Faber's proposals for a separate reserve were put into action:

> "The doubt whether, if bankers' balances were removed from the Bank of England, the assistance which might be needed in times of crisis would still be available did not carry so much weight as might have been expected. The idea was that the banks would have to go straight to the Treasury and ask the government for notes against securities."

All these meetings were agreed that a deputation should be sent to the Bank, and if received civilly, giving reason to believe that the competition that the bankers were complaining about would be discontinued, or at least modified, the matter would be closed. This in fact seems to be what occurred: at a meeting of the Country Bankers' Association the following year,[23] Faber gave an account of the deputation to the Bank, which had eventually consisted of representatives of two London joint stock banks, two London private banks and two country banks.[24] The result of the deputation was positive: the Bank's Governor "promised

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[22] Unfortunately he did not mention which meeting this was.

[23] Reported by Hughes in the Business Reports of his visit of May 12th-14th 1897 (Midland Bank Group Archive Reference M153/47/2).

[24] There is no indication given as to the reason for the two-thirds weighting given to London institutions in this deputation. It seems odd that the weighting was thus, given that the complaints about the Bank of England's competitive behaviour originated with the provincial banks. Perhaps the reason for the inclusion of so many london bankers was that they were better known and commanded more respect at the Bank.

to give instructions to their agents not to compete unduly with their neighbours".[25]

Hughes also gives a report here of the Central Association of Bankers' Dinner, where the Governor of the Bank of England, Colin Smith, gave a "short but effective " speech in which he "regretted that he did not see more of his banking friends and also the isolation of the Bank of England except when bad times come". After this speech, Tritton, then the Honorary Secretary of the London Clearing Bankers, "expressed a hope that something may arise out of the Governor's speech which would lead to a better understanding amongst bankers".[26]

Over the next few years the problem of the Bank of England competing against the country bankers resolved itself, without necessitating further action from the bankers themselves, in the main part because of a change in the Bank's behaviour. Once the concerns over its income became less serious in the early years of the twentieth century, it became less aggressive in its search for new business at the Branches, and so was no longer in direct competition with the country banks.

This episode is interesting for the study of the Bank of England's behaviour as a central bank, especially as regards the regulatory aspects of this role, because it is one of the few direct illustrations we have of how the Bank

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[25] Op cit.

[26] All the above quotes appear in the last cited reference.

was viewed by other institutions. It is also a good example of a case where the Bank tried to behave as a commercial bank, since of course in terms of its statute it was still a private, profit-making institution at that time, and yet got criticised on all sides for this behaviour. It is clear that the commercial banks regarded the Bank of England very much as a central bank by this time.

Having said all this, it is important to realise that the country bankers' complaints can also be regarded as an outburst by a group of institutions involved in a relatively sheltered industry, who suddenly found themselves exposed to a bout of competition that they were ill-equipped to deal with. Obviously, the initial policy step to take in such circumstances was to cry "it's not fair"!, and in doing this, the provincial bankers of the late nineteenth century were no different from many other earlier and later groups.

3: The Importance of the Governor

How important was the particular Governor who held the "Chair" for the conduct of Bank of England policy? This is an interesting question, because if we can show that certain Governors were very important in shaping the Bank's policy at particular times, this will suggest very strongly that the Bank did not have a coherent policy to deal with the markets and with financial crises. What we are basically asking here is to what extent the Bank of England's actions at particular times can be accounted for by the coincidence of certain Governor's terms of office?[27]

The idea that some Governors may have been more important than others, in terms of the Bank's policy in difficult situations, is not one which, in the words of a recent writer, is "fashionable among economists" since it "undermines the idea of constitutional continuity and stability".[28] However, it is an important concept and one which is deserving of further study.

At the outset we would probably believe that most Governors have little impact on Bank policy, but that some

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[27] The question we are really considering here is to what extent individuals can influence Bank of England policy. Normally, the individual in the best position to achieve this was the Bank's Governor, which is why we are concentrating on this aspect here, but occasionally there were individuals in the financial world with enough charisma to influence financial policy on a wide scale. One such person was arguably Edward Holden, and we will discuss his importance in connection with the Yorkshire Penny Bank at a later point.

[28] Fay (1987) pp.30.

have a disproportionate influence. To examine this in greater detail we first need to take a brief look at the means by which men became Governor. The election to the Bank's Court of Directors was made fairly early in a man's career: in 1900, the average age of Directors when first elected to the Court was thirty-seven,[29] and once elected to the Court eventual promotion to the "Chair", as the Governorship was known, was virtually automatic after a certain length of time, normally around twenty years, had been served. Until 1932 there was no fixed retirement age, and so most of the ex-Governors continued to serve on the Court of Directors after their period in the "chair".[30]

Since Governors were in effect chosen twenty years in advance, and the eventual appointment to the Chair was dependent on age and seniority rather than on ability, it is therefore not surprising that many Bank of England Governors were slightly lacking in personality, in the sense that their Governorship was to them simply the culmination of a perhaps distinguished career, and not their chance to make a mark on Bank policy-making. There were exceptions of course, Lidderdale being the most obvious one: primary sources suggest that all the impetus for intervention in the Baring affair came from him, and without him perhaps the Bank would not have intervened.[31]

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[29] Sayers (1976) vol II, pp.595.

[30] Retirement at seventy was introduced in 1932 on the recommendation of the Peacock Report.

[31] We will return to this issue at a later point.

From the Bank's point of view it seems to have been increasingly difficult to attract able men to serve on their Court of Directors: by the 1890s, it appears that being a Director of the Bank of England was no longer the status symbol it had been. This is illustrated by the following quote from Lidderdale, in answer to a question as to whether or not he favoured the idea of a permanent Governor:

> "...it is difficult enough to get good men as Directors: if we deprived them of the chance of the Chair, a coveted distinction, we would probably get even less good men to the Bank."[32]

There is no indication why attracting talented people to serve on the Banks' Court of Directors should be so difficult, except perhaps for the obvious explanation that the tasks which it involved were rather time-consuming, and people preferred to devote their time to their own businesses rather than to serving the "public interest".

In Lombard Street, Bagehot discusses the roles of the Governor and Directors of the Bank extensively.[33] He talks of the considerable status attached to the positions, both to the individual concerned and to the institution by whom he was employed, and mentions the surprise he felt on seeing a "very fresh and nice looking young man" and then being told that he was a Bank Director. He felt however that the system of picking the most talented people early

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[32] Source: The Diaries of Edward Walter Hamilton, January 8th 1891. Held at the British Library, Department of Manuscripts, reference Add 48,654.

[33] Bagehot (1873), Chapter VIII.

in their careers was correct, since the younger component of the Court of Directors had little influence, and yet sitting on it allowed young men to develop their expertise. The real power of the Bank of England lay in the Committee of Treasury, although these powers were ill-defined, and depended on the personality of the incumbent Governor:

> "A strong Governor does much mainly on his own responsibility, and a weak Governor does little."[34]

Bagehot summarises the weaknesses in the management of the Bank very neatly:

> "In theory, nothing can be worse than this government for a bank - a shifting executive; a board of directors chosen too young for it to be known whether they are able; a committee of management, in which seniority is the necessary qualification, and old age the common result,; and no trained bankers anywhere."[35]

He felt that the best means of introducing some measure of stability and continuity into the functioning of the Bank was to appoint a permanent Governor or Deputy Governor. The problem with having a permanent Governor however was that such a person would be a "little 'monarch' in the City" and would therefore be too powerful:

> "Everybody in business would bow down to him and try to stand well with him, for he might in a panic be able to save almost anyone he liked, and to ruin almost anyone he liked."[36]

He thus preferred the permanent appointment to be one of Deputy Governor, which would avoid many of the pitfalls

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[34] Op cit, pp.201.

[35] Op cit, pp.207.

[36] Op cit, pp.213.

associated with a permanent Governor, and would be a paid employee of the Bank. This person would be a trained banker and would thus be able to advise Governors, who were merely "Cautious merchants, not profoundly skilled in banking".[37] In Bagehot's words, he would:

> "...give to the decisions of the Bank that foresight, that quickness, and that consistency in which those decisions are undeniably now deficient."[38]

In this way some of the problems of having a continually changing management of the Bank could be resolved, facilitating an increased degree of policy continuity and more expert knowledge within the Bank.[39] It would also avoid some of the problems associated with less capable Governors, since they would have a full-time, permanent advisor always at hand, and thus situations such as this described by Tritton, of Brightwen & Co., would be eradicated, or at least reduced:

> "The present Governor is unfortunately very self-opinionated and will have his own way, and his idea is to run the Bank on purely mercantile lines, just as he would with his own business. He would not, for example, increase the price of gold though all his Co-Directors were against him in this, and this went on for a long time until the other day, when he at last gave way.
> The management of the Bank is of course on a very silly basis - there is no continuity in it - and how we shall fare when the next Governor comes in I do not know. He is a member of a declining firm which is doing no good, and he has never shewn

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[37] Op cit, pp.223.

[38] Op cit, pp.225.

[39] These ideas were never practically implemented. Today the Deputy Governor and Governor of the Bank of England are appointed for five year terms. This was introduced when the Bank was nationalised in 1946.

> any grasp, though in other respects he is decent enough."[40]

Here, according to Tritton, the Bank's selection procedure for Governors seems to have gone very wrong, in that two somewhat inept Governors followed each other to the Chair. Because they were chosen so far in advance, once elected to the Bank's Court it was extremely difficult to prevent men who failed to fulfil their initial promise becoming Governor. Having a full time, permanent Deputy Governor would at least reduce the negative aspects of this situation.

Having discussed the management of the Bank of England and the role of the Governor in general, we will now continue by looking more specifically at particular governors, focussing especially on the impact that they had during certain events, and on discussing the empirical work that was carried out on this subject. We will commence with the empirical analysis before discussing qualitative aspects of the situation.

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[40] Midland Bank Group Archives, reference M153/62/2. (Business Reports, as above, 9-11th May 1900.) The Governor of the Bank in 1900 was Samuel Steuart Gladstone. Following him, from 1901-03, was Augustus Prevost.

3.1: Empirical Analysis

The main aim of this analysis was to test whether certain Governors had a greater impact on Bank of England policy than others, in terms of the behaviour of discounts and advances. This is not easy to test empirically, since we are in effect dealing with a qualitative rather than quantitative concept, and thus the estimation procedure used involved the use of both the Daily Discount data and dummy variables to represent Governors who, a priori, seemed to be more *important* than others.

Table 8.1 overleaf gives a list of the Governors of the Bank of England between 1870-1914, together with their dates of office. On first consideration, many of these names are unfamiliar, even with a good knowledge of monetary events in this period. It seems that many Governors made little mark on the financial markets and monetary affairs in general. However, several of them are very well known. One of the questions we have to address is why some of these names achieved so much notoriety, and others so little? Was it purely an accident of fate that caused certain people to react very effectively to crises, and others to have no impact at all on Bank policy?

The method we shall use in an attempt to test the hypothesis that certain Governors had a disproportionate influence on the shaping of Bank of England policy is as follows. Firstly, although certain value judgments are involved in this estimation procedure, we can frame an

Table 8.1: Bank of England Governors, 1870-1914.

1869 - 1871	Thomas Newman Hunt
1871 - 1873	George Lyall
1873 - 1875	Benjamin Bucke Greene
1875 - 1877	Henry Hucks Gibbs
1877 - 1879	Edward Howley Palmer
1879 - 1881	John William Birch
1881 - 1883	Henry Riversdale Grenfell
1883 - 1885	John Saunders Gilliat
1885 - 1887	James Pattison Currie
1887 - 1889	Mark Wilks Collet
1889 - 1892	William Lidderdale
1892 - 1895	David Powell
1895 - 1897	Albert George Sandeman
1897 - 1899	Hugh Colin Smith
1899 - 1901	Samuel Steuart Gladstone
1901 - 1903	Augustus Prevost
1903 - 1905	Samuel Hope Morley
1905 - 1907	Alexander Falconer Wallace
1907 - 1909	William Middleton Campbell
1909 - 1911	Reginald Eden Johnson
1911 - 1913	Alfred Clayton Cole
1913 - 1918	Walter Cunliffe

initial hypothesis about the way in which the Bank's Governor affects the Bank's discount and advance operations. We can postulate that the volume of discounts will be a function both of the interest rate associated with discount and advance transactions, and of a dummy variable representing the Governor, which takes the value 1 when there is a Governor in office whom we consider to be influential, and 0 for the others. In addition, we can add other dummy variables to represent other qualitative factors we consider to be important in determining the value of the dependent variable. In this case two other dummies were included: one to represent financial crises, and another to represent the six-monthly seasonal pressure apparent in the data.[41]

In terms of symbols, the hypothesis for each of the variables is:

TVB = f (R, DGOV, DSEAS, DFINCR)

TVA = f (R, DGOV, DSEAS, DFINCR)

VAOS = f (R, DGOV, DSEAS, DFINCR)

where:

R	=	Interest rate on discount and advance transactions
DGOV	=	Dummy variable representing Bank Governors
DSEAS	=	Dummy variable representing Seasonality
DFINCR	=	Dummy variable representing Financial Crises

Note above that these estimations were carried out for

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[41] As discussed earlier, this increase in activity was due to "window dressing" by the commercial banks.

discounts and both advances variables, TVB, TVA and VAOS, the first two for the whole time period (2340 observations), and the latter for the period 1894-1914 (1092 observations).

We will now discuss the data on each of the variables in turn, except for that on discounts and advances, which has already been extensively discussed.

R: In a previous chapter[42] we have already seen that, using annual data, a positive relationship existed between the volume of discounts and advances and Bank Rate. We concluded from this result that there was some indication that the LLR function existed in the 1870-1914 period. It thus seems logical to include the interest rate in any other estimation which aims to explain the behaviour of the Daily Discount data. The data used were as shown in Appendices A and B below.

DGOV: This is the dummy variable in which we are most interested, since it reflects the importance of the Bank of England Governor. It is this variable which is most subject to valued judgments, since at the outset we have to decide which Governors are important, and thus should have the value 1 assigned to them, and which are not, thus carrying a zero value. This task was executed using prior knowledge of what the Bank was doing at certain times. For example, we know that in 1878 the Bank

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[42] Chapter Six, section 4.

of England did not intervene to save the City of Glasgow bank. The decision not to intervene must have been taken inside the Bank, either collectively or independently, and we can postulate that the governor of the time, **Edward Howley Palmer**, had some input into the decision, especially since Clapham (1944,pp.309) states that Bank rate was "jerked up to 6" (per cent) by the Governor. Thus, the period covering Palmer's office is assigned the value 1.[43] Other Governors given this value were **Lidderdale**,[44] **W.M.Campbell**[45] and **W.Cunliffe**. Several sources indicate that Lidderdale was one of the most energetic of the Governors in this period, and that he provided the whole inspiration for the Bank's actions in the Baring affair. In the words of two contemporaries:

> **"...the endeavour seems to have come completely from Lidderdale, without much seconding or more than tacit support from his colleagues. If my informant is correct then Mr. Lidderdale is the sole and courageous author of the endeavour which appears to have rescued the City temporarily or otherwise from the formidable embroilment that would have**

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[43] The changeover in Bank Governors took place in April of every second year, and therefore, the Governor dummy for Palmer, for example, is equal to 1 from week 14 of 1877 until week 13 of 1879.

[44] Between week 14 of 1889 and week 13 of 1892: Lidderdale's term of office was extended in order that he could continue negotiations he was involved in with Goschen, the Chancellor of the Exchequer, concerning the amounts the Bank charged the government for, among other things, the management of the National Debt.

[45] Governor between April 1907 and April 1909.

followed the failure of Barings."[46]

> "The Government and commercial world at large cannot congratulate themselves too much on how lucky they are to have Lidderdale at the helm"[47]

It seems that it was rare for a Governor to take his position as seriously as did Lidderdale; Sayers (1976, pp.640) reports that he had been so fully occupied by the affairs of the Bank that when his term as Governor ended the business from which he had previously gained the major part of his income was not in a strong position.

Campbell was included because the Bank came through the problems of 1907 without any serious problems, an experience totally different from that of the U.S. in the same period, where the crisis was admittedly more severe but was also dealt with less efficiently. Cunliffe, of course, was at the helm during the crisis that developed in the summer of 1914 on the outbreak of World War One.

In addition to these names, A.F.Cole, Governor between 1911 and 1913, was included because of his actions during the problems of the Yorkshire Penny Bank, when, guided and influenced by Edward Holden, the Bank formed (and contributed to) a guarantee

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[46] Contained in a letter from Howard Lloyd to Hoare dated November 18th 1890, held at Lloyds Bank Archives, Reference 4050.

[47] Diaries of Edward Walter Hamilton, 15th November 1890.

fund to rescue this bank.[48] In setting up the rescue of this bank, Holden used all the contacts and influence available to him. For example, on 27th July 1911, soon after the bank's problems had become evident, he wrote to the Chancellor, Lloyd George, asking for his help:

> "The Governor of the Bank of England and I have been working day and night for a week trying to prevent the most awful catastrophe of the institution I discussed with you coming down. Up to last night we had hopes, but this morning I despair. I think you and Mr. A(squith) should know exactly what the position is as some help from you may enable us to pull through."[49]

And then, two days later, he used a slightly more desperate note:

> "I know you are very much engaged with policy affairs, but I should like to point out to you that the matter I wrote to you about is equally important. If this debacle comes it will lay in ashes the whole of Yorkshire and a great deal of Lancashire. I cannot help but think it would do a great deal of damage to the Government in these districts."[50]

Holden's persistence here was rewarded, in that the Governor of the Bank of England did meet with the Chancellor, although the latter was keen that the government itself should not get involved unless it

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[48] The Governor's report of this affair is discussed in Chapter Four, section 4.9.

[49] Letter from Holden to Lloyd George, July 27th 1911. (Midland Bank Group Archives, Edward Holden's Private files, YPB).

[50] Op cit, July 29th.

was absolutely necessary.[51]

DSEAS: This dummy was included for obvious reasons. Again, careful study of the data reveals clear six-monthly moments of increased activity, and as discussed elsewhere, this pattern can be explained by the commercial bank's practice of "window dressing". The seasonal dummy took a value of 1 in the last week of June and of December, and zero everywhere else, throughout the estimation period.

DFINCR: This dummy variable was included in the estimation because it is fairly obvious, and indeed is a major hypothesis of this thesis, that the volume of discounts and advances increase when a financial crisis is in progress. Again, in defining the periods when this dummy would take a non-zero value, qualitative evidence was considered,

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[51] Lloyd George in turn was keen to use whatever influence he may have had with Holden, as can be seen below by the extract from a letter written around two weeks after the previous ones concerning the Yorkshire Penny Bank:

> "The bearer of this letter is my brother and my late partner in business. He, I understand, has come up to town to see you in reference to some transaction affecting the City & Midland Bank. He is acting on the behalf of a gentleman who, through no fault of his own, has found himself in some financial difficulty. I gather from what my brother has told me that the situation is a difficult one, but I have seen you solve difficulties that were incomparably greater than this one, and if you could in any way assist in this matter I should be infinitely obliged.
>
> P.S. The Yorkshire Bank was a great triumph for you."

Letter from Lloyd George to Holden, August 10th 1911. (Held at Midland Bank Archives, Holden's private files)

particularly that contained in the secondary literature, since it is not acceptable to use the data that is to be used in the analysis to define the periods when dummy variables should be operative.

There were therefore four occasions when the dummy variable representing financial crises took a non-zero value: 1873 (autumn), 1890 (November), 1907 (March, August and November) and 1914 (July and August). The theoretical justification for picking these points has been made elsewhere in this thesis.

3.1.1: Results

The regression results for two out of three estimated equations were fairly good, and are displayed in Tables 8.2, 8.3 and 8.4 overleaf, one for each variable. We will briefly discuss these results before going on to consider their qualitative implications.

The top half of the tables overleaf give the results for the initial ordinary least squares (OLS) estimations. For all three variables, the explanatory power of the regression (R^2) is not very high, at just over 0.2. This implies that there are factors other than those included here which are important in the determination of the dependent variable. However, most of the 't' statistics are significant, indicating that the variables which are included are important. The only regression equation that

Table 8.2: Governor Regression Results

Dependent variable	= TVB
Number of observations	= 2340
Mean of dependent variable	= 60810.86
Std. dev. of dependent variable	= 190496.54
R squared	= 0.2140
Adjusted R Squared	= 0.2127
F-statistic (4, 2335)	= 158.94
Durbin Watson statistic	= 0.84

Variable	Coefficient	Std Error	t-ratio	Sig.level
Constant	-2534	$(0.11*10^5)$	-0.24	0.79580
R	13295	3194	4.16	0.00006
DGOV	40670	8339	4.88	0.23333
DSEAS	41495	$(0.18*10^5)$	2.28	0.02176
DFINCR	588344	$(0.27*10^5)$	21.81	0.00000

Adjusted Results after AR1 Estimation

New DW = 2.09

Variable	Coefficient	Std Error	t-ratio	Sig.level
Constant	-20203	$(0.15*10^5)$	-1.32	0.18816
R	19627	4355	4.51	0.00001
DGOV	41632	$(0.16*10^5)$	2.65	0.01652
DSEAS	30235	$(0.13*10^5)$	2.40	0.01652
DFINCR	482898	$(0.37*10^5)$	13.05	0.00000

Table 8.3: Governor Regression Results

Dependent variable	= TVA
Number of observations	= 2340
Mean of dependent variable	= 67442.36
Std. dev. of dependent variable	= 183697.11
R squared	= 0.2660
Adjusted R Squared	= 0.2647
F-statistic (4, 2335)	= 211.54
Durbin Watson statistic	= 1.65

Variable	Coefficient	Std Error	t-ratio	Sig.level
Constant	-29032	9767	-2.97	0.00314
R	25244	2977	8.48	0.00000
DGOV	-18.19	7771	-0.002	0.94658
DSEAS	459035	$(0.17*10^5)$	27.02	0.00000
DFINCR	6900	$(0.25*10^5)$	0.27	0.77460

Adjusted Results after AR1 Estimation

New DW = 2.03

Variable	Coefficient	Std Error	t-ratio	Sig.level
Constant	-43433	$(0.11*10^5)$	-3.84	0.00013
R	29955	3431	8.73	0.00000
DGOV	-876.2	9291	-0.09	0.92487
DSEAS	452611	$(0.16*10^5)$	27.66	0.00000
DFINCR	0.1799	$(0.20*10^{-5})$	0.44	0.65942

Table 8.4: Governor Regression Results

Dependent variable	= VAOS
Number of observations	= 1092
Mean of dependent variable	= 112168.29
Std. dev. of dependent variable	= 251651.51
R squared	= 0.2155
Adjusted R Squared	= 0.2126
F-statistic (4, 2335)	= 74.64
Durbin Watson statistic	= 0.85

Variable	Coefficient	Std Error	t-ratio	Sig.level
Constant	-26070	$(0.21*10^5)$	-1.29	0.19357
R	53530	6692	8.00	0.00000
DGOV	-115463	$(0.16*10^5)$	-7.31	0.00000
DSEAS	437152	$(0.36*10^5)$	12.29	0.00000
DFINCR	-105454	$(0.47*10^5)$	-2.24	0.02408

Adjusted Results after AR1 Estimation

New DW = 2.20

Variable	Coefficient	Std Error	t-ratio	Sig.level
Constant	-27117	$(0.26*10^5)$	-1.03	0.30386
R	53660	7813	6.87	0.00000
DGOV	-123194	$(0.29*10^5)$	-4.28	0.00002
DSEAS	452685	$(0.25*10^5)$	17.94	0.00000
DFINCR	-53139	$(0.62*10^5)$	-0.86	0.38884

has 't' statistics associated with it that are not significant is that of advances on bills, TVA (Table 8.3). The 't' statistics here on both the Governor and the financial crises dummies are very low, implying that neither the Governor nor the incidence of financial crises had any impact on the value of this variable.

Although most of the variables in these estimations are significant, in all three estimations they are biased due to the presence of serial correlation in the residuals, as shown by the low Durbin-Watson statistics. Because of this bias, additional estimations were undertaken in order to eradicate the (first-order) serial correlation. The results obtained using a different procedure are shown in the bottom half of the tables.[52]

These results give slightly lower 't' statistics than previously, although the Governor dummy variable is still significant for TVB and VAOS. The Durbin-Watson statistic for all three variables is very much improved, standing at slightly over two for all three equations, indicating that the problem of first-order serial correlation has been more or less eradicated.

A summary of the results for all the variables is as follows:

R: Significant in every equation, whether serial

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[52] The computer package used to carry out these regressions was LIMDEP, chosen because it was capable of handling a larger number of observations than other packages. The autoregressive procedure used by LIMDEP is the Prais-Winsten method. This is similar to the Cochrane-Orcutt method, but includes an extra transformation on the first observation.

correlation is present or not, with consistently high (positive) coefficients and 't' statistics. This is as expected, since it seems logical that the interest rate will be very important in determining the demand for discounts and advances.

DGOV: Significant on OLS and AR1 estimations for TVB and VAOS, but not for TVA, where the 't' statistics are very low.

DSEAS: Consistently significant, displaying high 't' statistics.

DFINCR: The only equation where the 't' statistic on the dummy variable representing financial crises was significant both before and after the application of the AR1 process was that for discounts. This is somewhat surprising, since we would expect the incidence of financial crises to be very important in determining the time path of both discounts and advances and, according to these equations at least, it appears not to be the case.

3.1.2: Implications of these Results.

The implications of these results are interesting, although we must take care not to construe too much from what is, after all, a series of fairly basic regressions.

Firstly, it comes as no surprise to find that the interest rate is significant in all of the regression equations, since, as mentioned earlier, we have already

identified the positive relationship which exists between the volume of discounts and advances and the interest rate, and concluded that this relationship gives some indication that the LLR function is operative. This then is simply confirmation of what was already thought to be the case. In addition, the same comment can be made of the consistently significant dummy variable representing seasonality; the seasonal element in the data is obvious even to the naked eye, and thus it is expected that a dummy variable representing seasonality would be significant.

Of greater interest than these two are the results obtained on the dummies for financial crises and for the Governor. As mentioned above, the results for financial crises were rather surprising, in that a priori one would have expected this dummy variable to be very significant, and it transpires that it was rarely so, except on discounts, when it was very strong.[53] In addition, prior data analysis undertaken on the Daily Discount data did not suggest that there was little or no relationship between periods of crisis and the volume of advances granted by the Bank of England.

These results indicate that the Governor is important in determining the Bank of England's discount and advance

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[53] In some ways this result is slightly worrying in terms of the analysis carried out in the two previous chapters, since the primary hypothesis underlying the data analysis was that the volume of discounts and advances increases when a financial crisis is in progress. The evidence here is not sufficient for us to abandon this hypothesis, but we must bear these results in mind all the same.

policy, at least for discounts and for advances on securities, since the dummy variable representing the Governor is significant in the regressions with these as independent variables. In some ways this significance is surprising, since in essence this is a weak test relying on qualitative assumptions,[54] and uses a time series with a large number of observations.[55] In addition of course, the finding that individual Bank Governors seem to be important for Bank policy making runs contrary to much of the perceived wisdom, which holds that the Bank was engaged in institutional rather than individual policy making, especially as regards policy towards financial crises.

However, there are major problems involved with this type of empirical testing using dummy variables, especially in the sphere in which we are currently involved. One of these is that, as might be expected, the analysis only

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[54] In essence, the major problem with this analysis is that in initially identifying the Governors thought to be important, and then assigning them the non-zero dummy, we are already assuming that these are the Governors in whom we should be interested, and so a bias is introduced. However, the only alternative to this sort of approach would be to put in one dummy variable for each Governor (twenty-two in all), and then to see whether any of them were significant in a similar regression to that which was carried out. The problem here again is in terms of computer memory: no packages would be capable of running a regression which included around twenty-five regressors, on a sample of 2340 observations. Splitting the sample would be one solution to this problem, but would not be appropriate in this case, because we are interested in how the variables relate to each other over the whole time period.

[55] The relevance of the long time series is that we might not expect dummy variables which cover relatively short spans to be significant when they are immersed in such a long data run.

picks up those events which actually affect the dependent variable. Thus if, as actually occurred in this period, the Bank of England took extra-ordinary measures in order to avoid what may have resulted in a financial crisis, such as happened with Barings and also with the Yorkshire Penny Bank, the discount data is not affected and thus these actions would not show up in this type of analysis.

The implication of the above problem is that empirical testing using dummy variables is perhaps not the most efficient method of analysing whether the Bank of England showed a consistent policy towards financial crises, or whether the policies adopted by the Bank were almost totally dependent on the personality and capability of the individual who was currently in "the Chair". However, given that it is not possible to utilise others methods in this case, we cannot ignore the statistical analysis carried out above which indicates the importance of the Governor, since, taken in conjunction with qualitative evidence, it points strongly towards the conclusion that the Bank's Governor was potentially important in Bank policy making, but in fact only so if the man in question showed a sufficient grasp of monetary affairs and of the problems faced by the Bank.

4: Conclusions

This chapter has sought to focus attention on the related issues of the Bank of England's links with the financial markets and on the role of the Bank's Governor. Using a combination of empirical investigation and qualitative evidence it has addressed the question of whether the Bank followed a consistent policy towards financial crises in the 1870-1914 period, or whether the actions it took in dealing with the problems it faced were to some extent dependent on the wishes and feelings of the people in charge of the Bank at the relevant times.

The chapter commenced with a discussion of moral suasion, both in a contemporary sense and in relation to its nineteenth century origins. This concept is important in relation to the Bank of England's behaviour in the late nineteenth century, because most of their regulatory actions in this period involved simply making their views known to the markets. The Bank was competing with certain parts of these markets, and it appears that the institutions concerned did not hold the Bank in very high esteem.

Qualitative evidence on this subject confirms the idea that many individuals and institutions were dissatisfied with the Bank's behaviour and policies, especially during the 1890s when concerns about the latter's low levels of income and consequent low dividends were at their peak. Given that this was so, it must have been very difficult

for the Bank to impose any strong discipline on the financial markets: it is not easy to influence opinion in your favour when your own behaviour leaves much to be desired.

The next section of the chapter dealt with work carried out on the importance of the Governor of the Bank of England. Firstly, the ways in which men became Governor were examined, followed by a discussion of nineteenth century views on the role of the Governor. Included in the latter section was an examination of Bagehot's views on the Governor, including his proposals to have a permanent Deputy Governor, which was aimed at introducing some degree of stability into the management of the Bank.

The empirical analysis is discussed in the final section of the chapter. Here the estimation method utilised (that of representing Governors thought to have had greater influence on Bank policy by a dummy variable carrying a non-zero value) and results obtained are set out. In brief, the major conclusion here was that it seems that certain Governors did have a disproportionate effect on Bank of England discount and advance policy, but that this conclusion must be tentative due to the nature of the analysis and the fact that actions taken by the Bank, such as direct rescues, did not affect the demand for discounts and advances and therefore would not show up in this analysis.

Two things can therefore be concluded from this analysis. Firstly, it appears that it must have been very

difficult for the Bank to utilise moral suasion to any great extent in this period, particularly in the late nineteenth century, because of the lack of respect it commanded among the banking community. Secondly, it seems that the Governor of the Bank of England did have some significant impact on Bank policy making at certain points in this period, but that this was only so when the individual concerned was sufficiently able and charismatic to do justice to his position.

One aspect of the role of the Governor that has not been addressed in this study is whether Governors who appear to be more influential were inherently gifted at central banking, or whether external problems which occurred brought out the best in them. If the latter is the case, there are strong arguments suggesting that almost any of the Governors could have been influential had events forced them to act in a decisive manner on important issues. However, testing whether Governors have greatness thrust upon them is not easy. In effect we are questioning whether the causality runs from a particular Governor being capable of solving a particular problem, or from a problem bringing out the best in a particular Governor. This is intrinsically very difficult, and would in fact require a major study in its own right.

CHAPTER NINE

CONCLUSIONS

1: Introduction

This thesis has sought to provide a thorough examination of the behaviour of the Bank of England as a central bank in the 1870-1914 period, concentrating on aspects of its behaviour linked to its role as a Lender of Last Resort. The thesis is historical in emphasis, although no historical treatment of this subject is complete without an extensive examination of the theoretical issues which underlie the development and current position of the Bank of England, in particular as regards its policies towards, and reactions to, financial crises and bank failures.

The established view with respect to the changing nature of the Bank of England's role is that, by the time of the Overend-Gurney crisis in 1866, the Bank had accepted its "duty" to act as a LLR and to aid the financial system in times of need.[1] However, there was no clear policy statement of the Bank's intent, and thus even by this time there was no certainty that it would react in a consistent manner during each individual crisis. This policy statement was never forthcoming. What Thornton had earlier discussed in theoretical terms, became a more established practical proposition as a result both of the publication of Lombard Street in 1873 and of Bagehot's editorials in The Economist. The publication and general acceptance of the arguments contained in Lombard Street were not in themselves enough to make the Bank behave entirely

[1] See Chapter One.

consistently however, as we have seen in this study.

The aim of this concluding chapter is to summarise the historical evidence of changes in the Bank's behaviour, and to then draw general conclusions on the basis of this evidence. With this in mind, we will discuss the evidence on questions posed by the study, which can be divided into three main areas:

(1) The role of the Bank as a Lender of Last Resort and its attitudes to financial crises.

(2) The importance of the Bank's Governor in framing Bank of England policy: to what extent the policies implemented by the Bank were dependent on the Governor of the time.

(3) The pattern of the Bank's discount and advance operations in "normal" times: how the structure of the Bank's customers was changing over the period, and how the various Discount and Advance Committees discharged their responsibilities.

We shall discuss conclusions derived from the historical evidence on each of these questions in turn, before turning to suggestions for future work that fruitfully could be carried out in this area.

2: The Role of the Bank of England as a LLR

This aspect of the Bank's behaviour forms the basis of all other work undertaken in this study. The fundamental question here is whether, in relation to its reactions to bank failures and financial crises, the Bank of England altered its behaviour towards the financial system in the last quarter of the nineteenth century, as a result of its acceptance of its duty to provide the system with liquidity when necessary.

There is no straightforward answer to this question. However, it is possible to say that any change in the behaviour of the Bank took place implicitly rather than explicitly, since as already mentioned there were no great policy statements made in this period. The only time the Bank commented directly on its own behaviour was in the evidence given to the American Monetary Commission in 1910, and even then it gave little away.[2]

Throughout these years the Bank was becoming more conscious of the conflict between its position as a private bank, with profit maximisation a primary aim, and its role as a central bank, charged with the keeping of the country's sole gold reserve. There is no doubt that this conflict of interest existed. It was evident in two, contradictory, ways. Firstly, against all the principles of profit-making banking, it was forced by its role as the country's final source of liquidity, to keep a large

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[2] See section 9 of Chapter Four.

reserve of idle balances, which earned no interest and therefore no income for the Bank. Secondly however, periods of crisis, which necessarily carried with them high interest rates, were extremely profitable for the Bank, in terms of the income it derived from advances and discounts, which during a crisis would be very high.[3] Thus in one way its role as a LLR was very unprofitable for the Bank, and in another very profitable. In general, because of the rarity of crises, it was more unprofitable than profitable.

Other bankers at this time were aware of the conflict of interest between the Bank's dual role, and were keen for it to concentrate on its role as a central bank, leaving aside its profit-making activities, as least those which involved commercial banking.[4] A large amount of evidence on this matter was presented in Chapter Eight, from which it is clear, unsurprisingly in view of the dominant position reached by the Bank by this time, that the commercial banks were very keen to remove this source of

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[3] Clapham (1944, volume II, pp. 440-442), graphs the Bank's income from bills discounted and from short loans and advances, which display peaks in many of the years when Bank Rate was high. We should recognise here however that, as discussed extensively in Chapter Seven, there were several occasions when the volume of bills discounted and/or advances was high, without the existence of a high level of Bank Rate. Several of these can be explained by other events occurring at the time, but for others there is no clear explanation.

[4] The commercial banks were not in competition with the Bank of England for the latter's governmental business, which was in any case not highly profitable. One of the other major functions of the Bank of England, not discussed in this thesis, is its duties as the banker to the government.

competition from their markets.[5]

The concern over profitability and its status as a private bank did not stop the Bank behaving like a central bank however. The pattern of intervention in the affairs of financial institutions experiencing problems which seemed to be, in the view of contemporaries at least, serious enough to threaten financial stability, can perhaps be best seen in the light of the recent illiquidity-insolvency debate, which was discussed extensively in Chapter Two. The Bank's decision whether or not to intervene seems to have been made on the basis that it intervened directly only when there was a "lock up" of funds involved rather than the insolvency of the institution concerned. Thus, since both Barings and the Yorkshire Penny Bank (YPB) were involved in a situation of illiquidity rather than insolvency, the Bank was involved in setting up guarantee funds for both of them.[6] However, when the City of Glasgow Bank failed in 1878, the Bank was willing to intervene only

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[5] One of the reasons explaining the strength of bankers' feelings was presumably the powerful position the Bank of England was in: its name was known throughout the country, and thus it could presumably go into any (geographical) area with its initial reputation already established, before it even started to push for new business.

[6] We do not know whether the illiquidity-insolvency debate was ever discussed, or even identified, but the Bank's actions in this period certainly seem to provide examples of the main issues involved in this debate. However, the feeling during both these rescues seems to have been that the Bank of England would only have considered forming guarantee funds of the problem was one of illiquidity rather than insolvency; see for example the comment made in The Times of 25th November 1890, which is reproduced in section 5 of Chapter Four.

to the extent of providing extra liquidity to the firms affected by the failure, and so the Clydesdale Bank and the Yorkshire Banking Co. were both granted discount facilities.[7] In addition, Murrietas were refused aid after the Baring crisis of 1890, when the securities they were able to provide were not acceptable.[8]

In the light of the illiquidity-insolvency debate, the question which then needs to be addressed however, which is as relevant these days as it was in the late nineteenth century, is how the Bank judged whether an institution was illiquid or insolvent. As discussed in an earlier chapter, Barings were said to be illiquid, but it took over four years for a surplus of assets over liabilities to materialise. Many institutions initially regarded as being insolvent would be able to recover their position if they were given several years in which to do so. This issue comes down to opinions on the current worth of various assets, or rather, their likely value when liquidated, and as such is based to a large extent on judgments. Given this is the case, it is difficult to have a coherent and consistent policy towards bank failures, unless the policy is simply to judge each failure in terms of the institution's net worth, although, as detailed in Chapter One and again above, it is extremely difficult to make this judgement accurately.

In some ways, the debate about insolvency versus

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[7] See Section 2.6 of Chapter Seven.

[8] See section 2.12 of Chapter Seven.

illiquidity is irrelevant if the view taken of the role of the LLR is that it should aid the system in times of need, by discounting and lending on "good" paper. If this is the view taken, then aid would never be given directly to institutions which were experiencing problems, unless they could produce securities which the LLR was willing to accept as collateral for a loan or were eligible for discount. In this sense the troubled institution would be treated in exactly the same way as any other institution which came to the LLR.

There are obvious problems with this approach, as detailed in Chapter Two, one of the most important of which is the issue of depositor protection. In terms of the Bank of England's nineteenth century interventions, only in the case of the Yorkshire Penny Bank was any mention made of the losses depositors would face if the bank was to close.[9] The YPB however was in essence a savings bank, its clientele being mainly small depositors, and thus its failure would hit those least able to cope.

In addition to evidence on those Bank of England last resort interventions discussed above, the analysis in Chapters Six and Seven also identified other moments when the Bank was pumping liquidity into the financial system, often in fairly large amounts. Some of these moments have obvious explanations, and others do not, but they all form interesting examples of the Bank of England acting as a

[9] Since Barings was a merchant bank, this was not an issue, and thus the argument of depositor protection cannot be utilised in this case.

true LLR: increasing its liquidity injections into the financial system. In some of these cases,[10] the Bank acted as a LLR in the "Bagehotian" sense: increasing Bank Rate, in order that the liquidity it provided would be at a higher cost than that available elsewhere, but at the same time discounting and lending freely. In short, it was putting into action Bagehot's first rule of "lend freely at a high rate".

Thus by 1914 the Bank of England appeared to have arrived at a policy towards financial crises that had two components: in the case of a general drain of cash from the system, it would provide an injection of liquidity by stepping up its discount and advance operations, but if the survival of a major participant in the financial world was at risk, it would, if the troubled institution could show itself to be solvent, take on the organisation of a bail-out operation.[11] In this sense the Bank appeared to have learned from its experience (and mistakes) of the previous century, and was successful in preventing serious crises from arising. This was in marked contrast to previous eighteenth and nineteenth century experience, when financial crises were commonplace. What remains to be decided is to what extent this policy towards financial

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[10] For example, 1870, 1873, 1899, 1903, 1906, 1913 and especially in 1907, when the Bank of England managed to keep under control a situation which could very easily have developed into a system-wide crisis. See Chapter Seven for further discussion of all these points.

[11] In these two ways the behaviour of the Bank has not changed very much since 1914; see for example, the Bank of England's actions during the 1974 Secondary Banking crisis.

crises was consistent: how much the chosen policy route was dependent on the personalities which were around at the time problems arose.

This conclusion does not overturn the existing literature on the role of the Bank of England as a LLR in this period. As discussed in Chapter One, the established view is that the Bank had accepted its role in this sphere by the early 1870s.[12] However, much of the literature does not concentrate explicitly on the Bank's function as a LLR, but rather treats this as only one aspect of its overall role. This study has extended the existing view, in concentrating more specifically on the evolution of the Bank's last resort activities, and providing greater detail as to how these were carried out and which institutions gained by them.

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[12] Chapter One, section 3.

3: The Importance of the Governor and Moral Suasion

How much influence did the Governor of the Bank of England bring to bear on Bank policy? The importance of this issue lies in the suggestion that if it can be shown that certain Governors had a disproportionate effect on Bank policy making, this would indicate that the Bank could have had no coherent policy towards financial crises in particular, and towards the financial system in general, during this period.

This subject was discussed in Chapter Eight, and it was found that there is evidence that suggests that, during the 1870-1914 period at least, the Governor of the Bank of England did have some significant impact on Bank policy formation. During this period, there were certain "strong" Governors, such as Lidderdale, who were innovative, hard-working, and keen to implement new policies. However, there were also others who at best left no mark on the Bank, and at worst, in the eyes of contemporaries at least, were rather inept in their handling not just of the affairs of the Bank of England, but also in their involvement with the institutions by whom they were employed.[13]

In Chapter Eight the importance of the Governor was illustrated through the use of regression analysis which included dummy variables representing the Bank Governors,

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[13] See, for example, the comments made by Tritton, of Brightwen & Co., about the Governors in the first years of the twentieth century, which is reproduced in section 3 of Chapter Eight.

seasonality and financial crises. Somewhat surprisingly, in view of the length of the data series and other associated problems, the coefficient on the dummy variable which represented the Governor was significant, at least in the regression for discounts and advances on securities.[14] This result implies that the Governor did have an impact on Bank policy making, but only if the individual in the "Chair" was sufficiently capable to make decisions which would stand up in the long run, such as occurred with Lidderdale, who, as previously mentioned, provided all the initiative for the formation of the Barings Guarantee, and later with Holden, who provided the leadership in the later case of the YPB. Holden of course was not a Governor, but his views carried sufficient weight in financial circles for the Governor at the time to listen to and take action on the basis of what he said.

It is of course possible that, had Lidderdale not come up with the idea of forming the Guarantee fund that enabled Barings to recover from their difficulties, the City of London would today be without one of its more famous names. As argued in Chapter Eight, this would not necessarily have been a bad thing.

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[14] The coefficient on advances on securities was not significant. See Tables 8.2 - 8.4 for a full list of the results.

4: The Changing Pattern of the Bank's Discount and Advance Operations

Because of the nature of data collection and other work carried out at the Bank of England Archives, much information was acquired on changes in the pattern of the Bank's discount and advance behaviour as a by-product of the primary analysis. However, once obtained, it was worth using this information in attempt to answer various questions on the Bank's activities. This has been achieved through examining long term fluctuations in the Daily Discount data. In addition, there has been a brief study of the various Discount and Advance Committees which were in existence during this period, in order to examine the regulatory environment in which the Bank of England operated, and to see if these Committees had any regulatory impact.

The Bank commenced the period with a fairly healthy private clientele, although business with them had been falling over the previous few years. However, over the following decades, the number of customers receiving discounts at the Bank fell enormously, from 424 in 1870 to 197 in 1914, a fall of over 50 per cent. This occurred despite the fact that for much of the period the Bank was struggling for income, at times competing with commercial banks for business, especially outside London. This situation came about as its role as a central bank increased, and as the commercial banks began to offer customers attractive facilities, which the Bank of England

were unable to match.

The main trend in the Banks' discount and advance operations is the decline in importance and then subsequent revitalisation of the volume of bills discounted, which, aside for odd peaks, was fairly constant up until the turn of the century, before increasing, to such an extent that in 1914 by far the greatest part of business carried out at the Bank involved the discounting of bills, rather than the granting of advances secured on bills or securities.[15] This is again a reflection of the decline of the Bank's private custom, since the volume of discounts increases quickly again when any tension developed in the markets.

A study of the Committees on Advances and Discounts operative during the 1870-1914 period revealed that they could play little or no regulatory role. Since their meetings were fairly infrequent, they were not available to give immediate advice on particular issues, and thus their views in day-to-day issues were not influential. However, one role the Committees did fulfil over the longer term was to note and advise on any changes to the regulations of the Discount Office which would improve its functioning. In this sense they had an impact on future discount policy.

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[15] There is a specific cause of this increase in business on discounts in 1914, as was detailed in an earlier chapter.

5: Summary and Suggestions for Future Work

This thesis has sought to address questions relating to the three different aspects of the Bank of England's behaviour, as outlined above, in the 1870-1914 period.

The most important aspect of the Bank's behaviour studied is in its attitudes towards financial crises. On this subject it seems that the Bank's policies did not undergo a major change in the last part of the nineteenth century; rather, that the Bank had taken on most of the characteristics now associated with a lender of last resort, and acted as such in several later moments when activity in the financial markets increased. The Bank did not however allow this increase in activity to reach breaking point. In addition, certain other rescues of financial institutions were undertaken by the Bank of England, in circumstances which were sometimes rather dubious, but where the institutions concerned were suffering from a liquidity rather than insolvency problem, as then defined.

One area where future work would be very appropriate is in a greater statistical use of the data set on Daily Discounts.[16] Perhaps, as estimation techniques improve, and computer packages become even more advanced, a more sophisticated econometric evaluation of this data set can be made.

Another area where additional work is needed concerns

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[16] Included here in Appendices A and B.

the role of the Bank's Governor. As earlier mentioned, this study has left some questions unanswered in this sphere, in particular concerning the issue of causality between a Governor's term of office and extra-ordinary events occurring. Addressing these questions in a comprehensive manner would in effect require a major study in its own right, but this would be likely to reveal some extremely interesting insights into relationships between personalities and institutions.

APPENDIX A

DAILY DISCOUNT DATA: 1870-1893

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1870	1	32354	13	3.0	4983	1	875	3
	2	28550	12	3.0	14300	1	1018	2
	3	35332	13	3.0	70783	2	687	2
	4	74467	16	3.0	225133	5	563	1
	5	81933	19	3.0	77267	2	1311	2
	6	35017	15	3.0	11717	1	1257	3
	7	47133	14	3.0	13367	1	936	2
	8	65600	16	3.0	192800	6	1020	3
	9	158992	26	3.0	83450	5	2784	3
	10	70850	19	3.0	28400	2	887	2
	11	73383	20	3.0	58550	2	260	1
	12	55150	16	3.0	159683	5	2833	3
	13	73750	15	3.0	44917	1	230	1
	14	31567	14	3.0	20083	2	920	1
	15	67767	14	3.0	114450	4	691	1
	16	51530	18	4.0	51740	3	1691	2
	17	47133	11	3.0	194158	6	833	1
	18	59958	17	3.0	43083	3	1160	2
	19	53283	18	3.0	61017	3	1250	2
	20	46695	17	3.0	48883	3	274	1
	21	54317	14	3.0	27733	3	634	1
	22	37150	12	3.0	102833	4	143	1
	23	56500	15	3.0	71333	3	1033	2
	24	78833	17	3.0	255867	5	746	2
	25	58283	16	3.0	44017	2	613	1
	26	99308	15	3.0	486842	10	1031	2
	27	47417	13	3.0	9583	1	1412	2
	28	54117	18	3.0	48908	3	786	3
	29	289612	33	3.0	431483	5	4090	4
	30	302077	38	5.0	118108	6	4460	4
	31	84998	22	6.0	62450	3	4658	3
	32	41320	12	6.0	40650	2	3884	5
	33	53050	11	5.0	18767	2	1997	2
	34	41350	10	4.0	29558	2	5673	3
	35	27700	10	4.0	21300	2	1075	2
	36	32167	12	4.0	34000	2	1390	2
	37	35600	12	3.0	36617	3	1166	2
	38	32283	9	3.0	26433	2	2062	2
	39	34567	12	3.0	94500	3	878	2
	40	50467	14	3.0	21500	2	2228	3
	41	36500	13	3.0	21000	2	2302	2
	42	75667	13	3.0	11533	1	276	1
	43	71367	17	3.0	51950	3	1470	3
	44	61817	21	3.0	52017	3	397	2
	45	27783	11	3.0	18458	2	721	1
	46	30673	13	3.0	30083	2	3398	3
	47	32650	12	3.0	13567	1	924	2
	48	38067	13	3.0	17817	1	3203	3
	49	19083	10	3.0	23017	2	1069	2
	50	38867	13	3.0	56967	4	3536	3
	51	27367	11	3.0	82167	4	1478	2
	52	67020	15	3.0	448080	10	1532	2

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1871	1	27983	10	3.0	3917	1	1923	1
	2	25357	8	3.0	13367	1	867	2
	3	24667	11	3.0	8600	1	917	2
	4	39667	11	3.0	12167	1	1085	2
	5	172933	24	3.0	45417	2	2635	4
	6	68917	16	3.0	67883	3	3522	3
	7	180850	24	3.0	216533	7	3372	3
	8	206467	28	3.0	127900	6	7933	5
	9	383833	36	3.0	222483	7	9105	7
	10	70950	22	3.0	87833	4	9667	5
	11	58650	14	3.0	76000	4	1998	2
	12	39700	13	3.0	19767	2	473	2
	13	21257	8	3.0	132217	4	617	2
	14	30140	15	3.0	24600	3	1482	2
	15	20183	10	3.0	45550	3	3597	2
	16	48050	13	3.0	51333	3	1080	2
	17	38867	10	3.0	98325	4	623	1
	18	47633	14	3.0	14733	2	967	3
	19	75897	12	3.0	21400	1	1302	2
	20	32400	11	3.0	36100	2	2030	2
	21	51117	11	3.0	33733	3	2353	2
	22	39980	12	3.0	69720	3	2152	2
	23	34500	12	3.0	32267	2	717	2
	24	92500	17	2.0	80167	3	267	2
	25	37917	12	2.0	70117	3	1667	2
	26	127102	14	2.0	583467	12	863	2
	27	40700	13	2.0	9808	1	115	1
	28	44900	15	2.0	34050	2	10957	1
	29	36050	12	2.0	26983	2	1175	2
	30	30650	11	2.0	33050	3	942	1
	31	28350	11	2.0	13967	2	95	1
	32	35980	12	2.0	32100	2	1304	2
	33	37850	11	2.0	11917	2	507	2
	34	27350	11	2.0	15425	1	2315	2
	35	48567	10	2.0	33150	1	1798	2
	36	35167	11	2.0	6000	1	685	2
	37	32150	13	2.0	54483	2	5813	3
	38	95817	18	3.0	366800	8	683	2
	39	266933	26	4.0	343250	8	4628	4
	40	61833	15	4.0	27367	2	2115	2
	41	53717	15	5.0	12700	2	10642	3
	42	39017	12	5.0	6433	1	2870	3
	43	9367	6	5.0	5433	1	2380	1
	44	24883	10	5.0	5258	1	62	1
	45	20040	9	5.0	9600	2	324	2
	46	19200	9	5.0	7571	2	559	1
	47	30217	9	4.0	4783	1	88	1
	48	27317	10	4.0	16583	1	1387	2
	49	29533	11	4.0	13233	1	1168	2
	50	33150	11	3.0	7033	1	707	2
	51	27767	12	3.0	143783	5	655	2
	52	74475	19	3.0	847625	12	3793	3

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1872	1	31633	10	3.0	13475	1	325	1
	2	24833	10	3.0	7667	1	1117	2
	3	37617	10	3.0	12383	1	612	1
	4	22767	10	3.0	5633	1	920	1
	5	56517	12	3.0	118683	3	633	2
	6	67283	17	3.0	130858	4	3608	3
	7	228025	31	5.0	204900	8	11076	5
	8	33000	13	3.0	10183	1	933	1
	9	51040	14	3.0	248710	8	1746	2
	10	57117	13	3.0	38017	2	3185	3
	11	55733	15	3.0	218067	5	3108	3
	12	89860	10	3.0	37860	2	1910	2
	13	65920	14	3.0	364740	9	3258	1
	14	58860	16	3.0	107240	3	5724	5
	15	367517	30	4.0	155533	4	10862	6
	16	30433	11	4.0	1017	1	557	1
	17	26717	8	4.0	54633	2	1052	1
	18	63700	11	4.0	49017	3	257	2
	19	275633	23	5.0	108967	3	4650	4
	20	27150	11	5.0	3417	1	1170	2
	21	30720	10	5.0	1090	1	1210	1
	22	15217	8	5.0	35817	1	732	2
	23	29967	12	4.0	7058	1	497	2
	24	34117	13	4.0	45508	1	1507	2
	25	32633	12	3.0	63482	2	395	1
	26	31767	9	3.0	458700	9	453	1
	27	29883	12	3.0	31450	2	392	2
	28	43250	10	3.0	48775	2	2388	2
	29	220667	19	3.0	58133	5	16608	5
	30	328917	20	4.0	171683	5	7957	2
	31	190317	19	4.0	309450	7	9090	4
	32	67840	12	4.0	36180	1	2014	3
	33	38233	12	4.0	8483	1	1338	2
	34	15400	8	4.0	6583	1	1137	2
	35	13617	7	4.0	54317	2	1062	2
	36	38617	11	4.0	148517	4	1453	3
	37	168650	20	3.0	63617	3	9687	4
	38	222700	21	4.0	164633	3	84928	6
	39	196400	15	4.0	44217	2	5397	3
	40	59867	12	5.0	36000	1	1015	1
	41	48983	13	6.0	35933	2	1540	2
	42	32878	10	6.0	15733	1	247	2
	43	69367	11	6.0	132817	4	1188	3
	44	25600	10	6.0	10267	2	322	1
	45	128783	17	6.0	94467	2	27962	3
	46	177200	21	7.0	168367	4	16808	4
	47	31717	11	7.0	57883	2	3035	2
	48	29100	11	7.0	22000	1	480	2
	49	38033	12	6.0	19583	1	1883	3
	50	39267	12	6.0	60883	2	1250	2
	51	55883	14	5.0	50650	2	2067	4
	52	72967	14	5.0	435233	8	1550	2

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1873	1	44500	10	5.0	17675	2	1025	2
	2	50367	11	5.0	3483	1	3067	3
	3	30617	11	5.0	58217	3	4817	5
	4	26767	9	4.0	12350	1	3900	3
	5	105717	17	4.0	98050	3	3267	4
	6	224733	22	4.0	152450	4	4300	5
	7	348333	29	4.0	83867	4	13950	7
	8	67350	15	4.0	26283	1	4017	2
	9	135967	16	4.0	100100	2	2117	2
	10	88650	18	4.0	79500	2	11550	5
	11	185867	19	4.0	169633	6	7150	3
	12	136033	17	4.0	24667	1	6867	4
	13	283383	22	4.0	124133	4	40883	5
	14	229417	21	4.0	201150	4	25300	5
	15	138440	21	4.0	32100	2	21700	4
	16	135620	19	4.0	4760	1	5340	3
	17	129367	17	4.0	1550	1	5417	3
	18	39283	10	4.0	1650	1	467	2
	19	219583	19	4.0	73783	3	7233	2
	20	170050	23	5.0	85350	3	25467	5
	21	22133	10	6.0	15033	1	803	2
	22	24767	8	6.0	171833	3	217	1
	23	49140	13	7.0	192960	4	2248	1
	24	30983	11	7.0	78700	2	133	1
	25	38133	11	6.0	284800	5	1092	2
	26	72750	11	6.0	133167	3	0	0
	27	85600	12	6.0	218367	4	388	1
	28	39133	11	6.0	37767	1	467	2
	29	67467	12	5.0	3250	1	588	2
	30	29683	11	4.0	7333	1	1283	2
	31	36417	12	4.0	7100	1	917	2
	32	51000	14	4.0	7120	1	920	2
	33	41700	14	4.0	29850	1	2080	2
	34	57717	12	3.0	4017	1	1883	2
	35	230650	22	3.0	45633	1	35983	4
	36	272267	31	3.0	41900	2	34700	7
	37	152217	22	3.0	10883	1	14833	3
	38	62569	13	3.0	15917	2	2950	3
	39	99333	15	4.0	42900	1	1933	2
	40	433952	69	5.0	204317	8	54917	11
	41	16917	7	5.0	4333	1	395	1
	42	36767	12	6.0	9533	2	127	1
	43	17850	8	7.0	3917	1	0	0
	44	53817	12	7.0	69283	2	6733	3
	45	133017	14	8.0	140400	4	22200	3
	46	78683	15	9.0	180417	4	13300	3
	47	15533	7	9.0	7817	1	517	2
	48	14850	8	7.0	4967	1	2005	1
	49	45383	13	6.0	52617	2	967	2
	50	36767	12	5.0	13800	1	900	2
	51	45033	12	5.0	42700	1	1440	2
	52	57557	13	5.0	380271	7	967	2

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1874	1	30067	11	5.0	6533	1	2300	2
	2	20050	9	4.0	9100	1	817	1
	3	32167	11	4.0	4983	1	3633	2
	4	34017	10	4.0	3367	1	7733	2
	5	28900	11	4.0	7583	1	1155	1
	6	43167	13	4.0	2633	1	3733	2
	7	61100	12	4.0	39233	1	1067	2
	8	30983	11	4.0	41883	1	2407	1
	9	42450	12	4.0	45817	2	1283	2
	10	39867	13	4.0	25000	1	2783	2
	11	58100	12	4.0	36517	1	2633	2
	12	82917	17	4.0	22917	1	2950	3
	13	92100	14	4.0	79833	2	3667	2
	14	77840	17	4.0	121060	2	6380	3
	15	33220	10	4.0	20940	1	1000	1
	16	31783	12	4.0	2950	1	533	1
	17	39817	9	4.0	19717	1	1350	1
	18	64600	13	4.0	199400	4	3717	2
	19	33333	10	4.0	38617	2	790	1
	20	29217	11	4.0	34833	1	3200	3
	21	30617	10	4.0	11217	1	1433	2
	22	19760	9	4.0	31340	1	304	1
	23	28150	11	3.0	22950	1	867	1
	24	28067	10	3.0	10317	1	3922	1
	25	33467	12	3.0	15183	1	227	1
	26	29917	13	3.0	140217	3	2467	2
	27	44750	13	3.0	175717	3	1000	2
	28	14950	7	3.0	16383	1	1267	1
	29	27717	12	3.0	9050	1	183	1
	30	40833	11	3.0	1867	1	3267	2
	31	36967	13	3.0	36817	1	672	1
	32	160160	17	4.0	15680	1	5500	3
	33	25817	11	4.0	5567	1	1850	2
	34	20750	10	4.0	583	1	908	2
	35	14917	8	3.0	5283	1	1733	2
	36	23000	9	3.0	5317	1	362	1
	37	28417	11	3.0	12650	1	1067	2
	38	24117	10	3.0	7717	1	543	2
	39	40383	9	3.0	0	0	700	1
	40	112017	19	3.0	108217	4	2567	2
	41	161467	20	3.0	47283	2	7635	3
	42	29150	10	4.0	13283	1	1350	1
	43	45217	12	4.0	8167	1	2700	2
	44	21183	7	3.0	6217	1	1867	2
	45	12967	8	4.0	4675	1	2883	2
	46	16767	8	4.0	27717	1	1283	1
	47	19267	8	5.0	0	0	100	1
	48	14467	6	5.0	5800	1	1850	1
	49	19417	8	6.0	24100	1	462	1
	50	12433	7	6.0	5250	1	223	1
	51	30933	9	6.0	50667	1	483	2
	52	38925	11	6.0	283163	4	873	2

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1875	1	34950	7	6.0	10000	1	350	1
	2	20450	9	6.0	4017	1	883	1
	3	19400	8	5.0	8633	1	607	1
	4	13750	8	4.0	9900	1	185	1
	5	21117	9	4.0	8133	1	150	1
	6	122683	18	3.0	44467	1	2383	3
	7	26883	10	3.0	24333	1	1483	2
	8	98600	14	3.0	71067	2	933	2
	9	13783	8	4.0	6250	1	53	1
	10	46483	12	4.0	59167	2	750	2
	11	64250	12	4.0	92767	3	717	1
	12	32017	11	4.0	13133	1	2383	2
	13	25280	9	4.0	15740	1	470	1
	14	26840	12	4.0	72000	1	5480	5
	15	26950	8	4.0	5267	1	350	1
	16	22400	11	4.0	11217	1	733	1
	17	15667	6	4.0	1000	1	350	1
	18	19167	7	4.0	1850	1	660	1
	19	18883	9	4.0	67600	2	1058	2
	20	37583	12	4.0	64067	2	2317	1
	21	39120	9	4.0	74560	2	1420	2
	22	43533	8	4.0	69550	2	517	1
	23	77383	17	4.0	126317	3	5517	2
	24	35483	11	4.0	12367	1	633	2
	25	80650	16	4.0	127517	4	4583	3
	26	118833	19	4.0	57683	2	5203	4
	27	115917	18	4.0	174067	4	4700	3
	28	34033	10	3.0	13700	1	4017	2
	29	38500	13	3.0	25800	2	2567	3
	30	16017	10	3.0	4667	1	1167	1
	31	34700	11	3.0	13383	2	1117	1
	32	33200	12	3.0	10800	2	1534	2
	33	47867	8	2.0	8933	1	2750	2
	34	27467	11	2.0	1617	1	1333	1
	35	40217	12	2.0	26650	1	1250	2
	36	26317	10	2.0	7333	1	1883	2
	37	21617	10	2.0	17433	1	207	1
	38	30883	10	2.0	3533	1	817	2
	39	72600	13	2.0	19300	1	945	1
	40	123967	20	2.0	79550	3	2567	3
	41	117133	18	2.0	54517	1	6933	5
	42	155217	20	3.0	37617	2	9967	4
	43	36517	11	4.0	6533	1	1300	1
	44	14217	6	4.0	5700	1	5533	1
	45	20100	8	4.0	4417	1	1267	1
	46	21983	7	4.0	1800	1	833	1
	47	22750	9	4.0	9250	1	297	1
	48	23817	9	3.0	5667	1	383	1
	49	23633	11	3.0	21483	1	668	1
	50	26067	8	3.0	2433	1	333	1
	51	23900	10	3.0	22150	1	800	1
	52	55167	12	3.0	209011	4	1822	2

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1876	1	29250	9	5.0	10500	1	333	1
	2	18133	7	5.0	7817	1	1450	1
	3	18017	8	5.0	7700	1	1567	1
	4	8783	6	5.0	11033	1	0	0
	5	43817	7	4.0	3333	1	627	1
	6	35833	9	4.0	12817	1	667	2
	7	36233	9	4.0	3633	1	60	1
	8	29817	9	4.0	35000	1	150	1
	9	23950	10	4.0	38400	1	702	1
	10	32250	10	4.0	38450	1	767	2
	11	30250	9	4.0	63583	2	535	1
	12	23300	9	4.0	27150	1	52	1
	13	28617	8	4.0	67117	1	2233	1
	14	18617	8	3.0	11200	1	800	1
	15	25560	10	3.0	8300	1	286	1
	16	24320	9	2.0	12880	1	200	1
	17	21433	9	2.0	10750	1	1517	1
	18	22833	9	2.0	12500	2	1000	1
	19	12250	7	2.0	8067	1	550	2
	20	21583	8	2.0	8233	1	1167	2
	21	13633	9	2.0	4367	1	2450	2
	22	41800	10	2.0	16617	2	763	2
	23	17760	8	2.0	20200	1	158	1
	24	21950	10	2.0	8883	1	633	2
	25	12000	6	2.0	3467	1	375	1
	26	17200	9	2.0	21200	1	767	1
	27	22717	8	2.0	9267	1	1000	2
	28	19700	7	2.0	4150	1	1683	1
	29	83450	7	2.0	2233	1	717	1
	30	10900	7	2.0	6017	1	0	0
	31	26283	10	2.0	2850	1	1760	1
	32	19560	7	2.0	4880	1	0	0
	33	21900	8	2.0	4767	1	1400	2
	34	10950	6	2.0	2267	1	608	1
	35	20933	8	2.0	5200	1	567	1
	36	39450	8	2.0	3333	1	795	1
	37	24450	9	2.0	8333	2	2400	2
	38	11500	6	2.0	500	1	1185	2
	39	20250	8	2.0	4250	1	343	1
	40	13667	7	2.0	10817	1	1683	1
	41	17183	5	2.0	8317	1	277	1
	42	15083	8	2.0	767	1	165	1
	43	16350	9	2.0	3400	1	1195	1
	44	20583	8	2.0	2650	1	983	1
	45	19533	6	2.0	12300	1	750	1
	46	15350	6	2.0	5417	1	1350	1
	47	16567	8	2.0	2167	1	2718	2
	48	13000	7	2.0	6950	1	158	1
	49	16950	7	2.0	5350	1	1783	2
	50	30317	10	2.0	2642	1	1250	2
	51	17967	9	2.0	24600	1	2240	2
	52	37350	11	2.0	244900	4	1040	2

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1877	1	19317	8	2.0	14267	1	967	2
	2	24200	6	2.0	2767	1	1050	1
	3	15917	7	2.0	5583	1	533	1
	4	18283	7	2.0	5667	1	367	1
	5	21567	7	2.0	8117	1	433	1
	6	21033	7	2.0	2683	1	225	1
	7	18717	10	2.0	4267	1	345	1
	8	20917	8	2.0	7700	1	583	1
	9	35967	11	2.0	7417	1	217	1
	10	17802	10	2.0	18000	1	683	2
	11	54300	15	2.0	31383	2	1992	2
	12	24333	7	2.0	11267	1	1137	2
	13	66740	9	2.0	293420	6	1280	2
	14	30200	10	2.0	17180	1	740	2
	15	17783	7	2.0	31850	2	0	0
	16	13917	8	2.0	467	1	280	1
	17	20333	7	2.0	9817	1	1173	1
	18	59350	13	3.0	10833	1	21850	4
	19	17517	7	3.0	2967	1	633	2
	20	25467	8	3.0	5917	1	613	2
	21	24600	8	3.0	10150	1	3420	1
	22	15333	9	3.0	12167	1	0	0
	23	20883	9	3.0	3017	1	3417	1
	24	16117	9	3.0	15967	1	883	1
	25	15367	5	3.0	2833	1	0	0
	26	21350	7	3.0	90917	2	0	0
	27	14083	9	3.0	1817	1	2197	2
	28	16350	7	2.0	3733	1	3228	2
	29	15317	8	2.0	2333	1	233	1
	30	17167	7	2.0	3400	1	2033	1
	31	32600	11	2.0	3767	1	613	1
	32	15660	7	2.0	7920	1	188	1
	33	42350	10	2.0	5467	1	767	1
	34	29783	8	2.0	3417	1	1145	1
	35	75467	8	3.0	4150	1	43570	3
	36	19383	7	3.0	917	1	550	2
	37	55417	11	3.0	31800	1	605	1
	38	12417	7	3.0	8033	1	1200	1
	39	20900	8	3.0	1950	1	250	1
	40	24700	11	4.0	6050	1	798	1
	41	36850	10	5.0	4233	1	700	2
	42	15067	7	5.0	2967	1	217	1
	43	17367	6	5.0	233	1	715	1
	44	9283	4	5.0	9850	1	0	0
	45	19233	7	5.0	7800	1	443	1
	46	7133	5	5.0	0	0	217	1
	47	11483	6	5.0	9000	1	917	2
	48	18167	6	5.0	7700	1	2533	1
	49	19733	8	4.0	11033	1	1138	1
	50	19967	9	4.0	5083	1	1583	1
	51	20450	10	4.0	11900	1	1188	1
	52	21560	9	4.0	46760	2	2926	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1878	1	23540	7	4.0	7980	1	248	1
	2	10600	5	4.0	1783	1	767	1
	3	18533	8	3.0	12733	1	1750	2
	4	11850	6	3.0	4417	1	1250	1
	5	20483	9	3.0	1017	1	0	0
	6	18283	6	2.0	0	0	900	2
	7	33417	9	2.0	15500	1	833	2
	8	47133	7	2.0	14183	1	730	1
	9	104183	14	2.0	178933	4	3117	3
	10	44100	10	2.0	62083	1	1695	2
	11	153050	18	2.0	154150	4	24783	4
	12	52950	11	2.0	55533	2	833	1
	13	29133	7	3.0	5333	1	4217	2
	14	20833	9	3.0	30783	1	1833	3
	15	6350	5	3.0	1917	1	2257	1
	16	20480	8	3.0	3600	1	1520	2
	17	12000	7	3.0	64700	2	874	1
	18	11283	7	3.0	52350	2	683	1
	19	42367	7	3.0	18333	1	950	1
	20	23600	9	3.0	1500	1	433	1
	21	7750	5	3.0	6517	1	1777	1
	22	15750	5	3.0	0	0	267	1
	23	12683	5	3.0	3183	1	200	1
	24	24720	8	3.0	20220	1	12856	1
	25	19567	9	3.0	37433	1	5983	1
	26	50167	7	3.0	191333	3	983	1
	27	32550	8	3.0	14717	1	5033	1
	28	8717	4	4.0	3333	1	1760	1
	29	12617	7	4.0	14717	1	2222	1
	30	11267	7	4.0	0	0	300	1
	31	27517	9	4.0	59483	2	857	1
	32	86300	13	4.0	43300	2	12360	3
	33	50483	9	5.0	34467	1	1893	1
	34	9850	6	5.0	2717	1	300	1
	35	14317	5	5.0	80250	2	1250	1
	36	19100	8	5.0	52500	1	3473	1
	37	38333	6	5.0	52733	2	217	1
	38	11050	6	5.0	21083	1	863	1
	39	13035	5	5.0	69583	2	2833	1
	40	12677	8	5.0	245917	5	28133	1
	41	60900	13	5.0	114750	3	3023	4
	42	122117	16	6.0	101067	3	25033	3
	43	63733	12	6.0	91850	2	4457	2
	44	28533	7	6.0	11917	1	1183	1
	45	66733	6	6.0	6550	1	1267	2
	46	12517	7	6.0	2417	1	1067	2
	47	15883	7	5.0	6967	1	2350	2
	48	22033	8	5.0	8133	1	967	1
	49	21383	10	5.0	12567	1	1567	2
	50	236617	15	5.0	87517	2	3867	2
	51	229933	20	5.0	160000	4	27500	3
	52	157950	18	5.0	54867	2	57033	5

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1879	1	464850	8	5.0	21250	1	535	2
	2	44700	7	5.0	5083	1	1217	1
	3	21333	7	4.0	9000	1	2367	1
	4	9433	5	4.0	0	0	83	1
	5	11050	6	3.0	10433	1	975	2
	6	28400	10	3.0	18467	1	895	2
	7	49200	12	3.0	23683	1	1158	1
	8	24867	9	3.0	38350	1	757	2
	9	32433	8	3.0	23667	1	520	1
	10	17717	9	3.0	3917	1	983	2
	11	36217	9	3.0	31533	1	2083	2
	12	25750	9	2.0	9417	1	187	1
	13	19133	8	2.0	26633	1	867	2
	14	13017	7	2.0	13133	1	2250	2
	15	21380	11	2.0	1840	1	0	0
	16	33800	10	2.0	4620	1	2840	1
	17	8783	6	2.0	1733	1	417	1
	18	44850	7	2.0	0	0	367	1
	19	10017	5	2.0	5017	1	817	2
	20	39700	10	2.0	4883	1	545	2
	21	18617	7	2.0	1400	1	150	1
	22	17483	6	2.0	1033	1	100	1
	23	15420	8	2.0	14640	1	1030	2
	24	31867	9	2.0	31333	2	3200	2
	25	16933	7	2.0	0	0	1050	2
	26	12917	7	2.0	5567	1	612	1
	27	19917	9	2.0	33900	1	895	2
	28	20733	9	2.0	967	1	395	1
	29	18967	9	2.0	6150	1	467	2
	30	8167	5	2.0	8350	1	100	1
	31	8850	9	2.0	0	0	308	1
	32	17717	8	2.0	2083	1	1017	1
	33	13483	7	2.0	4317	1	2183	2
	34	8650	8	2.0	0	0	1750	1
	35	8733	7	2.0	12917	1	400	1
	36	11867	7	2.0	0	0	100	1
	37	15417	6	2.0	8467	1	0	0
	38	8950	5	2.0	2383	1	43	1
	39	14550	7	2.0	1383	1	710	1
	40	17367	8	2.0	5150	1	683	1
	41	20233	8	2.0	1900	1	917	2
	42	14133	7	2.0	5683	1	3167	1
	43	27517	9	2.0	2317	1	333	1
	44	25783	8	2.0	5467	1	233	1
	45	113437	16	3.0	3817	1	1000	2
	46	15900	8	3.0	23350	1	517	1
	47	13367	8	3.0	3917	1	783	1
	48	10850	5	3.0	5000	1	750	1
	49	18300	7	3.0	0	0	138	1
	50	21317	7	3.0	18483	1	383	1
	51	14400	7	3.0	67167	2	172	1
	52	27929	10	3.0	178229	4	1464	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1880	1	22933	9	3.0	8000	1	0	0
	2	13183	8	3.0	1017	1	306	1
	3	13000	8	3.0	3633	1	576	1
	4	28200	8	3.0	4017	1	410	1
	5	12183	7	3.0	0	0	170	1
	6	20767	8	3.0	4084	1	344	1
	7	14517	7	3.0	44550	2	607	1
	8	23967	8	3.0	18167	1	552	1
	9	38067	8	3.0	184383	5	3246	2
	10	41083	9	3.0	101517	2	658	1
	11	91633	13	3.0	118617	3	3127	3
	12	32917	12	3.0	97983	2	173	1
	13	17440	8	3.0	82600	2	424	1
	14	30950	10	3.0	191600	4	85	1
	15	14617	8	3.0	12683	1	593	1
	16	14383	8	3.0	19583	1	648	1
	17	13217	8	3.0	44267	1	249	1
	18	41100	10	3.0	157933	3	928	1
	19	23483	9	3.0	8500	1	240	1
	20	25950	9	3.0	141900	3	173	1
	21	23500	10	3.0	68420	2	586	1
	22	28467	7	3.0	113533	3	745	1
	23	18067	6	3.0	18417	1	1342	1
	24	20500	7	3.0	43717	1	897	1
	25	11800	8	3.0	2267	1	760	1
	26	14933	6	3.0	4667	1	37	1
	27	28750	9	3.0	320967	5	0	0
	28	11783	6	2.0	1267	1	815	1
	29	17700	8	3.0	2117	1	628	1
	30	11900	6	3.0	0	0	410	1
	31	12067	6	3.0	1033	1	1300	1
	32	21400	9	3.0	300	1	784	2
	33	9050	5	3.0	4183	1	285	1
	34	8950	8	3.0	2117	1	660	1
	35	11400	5	3.0	2150	1	52	1
	36	27550	9	3.0	1250	1	378	1
	37	41117	9	3.0	41550	1	610	1
	38	25117	9	3.0	2233	1	670	2
	39	22520	7	3.0	5000	1	716	1
	40	20783	7	3.0	65233	2	1722	1
	41	14033	6	3.0	8833	1	0	0
	42	22400	8	3.0	3167	1	445	1
	43	6850	6	3.0	1050	1	48	1
	44	11000	6	2.0	0	0	443	1
	45	14250	5	2.0	0	0	0	0
	46	10250	6	3.0	9800	1	0	0
	47	16300	7	3.0	83450	2	0	0
	48	7683	4	3.0	0	0	0	0
	49	17317	7	3.0	15500	1	153	1
	50	23667	8	3.0	107933	3	740	1
	51	35650	9	3.0	106283	3	458	1
	52	33289	10	3.0	302922	5	873	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1881	1	15167	6	3.0	27917	1	1533	1
	2	112517	11	3.0	109783	3	683	2
	3	27867	7	4.0	54000	1	733	1
	4	57800	10	4.0	54000	1	1117	1
	5	57833	10	4.0	37083	1	2500	1
	6	57500	13	5.0	88967	2	413	1
	7	11417	7	3.0	2533	1	317	2
	8	16900	6	3.0	47233	1	1067	1
	9	13517	7	3.0	34267	1	443	1
	10	14300	7	3.0	1817	1	550	1
	11	18550	7	3.0	136333	2	160	1
	12	20083	8	3.0	0	0	0	0
	13	16233	6	3.0	270500	4	0	0
	14	8750	6	3.0	5483	1	0	0
	15	17260	9	3.0	97920	2	140	1
	16	15080	8	3.0	0	0	132	1
	17	19433	8	3.0	0	0	0	0
	18	15767	7	2.0	2050	1	170	1
	19	22350	7	2.0	81550	2	0	0
	20	13750	9	3.0	1033	1	183	1
	21	11700	6	2.0	61033	1	183	1
	22	12033	7	3.0	1483	1	422	1
	23	12700	6	3.0	1300	1	240	1
	24	13200	9	3.0	85733	1	90	1
	25	15500	8	3.0	2883	1	123	1
	26	16667	8	3.0	236900	3	967	1
	27	10833	5	3.0	0	0	330	1
	28	12417	6	3.0	2750	1	500	1
	29	11783	7	2.0	2167	1	137	1
	30	9417	6	2.0	0	0	0	0
	31	18500	8	2.0	3580	1	112	1
	32	27667	8	3.0	36283	1	0	0
	33	13417	9	3.0	2250	1	233	1
	34	132800	15	4.0	22217	1	2183	2
	35	28200	8	4.0	50150	1	133	1
	36	17683	7	4.0	1383	1	950	2
	37	7800	5	4.0	1667	1	400	1
	38	6817	5	4.0	0	0	80	1
	39	10900	6	4.0	37800	1	0	0
	40	68200	11	5.0	105650	2	67433	3
	41	10733	6	5.0	1650	1	0	0
	42	13167	6	5.0	1667	1	58	1
	43	10067	7	5.0	0	0	0	0
	44	17050	6	5.0	4467	1	0	0
	45	8683	5	5.0	4167	1	0	0
	46	11333	8	5.0	43967	1	0	0
	47	18117	6	5.0	16667	1	2633	1
	48	15300	8	5.0	192483	3	0	0
	49	14800	7	5.0	47917	2	183	1
	50	10583	6	5.0	93733	2	0	0
	51	19733	7	5.0	118533	2	128	1
	52	18880	9	5.0	399560	6	1480	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1882	1	9667	6	5.0	1600	1	378	1
	2	11417	6	5.0	0	0	0	0
	3	17550	8	5.0	2750	1	97	1
	4	16200	7	5.0	15333	1	433	1
	5	28433	9	6.0	160667	3	1375	2
	6	12733	5	6.0	99283	1	0	0
	7	19017	6	6.0	65200	1	0	0
	8	15683	6	6.0	122833	1	833	1
	9	38267	10	5.0	194867	2	297	1
	10	18800	7	5.0	165867	2	0	0
	11	17983	7	4.0	221350	3	0	0
	12	15883	8	3.0	128167	2	98	1
	13	16917	2	1.0	60000	1	0	0
	14	29880	8	3.0	141420	3	280	1
	15	22960	9	3.0	118400	2	0	0
	16	17150	7	3.0	29933	1	717	1
	17	14450	6	3.0	42383	1	467	1
	18	19333	7	3.0	37917	1	2783	1
	19	29467	7	3.0	3800	1	0	0
	20	30267	8	3.0	3767	1	0	0
	21	3667	4	3.0	38783	1	0	0
	22	11360	7	3.0	0	0	172	1
	23	14883	7	3.0	0	0	183	1
	24	14950	7	3.0	4400	1	293	1
	25	15983	9	3.0	0	0	700	1
	26	13717	7	3.0	334850	4	90	1
	27	13933	8	3.0	2067	1	797	1
	28	14350	5	3.0	5750	1	483	1
	29	12533	7	3.0	0	0	67	1
	30	20200	5	3.0	0	0	467	1
	31	27417	6	3.0	0	0	0	0
	32	14167	5	3.0	3350	1	0	0
	33	14683	8	4.0	3233	1	305	1
	34	16133	6	4.0	5167	1	0	0
	35	11550	4	4.0	0	0	338	1
	36	9683	6	4.0	5467	1	0	0
	37	58183	8	4.0	70083	2	117	1
	38	9817	5	5.0	3617	1	1507	1
	39	11133	5	5.0	40000	1	0	0
	40	24933	7	5.0	13650	1	0	0
	41	8250	4	5.0	2117	1	0	0
	42	9600	6	5.0	0	0	183	1
	43	5850	5	5.0	0	0	0	0
	44	15333	5	5.0	0	0	377	1
	45	7333	3	4.0	2650	1	0	0
	46	13500	6	5.0	6183	1	308	1
	47	6567	4	5.0	0	0	0	0
	48	12683	6	5.0	0	0	233	1
	49	8283	5	5.0	0	0	1700	1
	50	14083	6	5.0	20750	1	358	1
	51	19950	8	5.0	101900	2	1317	2
	52	37675	9	5.0	508025	5	200	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1883	1	8717	6	5.0	1700	1	1013	1
	2	9600	5	5.0	79758	1	0	0
	3	17367	6	5.0	0	0	0	0
	4	8250	4	4.0	1833	1	153	1
	5	13550	6	4.0	2583	1	0	0
	6	11433	6	4.0	61950	1	53	1
	7	30383	8	4.0	4400	1	228	1
	8	29267	7	3.0	52733	1	87	1
	9	40650	8	3.0	48750	1	2158	2
	10	31433	9	3.0	124450	2	433	1
	11	55500	10	3.0	76367	2	65	1
	12	36360	8	3.0	115000	1	0	0
	13	21380	7	3.0	276140	4	82	1
	14	32817	7	3.0	96967	1	583	1
	15	11917	5	3.0	16650	1	240	1
	16	36683	9	3.0	4417	1	2157	1
	17	27348	7	3.0	135233	2	700	1
	18	111117	14	3.0	15500	1	1517	1
	19	183633	16	4.0	53567	2	1300	1
	20	16080	7	4.0	0	0	0	0
	21	8533	5	4.0	967	1	0	0
	22	54967	6	4.0	7667	1	0	0
	23	9817	5	4.0	0	0	583	1
	24	52367	7	4.0	5100	1	283	1
	25	15850	8	4.0	0	0	117	1
	26	17433	7	4.0	170950	3	263	1
	27	13717	6	4.0	2617	1	317	1
	28	22367	5	4.0	14067	1	283	1
	29	37700	9	4.0	2117	1	1455	2
	30	42267	5	4.0	0	0	217	1
	31	18133	8	4.0	0	0	212	1
	32	64380	8	4.0	0	0	106	1
	33	18733	6	4.0	3917	1	272	1
	34	17883	6	4.0	0	0	0	0
	35	29000	5	4.0	0	0	0	0
	36	13317	6	4.0	1583	1	0	0
	37	12550	5	4.0	0	0	0	0
	38	12933	6	4.0	800	1	183	1
	39	12333	6	3.0	633	1	283	1
	40	12350	6	3.0	18867	1	773	1
	41	8950	5	3.0	2750	1	1488	1
	42	18683	6	3.0	0	0	783	1
	43	10300	6	3.0	2250	1	725	1
	44	16450	6	3.0	383	1	1142	1
	45	9367	4	3.0	550	1	883	1
	46	13367	6	3.0	6550	1	0	0
	47	22033	4	3.0	633	1	350	1
	48	12450	6	3.0	2433	1	0	0
	49	17050	7	3.0	9917	1	700	1
	50	20683	5	3.0	1833	1	0	0
	51	20283	8	3.0	106033	2	425	1
	52	33760	9	3.0	297300	4	0	0

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1884	1	9600	5	3.0	1120	1	0	0
	2	8267	5	3.0	2850	1	250	1
	3	11933	6	3.0	1150	1	317	1
	4	36117	7	3.0	983	1	1583	1
	5	18683	5	3.0	1617	1	0	0
	6	35167	8	3.0	71417	1	0	0
	7	44917	8	4.0	30100	1	643	2
	8	30500	7	4.0	108750	1	50	1
	9	16417	7	4.0	187467	3	767	1
	10	28000	6	4.0	157150	2	533	1
	11	8933	5	3.0	125450	2	1033	1
	12	8817	6	3.0	23917	1	900	1
	13	10417	5	3.0	250100	3	83	1
	14	1869	1	0.0	5757	1	0	0
	15	16420	7	3.0	11740	1	0	0
	16	6420	4	3.0	0	0	100	1
	17	7350	5	2.0	0	0	2133	1
	18	15767	7	2.0	3367	1	700	1
	19	21767	6	3.0	1083	1	1117	1
	20	12200	6	3.0	4183	1	0	0
	21	23350	4	2.0	0	0	1317	1
	22	19505	7	2.0	3867	1	0	0
	23	5060	5	3.0	28540	1	0	0
	24	13000	6	2.0	4083	1	978	1
	25	6817	5	2.0	0	0	1083	1
	26	13417	7	2.0	18967	1	750	1
	27	7150	4	2.0	70850	1	967	1
	28	24917	6	2.0	3483	1	867	1
	29	16083	6	2.0	0	0	0	0
	30	23183	6	2.0	3800	1	0	0
	31	11167	5	2.0	0	0	0	0
	32	10860	4	2.0	0	0	0	0
	33	13847	7	2.0	10883	1	77	1
	34	14050	5	2.0	1250	1	1350	1
	35	8050	6	2.0	2333	1	0	0
	36	10317	4	2.0	1967	1	467	1
	37	14833	5	2.0	2783	1	583	1
	38	9483	5	2.0	3667	1	150	1
	39	12300	7	2.0	0	0	350	1
	40	31983	7	2.0	170583	3	0	0
	41	73350	8	3.0	4117	1	27817	2
	42	12600	5	3.0	2717	1	0	0
	43	19117	5	3.0	1717	1	0	0
	44	71317	12	4.0	14567	1	66050	3
	45	31867	7	5.0	1117	1	10217	2
	46	8500	4	5.0	0	0	578	1
	47	8300	4	5.0	1583	1	850	1
	48	10400	5	5.0	56667	1	487	1
	49	16200	4	5.0	2817	1	2283	1
	50	31517	4	5.0	70583	1	742	1
	51	9183	5	5.0	4167	1	0	0
	52	45300	6	5.0	243543	4	53	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1885	1	10400	3	5.0	6967	1	0	0
	2	11667	5	4.9	1500	1	2123	1
	3	13017	6	4.9	2183	1	933	1
	4	19333	4	4.9	767	1	0	0
	5	12233	5	4.5	4133	1	1200	1
	6	5917	6	4.0	0	0	168	1
	7	11133	5	4.0	20433	1	483	1
	8	27317	5	4.0	107533	2	50	1
	9	23317	6	4.0	4883	1	300	1
	10	17833	7	4.0	113500	2	307	1
	11	17367	6	4.0	85250	2	917	1
	12	15767	7	3.8	8333	1	1145	1
	13	6033	4	3.5	151500	4	127	1
	14	18440	7	3.5	30240	1	410	1
	15	12660	6	3.5	1460	1	0	0
	16	15200	6	3.5	1467	1	383	1
	17	6733	5	3.5	0	0	110	1
	18	9933	6	3.5	2267	1	267	1
	19	8033	5	3.3	1450	1	425	1
	20	18767	6	2.8	4283	1	6695	1
	21	10083	6	2.5	833	1	383	1
	22	10200	6	2.2	3420	1	344	1
	23	8983	6	2.0	517	1	133	1
	24	8043	5	2.0	2900	1	133	1
	25	7983	6	2.0	0	0	1067	1
	26	10067	5	2.0	3217	1	83	1
	27	8467	6	2.0	583	1	20	1
	28	2367	5	2.0	850	1	73	1
	29	5933	4	2.0	2317	1	517	1
	30	12950	6	2.0	200	1	300	1
	31	15707	5	1.9	1517	1	1600	1
	32	9700	6	2.0	660	1	22	1
	33	9800	5	1.7	1517	1	20	1
	34	7650	4	2.0	2317	1	550	1
	35	7600	4	2.0	5117	1	0	0
	36	13900	6	2.0	3583	1	10	1
	37	10650	6	2.0	1833	1	167	1
	38	9117	4	1.7	1667	1	823	1
	39	14200	5	2.0	500	1	33	1
	40	11733	7	2.0	2217	1	1922	1
	41	6033	5	2.0	1833	1	600	1
	42	4367	3	2.0	500	1	8533	1
	43	17550	5	2.0	1717	1	0	0
	44	4400	4	2.0	500	1	33	1
	45	38300	8	2.0	483	1	817	1
	46	27783	6	2.5	3050	1	400	1
	47	13767	5	3.0	250	1	1057	1
	48	9333	3	2.0	0	0	433	1
	49	13650	6	3.0	1333	1	783	1
	50	11450	6	3.0	2300	1	8410	1
	51	29550	5	3.5	63067	1	150	1
	52	17375	6	4.0	98950	2	0	0

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1886	1	8000	3	4.0	0	0	1550	1
	2	8783	4	4.0	0	0	93	1
	3	13633	4	3.8	1233	1	325	1
	4	4900	4	2.8	0	0	188	1
	5	9733	6	2.8	1517	1	150	1
	6	3367	4	2.8	0	0	6783	1
	7	6883	3	2.7	1683	1	33	1
	8	6450	3	2.3	2000	1	1550	1
	9	11850	6	2.0	20000	1	317	1
	10	10717	5	2.0	267	1	0	0
	11	18983	5	2.0	2500	1	975	1
	12	27833	7	2.0	334167	4	117	1
	13	7817	4	2.0	9000	1	42	1
	14	10683	5	2.0	1917	1	333	1
	15	7317	5	2.0	4483	1	383	1
	16	6117	3	2.0	7383	1	100	1
	17	40660	7	2.0	7780	1	800	1
	18	84660	9	2.0	12520	1	380	1
	19	19567	7	2.6	8167	1	68083	3
	20	8667	4	3.0	1667	1	667	1
	21	7683	4	2.9	9750	1	767	1
	22	4600	3	2.8	3733	1	25	1
	23	6883	5	3.0	9167	1	6783	1
	24	4705	3	2.7	2000	1	233	1
	25	5620	6	2.5	0	0	280	1
	26	8300	5	2.5	12917	1	50	1
	27	13967	4	2.5	35417	1	0	0
	28	5708	3	2.4	250	1	533	1
	29	11050	3	2.5	1283	1	0	0
	30	7633	3	2.5	400	1	0	0
	31	4283	4	2.4	0	0	393	1
	32	12980	6	2.5	2000	1	70	1
	33	3900	4	2.5	5600	1	0	0
	34	11250	5	2.5	2500	1	383	1
	35	58567	8	3.0	633	1	42217	1
	36	4403	3	3.4	483	1	200	1
	37	4733	5	3.5	0	0	0	0
	38	6283	3	3.5	0	0	143	1
	39	9683	6	3.5	15800	1	133	1
	40	16733	5	2.3	127333	2	850	1
	41	4500	3	3.5	0	0	0	0
	42	9000	5	3.5	6217	1	6867	1
	43	6050	5	3.8	5167	1	100	1
	44	4367	3	4.0	10833	1	83	1
	45	8000	5	4.0	12767	1	217	1
	46	2917	2	4.0	3750	1	483	1
	47	6003	4	4.0	833	1	0	0
	48	4967	5	4.0	150	1	50	1
	49	3733	3	3.9	0	0	0	0
	50	5650	3	4.0	1000	1	283	1
	51	8142	3	4.4	27433	1	183	1
	52	17811	5	5.0	169033	2	13567	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1887	1	3683	3	5.0	767	1	0	0
	2	10767	4	5.0	2900	1	0	0
	3	6983	3	3.3	4217	1	0	0
	4	6567	4	4.9	17500	1	0	0
	5	6200	5	4.3	9167	1	0	0
	6	5167	3	3.9	21617	1	67	1
	7	7883	3	3.3	50000	1	250	1
	8	7438	3	4.0	173333	3	472	1
	9	19100	6	4.0	133333	1	187	1
	10	4250	2	3.7	817	1	0	0
	11	5533	3	2.9	241650	3	0	0
	12	5150	4	3.2	0	0	100	1
	13	11633	3	3.0	120833	1	317	1
	14	14640	5	3.0	3540	1	460	1
	15	9540	4	2.3	3160	1	0	0
	16	11600	4	2.4	1833	1	667	1
	17	10533	7	2.2	0	0	0	0
	18	7450	4	1.9	2283	1	533	1
	19	5667	4	2.0	2900	1	0	0
	20	8367	4	1.8	833	1	100	1
	21	5450	3	1.9	0	0	20	1
	22	11080	5	1.9	1080	1	140	1
	23	5183	3	2.0	4883	1	0	0
	24	6383	3	1.9	3450	1	97	1
	25	7067	4	1.9	9150	1	395	1
	26	18420	5	2.0	190000	2	0	0
	27	7467	5	2.0	2633	1	162	1
	28	7200	4	2.0	3217	1	283	1
	29	4150	3	2.0	4417	1	105	1
	30	3417	3	2.0	3517	1	0	0
	31	5220	3	2.6	0	0	0	0
	32	8617	4	2.9	1800	1	0	0
	33	8900	4	3.0	1667	1	500	1
	34	34367	6	3.0	517	1	50	1
	35	7950	3	3.5	833	1	0	0
	36	9617	4	4.0	3100	1	0	0
	37	40567	6	4.0	34167	1	883	1
	38	15200	3	4.0	2100	1	33	1
	39	29483	4	4.0	145000	1	783	1
	40	10783	5	4.0	22500	1	0	0
	41	9867	4	3.8	1250	1	1100	1
	42	9583	5	4.0	367	1	415	1
	43	5467	4	3.2	1333	1	0	0
	44	18217	5	4.0	1167	1	0	0
	45	4450	3	3.3	2083	1	33	1
	46	6400	4	3.9	16583	1	88	1
	47	7667	4	3.8	1800	1	77	1
	48	11283	4	3.7	50000	1	0	0
	49	5133	3	3.3	1917	1	0	0
	50	9067	5	2.6	2917	1	50	1
	51	6233	3	3.3	117	1	33	1
	52	13900	5	3.9	311420	3	260	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1888	1	5600	3	3.9	5833	1	30	1
	2	4117	3	3.3	6233	1	25	1
	3	8800	4	3.0	12500	1	83	1
	4	7050	4	2.8	1533	1	50	1
	5	12950	4	2.9	22817	1	100	1
	6	6900	4	2.8	750	1	33	1
	7	10850	4	2.6	3633	1	53	1
	8	9900	4	2.3	750	1	167	1
	9	28367	6	2.5	105667	1	0	0
	10	5150	4	2.0	68900	1	183	1
	11	19900	4	2.2	43950	1	0	0
	12	6667	4	2.2	25000	1	128	1
	13	21840	5	2.0	294600	2	0	0
	14	8920	6	2.0	82120	1	120	1
	15	9133	4	2.0	86333	1	0	0
	16	6083	4	2.0	0	0	233	1
	17	5267	3	2.0	14167	1	0	0
	18	35467	6	2.0	16667	1	40	1
	19	92317	6	2.6	5000	1	52500	1
	20	5317	5	3.0	2067	1	0	0
	21	7360	3	2.3	1000	1	160	1
	22	8550	3	2.7	0	0	467	1
	23	3317	3	2.6	1517	1	133	1
	24	12417	5	2.3	4767	1	0	0
	25	7917	4	2.4	0	0	0	0
	26	8517	5	2.1	567	1	0	0
	27	21428	4	2.3	2067	1	100	1
	28	4683	3	2.3	0	0	217	1
	29	7800	3	2.3	3233	1	5183	1
	30	4183	4	2.0	267	1	1080	1
	31	9483	3	2.4	2000	1	183	1
	32	6667	4	2.3	1717	1	133	1
	33	14850	5	3.0	1667	1	167	1
	34	6133	4	3.0	0	0	467	1
	35	20067	4	3.0	54167	1	350	1
	36	22700	5	3.0	52417	1	757	1
	37	20033	5	3.3	135750	2	0	0
	38	5767	4	4.0	0	0	950	1
	39	70883	6	3.3	287350	3	500	1
	40	52917	8	4.5	31667	1	237	1
	41	6267	3	4.8	12217	1	183	1
	42	4633	3	4.6	2667	1	0	0
	43	7117	3	4.6	217	1	0	0
	44	10183	4	4.6	1333	1	200	1
	45	4133	3	4.4	0	0	260	1
	46	7800	3	4.1	317	1	0	0
	47	4317	3	4.8	2817	1	0	0
	48	8400	4	3.9	58333	1	83	1
	49	11917	3	4.7	66083	1	83	1
	50	46700	7	5.0	52217	1	83	1
	51	24883	5	5.0	138250	2	2333	1
	52	30380	5	5.4	415900	3	2380	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1889	1	6080	3	5.0	3600	1	0	0
	2	12183	4	3.9	533	1	117	1
	3	15250	3	3.5	0	0	100	1
	4	8633	4	3.1	0	0	233	1
	5	14933	4	2.8	0	0	105	1
	6	4743	3	3.0	3483	1	0	0
	7	48317	6	3.0	54883	1	0	0
	8	15767	6	3.0	64417	1	0	0
	9	43600	4	3.0	133167	2	105	1
	10	9733	4	3.0	70083	1	0	0
	11	46300	6	3.0	136167	2	113	1
	12	48350	7	3.0	91667	1	100	1
	13	14467	4	3.0	104917	2	83	1
	14	4633	3	2.9	43250	1	0	0
	15	8483	4	2.5	35200	1	323	1
	16	4040	4	2.5	520	1	0	0
	17	8020	4	2.1	31300	1	100	1
	18	7400	4	2.2	1950	1	118	1
	19	4650	4	2.1	0	0	117	1
	20	14550	4	2.3	166283	1	0	0
	21	5317	3	2.1	3467	1	0	0
	22	7117	4	2.2	667	1	167	1
	23	11250	4	1.9	0	0	50	1
	24	3533	3	1.4	1367	1	488	1
	25	7050	4	2.0	0	0	117	1
	26	10117	5	1.9	76500	1	0	0
	27	9367	4	2.3	38183	1	150	1
	28	2960	3	2.0	667	1	33	1
	29	7000	4	2.1	0	0	0	0
	30	2273	2	2.1	867	1	35	1
	31	14067	4	2.2	3217	1	0	0
	32	17280	4	2.8	5040	1	0	0
	33	7483	4	3.0	667	1	50	1
	34	24767	4	3.0	0	0	217	1
	35	81233	6	3.4	59333	1	66503	2
	36	11133	5	4.0	0	0	0	0
	37	5400	3	3.3	3117	1	0	0
	38	6983	4	4.0	250	1	500	1
	39	27617	4	4.5	84200	1	0	0
	40	18640	4	4.9	1333	1	67	1
	41	3327	3	4.8	12717	1	0	0
	42	5383	3	3.8	667	1	183	1
	43	10300	3	4.2	0	0	0	0
	44	5767	3	4.5	2983	1	0	0
	45	18183	5	4.5	0	0	150	1
	46	8317	4	4.6	33333	1	0	0
	47	7417	3	4.7	1333	1	0	0
	48	4733	3	4.6	133533	1	167	1
	49	2383	3	4.8	0	0	0	0
	50	5000	3	3.7	7383	1	122	1
	51	12733	4	4.5	433	1	217	1
	52	17500	4	5.6	364500	4	19750	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1890	1	2500	2	5.5	1250	1	0	0
	2	1290	2	5.8	60833	1	167	1
	3	9967	2	5.1	97417	2	4500	1
	4	2235	2	3.5	53883	2	0	0
	5	9667	3	5.4	97167	1	2167	1
	6	10000	4	5.7	29000	1	67	1
	7	27783	4	5.5	29983	1	52	1
	8	4233	3	5.3	51333	1	0	0
	9	33583	4	4.8	125917	2	5360	1
	10	6667	3	4.4	3767	1	167	1
	11	14333	5	3.9	28167	1	140	1
	12	9800	4	3.6	127500	1	38	1
	13	9017	4	3.6	151167	2	129	1
	14	5600	5	3.2	44400	1	0	0
	15	12400	6	2.7	0	0	0	0
	16	9233	6	2.9	2500	1	70	1
	17	8233	3	2.5	333	1	0	0
	18	9167	4	2.8	917	1	0	0
	19	13333	5	2.3	1333	1	188	1
	20	9750	4	2.6	2967	1	28	1
	21	3505	3	2.6	0	0	283	1
	22	6860	2	2.1	900	1	50	1
	23	18700	4	2.8	1667	1	0	0
	24	44633	6	3.0	150500	1	603	1
	25	103833	7	3.0	1500	1	15217	1
	26	75500	6	3.6	148833	2	31833	2
	27	10117	5	4.0	217117	2	70	1
	28	51683	6	4.3	78767	2	21157	2
	29	11483	6	4.3	50667	1	462	1
	30	24900	4	4.1	0	0	4178	1
	31	108867	4	4.6	96583	2	2793	1
	32	6980	4	4.9	300	1	3600	1
	33	44667	3	4.7	8200	1	0	0
	34	6833	3	4.1	2033	1	0	0
	35	17500	4	3.0	68408	1	113	1
	36	7000	4	3.8	0	0	155	1
	37	63667	4	4.0	34167	1	117	1
	38	59087	6	4.0	3500	1	520	1
	39	178417	8	4.7	45833	1	18530	1
	40	136833	7	5.1	123667	2	2707	1
	41	77667	6	5.0	3917	1	56033	1
	42	53483	6	5.0	2133	1	10488	1
	43	51733	5	5.0	2833	1	525	1
	44	24783	4	5.0	17250	1	0	0
	45	66333	6	5.3	54667	1	45993	1
	46	364833	9	6.3	212083	3	65	1
	47	293333	10	6.6	136667	2	14900	1
	48	9667	3	5.8	10667	1	83	1
	49	31900	3	5.1	2500	1	0	0
	50	22200	5	4.8	75167	1	120	1
	51	7433	4	4.8	0	0	0	0
	52	58667	6	4.9	146167	2	0	0

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1891	1	9600	3	4.7	1333	1	0	0
	2	21767	4	4.1	54650	1	0	0
	3	16933	3	3.0	1333	1	0	0
	4	6975	4	3.2	5000	1	67	1
	5	27950	4	3.0	1583	1	0	0
	6	9567	4	2.3	9400	1	67	1
	7	49967	3	2.8	40200	1	63	1
	8	107983	6	3.0	5667	1	367	1
	9	165833	9	3.0	1000	1	275	1
	10	84333	5	3.0	5733	1	80	1
	11	12167	5	2.9	24567	1	117	1
	12	9667	4	3.0	5000	1	72	1
	13	247980	6	3.0	2800	1	80	1
	14	28320	7	3.0	20000	1	20000	1
	15	3800	3	2.8	15750	1	100	1
	16	26917	6	3.3	933	1	280	1
	17	116217	7	3.5	1733	1	67	1
	18	84117	7	3.6	13083	1	40367	1
	19	40333	6	3.9	9450	1	1282	1
	20	86500	6	4.7	90133	2	51883	1
	21	5800	3	5.0	97080	1	18870	1
	22	36667	5	5.0	3583	1	83	1
	23	4733	3	4.5	417	1	0	0
	24	71050	5	3.8	22750	1	467	1
	25	4750	3	3.3	517	1	0	0
	26	12100	4	3.0	3083	1	0	0
	27	15767	4	2.7	0	0	183	1
	28	5917	4	2.5	19833	1	0	0
	29	16467	3	2.4	3217	1	120	1
	30	12700	5	2.5	0	0	950	1
	31	9000	5	2.1	2500	1	267	1
	32	8600	5	2.2	0	0	0	0
	33	8483	3	2.2	16000	1	28	1
	34	15317	4	2.3	0	0	33	1
	35	3500	3	2.3	1083	1	0	0
	36	18167	4	2.5	0	0	73	1
	37	5567	3	2.4	7767	1	37	1
	38	3383	3	2.4	2250	1	0	0
	39	33917	7	2.8	400	1	21600	1
	40	55833	5	3.0	24417	1	0	0
	41	23450	5	2.9	6917	1	3233	1
	42	31717	5	3.0	1083	1	217	1
	43	73667	4	3.0	200	1	0	0
	44	27333	4	3.5	2067	1	4963	1
	45	7417	4	4.0	0	0	33	1
	46	7567	4	3.8	1500	1	67	1
	47	19200	3	3.9	5267	1	1462	1
	48	37100	4	3.8	5833	1	183	1
	49	7667	3	3.7	817	1	0	0
	50	3067	2	3.2	767	1	0	0
	51	19183	4	2.1	0	0	40	1
	52	186625	7	3.3	43263	1	18620	1

	WEEK	TVB (£)	TNT	R (%)	TVA (£)	TNAT	TVR (£)	TNR
1892	1	37500	6	3.0	0	0	35	1
	2	8513	4	3.2	1100	1	833	1
	3	40833	3	3.0	2233	1	25	1
	4	18617	4	3.0	0	0	0	0
	5	10917	3	2.8	1767	1	33	1
	6	15167	4	2.8	0	0	83	1
	7	20183	4	2.8	3667	1	858	1
	8	54067	5	3.0	2167	1	383	1
	9	145667	6	3.0	34300	1	0	0
	10	13717	4	2.8	0	0	1017	1
	11	6567	4	2.6	1500	1	117	1
	12	13167	3	2.1	1333	1	0	0
	13	10400	3	2.6	250333	3	153	1
	14	21333	5	2.8	126500	2	27	1
	15	6167	4	2.3	317	1	38	1
	16	75720	5	2.0	1400	1	0	0
	17	10800	4	1.6	2240	1	0	0
	18	101500	4	2.1	9933	1	317	1
	19	13767	4	2.0	267	1	50	1
	20	3667	3	1.8	667	1	5033	1
	21	12633	3	1.5	150	1	0	0
	22	12833	5	1.8	3567	1	2150	1
	23	6172	3	1.6	200	1	0	0
	24	4900	3	2.0	0	0	100	1
	25	4783	4	2.2	1109	1	0	0
	26	4367	4	1.8	1817	1	297.	1
	27	50250	3	1.7	116000	2	817	1
	28	4917	3	1.7	433	1	0	0
	29	29367	4	1.9	100	1	98	1
	30	9317	4	1.9	233	1	0	0
	31	6600	3	1.8	667	1	83	1
	32	5860	3	2.0	0	0	0	0
	33	27863	3	1.9	3833	1	0	0
	34	5067	4	2.0	0	0	100	1
	35	3467	2	1.3	3417	1	33	1
	36	10483	4	1.8	2667	1	158	1
	37	2883	2	1.8	0	0	0	0
	38	6517	4	1.8	1083	1	400	1
	39	5317	3	1.8	0	0	0	0
	40	54920	4	1.7	1467	1	150	1
	41	5100	3	1.7	267	1	0	0
	42	1583	3	2.0	2367	1	33	1
	43	7183	4	2.5	0	0	0	0
	44	53933	3	2.5	5567	1	233	1
	45	17317	5	3.0	0	0	417	1
	46	6667	2	2.5	0	0	0	0
	47	2900	2	2.4	1033	1	67	1
	48	4800	4	3.1	500	1	57	1
	49	46850	4	3.0	4833	1	0	0
	50	4333	2	2.0	1000	1	50	1
	51	5200	4	3.0	667	1	100	1
	52	62415	4	2.6	130545	2	0	0

	WEEK	TVB (£)	TNT	R (₹)	TVA (£)	TNAT	TVR (£)	TNR
1893	1	9500	5	2.8	0	0	167	1
	2	18067	3	2.8	917	1	167	1
	3	3360	3	2.9	0	0	110	1
	4	5550	3	2.3	667	1	0	0
	5	12533	2	1.9	0	0	33	1
	6	9567	4	2.4	4433	1	483	1
	7	6867	3	2.4	0	0	60	1
	8	87583	5	2.4	17333	1	217	1
	9	8733	3	2.3	10717	1	0	0
	10	7483	3	2.4	0	0	50	1
	11	5533	3	2.3	42500	1	33	1
	12	23033	3	2.4	241500	3	0	0
	13	19960	4	2.3	100800	2	0	0
	14	2740	2	1.5	6220	1	0	0
	15	10500	3	2.3	867	1	28	1
	16	3783	3	2.1	0	0	0	0
	17	280183	6	2.5	153833	3	0	0
	18	152850	7	2.8	62817	1	28450	1
	19	326333	10	3.3	94000	1	19010	1
	20	124917	10	3.8	132967	2	8233	1
	21	89840	5	3.2	80000	1	3000	1
	22	8233	3	4.0	667	1	167	1
	23	4350	3	3.3	283	1	0	0
	24	8000	3	1.6	2250	1	67	1
	25	4783	3	2.1	833	1	67	1
	26	64615	3	2.5	152167	2	533	1
	27	6583	3	2.3	0	0	0	0
	28	25317	3	2.0	1050	1	0	0
	29	9433	3	2.3	250	1	0	0
	30	5017	2	1.9	867	1	0	0
	31	18233	4	2.8	1600	1	0	0
	32	28000	5	3.6	2020	1	67820	2
	33	5833	2	3.3	667	1	63	1
	34	29033	5	4.5	4833	1	16917	1
	35	5150	1	3.3	933	1	0	0
	36	19608	3	4.2	0	0	0	0
	37	4117	3	4.3	817	1	22	1
	38	2067	2	3.1	0	0	0	0
	39	19200	2	2.8	51500	1	533	1
	40	3700	4	3.2	350	1	50	1
	41	5383	3	3.0	667	1	8	0
	42	4500	3	3.0	0	0	0	0
	43	6400	3	3.0	833	1	0	0
	44	70983	3	3.0	2167	1	1060	1
	45	7433	3	2.9	383	1	23	1
	46	3767	3	2.5	667	1	0	0
	47	6419	3	3.0	0	0	117	1
	48	57000	4	3.0	59500	1	50	1
	49	4443	2	3.0	900	1	50	1
	50	98783	4	3.0	967	1	28	1
	51	208000	5	3.0	87000	1	1300	1
	52	234000	5	3.0	223000	2	133	1

APPENDIX B

DAILY DISCOUNT DATA: 1895-1914

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1894	1	4283	3	3.2	0	0	0	133	1
	2	11125	3	2.8	0	500	1	155	1
	3	18200	1	2.6	0	667	1	500	1
	4	3283	3	2.9	0	0	0	0	0
	5	13683	3	2.7	0	38833	1	0	0
	6	13583	3	2.5	0	33333	1	38	1
	7	7333	2	2.1	0	61083	1	1767	1
	8	22500	4	2.2	0	100000	1	133	1
	9	145667	5	2.0	0	58333	1	367	1
	10	37750	4	2.0	0	125000	1	217	1
	11	97667	5	2.0	0	58333	1	0	0
	12	110000	5	1.6	0	158800	2	0	0
	13	123520	4	2.0	0	244000	2	200	1
	14	4917	3	2.0	0	34650	1	33	1
	15	36033	3	2.0	0	25267	1	0	0
	16	6167	4	1.8	0	0	0	0	0
	17	70783	4	2.0	0	27000	1	200	1
	18	21167	4	2.0	0	0	0	0	0
	19	13167	2	1.6	0	1250	1	0	0
	20	4820	3	1.5	0	540	1	0	0
	21	10433	3	1.7	0	0	0	0	0
	22	7350	2	1.5	0	2000	1	0	0
	23	8383	3	1.8	0	533	1	0	0
	24	5550	3	2.0	0	167	1	33	1
	25	4800	3	1.8	0	0	0	250	1
	26	28950	3	1.7	164250	40833	3	33	1
	27	5083	3	2.0	0	0	0	50	1
	28	4417	4	2.0	0	167	1	0	0
	29	2883	2	1.6	0	0	0	0	0
	30	4700	3	1.8	0	1000	1	107	1
	31	4167	2	1.6	0	0	0	267	1
	32	7000	4	2.0	0	0	0	0	0
	33	10500	3	1.7	0	2750	1	0	0
	34	4967	3	1.9	0	0	0	0	0
	35	3317	2	1.6	0	0	0	0	0
	36	7550	3	1.8	0	0	0	45	1
	37	2567	2	1.3	0	0	0	67	1
	38	2833	2	1.3	0	0	0	0	0
	39	7017	3	2.0	0	1167	1	0	0
	40	2933	3	1.6	0	0	0	133	1
	41	6633	3	1.8	0	0	0	0	0
	42	6900	3	1.8	0	250	1	300	1
	43	5583	3	1.8	0	0	0	0	0
	44	10167	2	1.5	0	0	0	0	0
	45	6417	3	2.0	0	4483	1	33	1
	46	2783	3	1.6	0	0	0	183	1
	47	4600	3	1.5	0	0	0	0	0
	48	8950	3	1.8	0	0	0	0	0
	49	5533	3	1.9	0	0	0	0	0
	50	4683	2	1.8	0	0	0	262	1
	51	7450	3	1.5	0	7700	1	50	1
	52	172209	6	2.0	441300	300520	11	80	1

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1895	1	4472	2	1.9	0	0	0	200	1
	2	8267	2	1.6	0	0	0	33	1
	3	7000	2	1.5	0	167	1	533	1
	4	3833	2	1.1	0	4717	1	117	1
	5	6383	2	1.8	0	0	0	417	1
	6	7817	4	1.4	0	350	1	350	1
	7	6833	3	1.5	0	4833	1	0	0
	8	4883	2	1.9	3333	333	2	0	0
	9	66833	4	1.9	181167	72667	4	277	1
	10	8100	2	1.3	0	0	0	0	0
	11	15100	3	1.6	3333	36967	2	117	1
	12	10683	2	1.9	59167	105000	3	0	0
	13	112333	5	1.8	170000	169167	4	0	0
	14	3117	2	2.0	0	0	0	100	1
	15	4420	3	1.8	0	0	0	200	1
	16	2940	2	1.9	0	0	0	140	1
	17	10693	3	1.7	33333	52500	2	0	0
	18	4633	2	1.4	0	0	0	0	0
	19	10567	3	1.9	0	250	1	117	1
	20	6067	2	1.8	0	0	0	0	0
	21	8750	3	1.7	0	1500	1	210	1
	22	2867	2	1.7	0	0	0	50	1
	23	2860	1	1.5	0	0	0	0	0
	24	3233	3	1.5	0	833	1	0	0
	25	3200	2	1.3	0	833	1	33	1
	26	43667	4	1.7	131400	80250	3	38	1
	27	32200	2	1.3	0	0	0	13517	1
	28	6500	3	1.8	0	383	1	48	1
	29	4723	3	1.8	0	0	0	16750	1
	30	4450	2	1.4	0	0	0	0	0
	31	26750	3	1.5	0	0	0	50	1
	32	6810	2	1.5	0	1000	1	0	0
	33	15925	2	1.9	16667	5000	2	0	0
	34	4600	3	1.8	0	0	0	43	1
	35	12867	3	1.4	13333	0	1	0	0
	36	24350	3	1.5	0	0	0	0	0
	37	6367	2	1.2	12500	16667	2	0	0
	38	12333	3	1.5	0	267	1	0	0
	39	1058	2	1.5	4167	19167	2	0	0
	40	4383	3	1.3	0	0	0	0	0
	41	8850	3	1.8	0	0	0	0	0
	42	8583	3	1.7	0	0	0	0	0
	43	2533	2	1.8	0	0	0	0	0
	44	7333	3	2.0	0	0	0	33	1
	45	5867	2	1.8	4167	1667	2	133	1
	46	6033	3	2.0	60833	79367	3	50	1
	47	65002	3	2.0	25500	21150	2	0	0
	48	5083	3	1.7	0	0	0	67	1
	49	10933	3	1.8	0	0	0	0	0
	50	20583	3	1.6	0	417	1	0	0
	51	40608	5	1.9	0	0	0	0	0
	52	228650	5	2.0	542833	465750	10	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1896	1	39850	3	1.5	0	0	0	100	1
	2	4083	2	1.0	0	0	0	117	1
	3	27783	4	1.9	0	0	0	38	1
	4	4400	2	2.0	0	0	0	63	1
	5	5500	4	1.8	0	0	0	0	0
	6	7983	2	1.6	0	0	0	143	1
	7	9417	3	1.5	0	133	2	67	1
	8	6033	2	1.8	0	0	0	0	0
	9	35152	3	1.8	81667	0	1	83	1
	10	6784	3	2.0	3167	0	1	50	1
	11	16000	2	1.7	0	0	0	0	0
	12	10983	4	1.8	0	0	0	50	1
	13	39667	3	1.7	0	0	0	43	1
	14	8240	3	1.8	0	0	0	0	0
	15	5700	2	1.6	0	0	0	0	0
	16	8651	4	1.8	0	333	1	0	0
	17	4690	2	1.8	0	0	0	0	0
	18	37167	4	1.3	12500	0	1	0	0
	19	13383	4	1.6	20833	0	1	833	1
	20	36217	4	1.8	12667	50000	2	100	1
	21	1767	2	1.9	0	0	0	100	1
	22	1867	2	0.9	4167	700	2	167	1
	23	10133	2	1.9	0	1000	1	33	1
	24	20167	2	1.9	0	0	0	33	1
	25	5567	3	1.3	0	3333	1	0	0
	26	40783	3	1.8	50333	16833	2	0	0
	27	124500	5	1.6	257667	266167	5	0	0
	28	7000	2	1.5	0	1167	1	267	1
	29	7183	3	1.3	0	0	0	0	0
	30	5597	2	1.7	0	0	0	0	0
	31	4667	3	1.6	0	4333	1	0	0
	32	9408	3	1.7	0	320	1	200	1
	33	7733	2	1.8	0	4333	1	0	0
	34	22500	3	1.3	0	0	0	67	1
	35	12540	1	1.2	0	0	0	0	0
	36	11367	3	1.7	0	0	0	167	1
	37	5250	2	1.8	0	7500	1	0	0
	38	10467	3	2.3	0	400	1	45	1
	39	35167	2	1.4	0	0	0	0	0
	40	114167	4	2.8	56667	91167	2	16750	1
	41	1667	1	2.0	0	0	0	0	0
	42	7300	4	3.0	0	6000	1	0	0
	43	76883	3	3.3	0	12500	1	0	0
	44	85850	3	4.0	52833	44417	2	0	0
	45	7550	2	3.6	3333	47500	2	600	1
	46	110505	4	2.6	43333	31667	2	0	0
	47	2367	3	4.1	0	0	0	0	0
	48	43667	3	3.3	16667	5167	2	0	0
	49	75667	2	3.2	0	0	0	0	0
	50	7600	2	3.7	46167	34217	2	67	1
	51	65233	3	4.0	66167	46667	2	100	1
	52	146625	5	4.2	563438	542813	12	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1897	1	1500	1	2.0	0	0	0	0	0
	2	3700	2	3.2	0	0	0	50	1
	3	4333	2	3.1	0	0	0	0	0
	4	4867	2	3.0	0	0	0	33	1
	5	4933	3	3.3	0	0	0	83	1
	6	2110	1	1.8	0	0	0	0	0
	7	6680	2	1.8	0	0	0	0	0
	8	2933	2	2.2	0	0	0	0	0
	9	27992	3	2.8	176750	34667	3	0	0
	10	4000	3	2.8	83333	0	1	50	1
	11	3133	3	2.6	0	0	0	0	0
	12	4817	3	1.4	0	0	0	0	0
	13	1583	2	2.3	103083	62417	2	67	1
	14	4750	3	2.5	97833	28333	2	0	0
	15	11517	2	1.7	0	0	0	133	1
	16	2517	2	1.5	0	0	0	0	0
	17	2350	2	1.1	0	0	0	0	0
	18	1900	2	2.5	0	483	1	33	1
	19	25333	4	1.9	0	0	0	0	0
	20	2383	2	1.9	0	0	0	0	0
	21	13683	3	1.8	0	0	0	0	0
	22	5483	2	1.3	0	0	0	0	0
	23	9533	2	1.6	0	0	0	0	0
	24	2240	2	1.4	0	0	0	0	0
	25	6733	3	1.8	0	0	0	100	1
	26	23600	2	2.0	50400	31000	2	0	0
	27	129317	4	1.5	332417	329167	7	0	0
	28	4650	2	1.2	0	0	0	333	1
	29	4883	2	1.9	0	0	0	0	0
	30	5083	3	1.8	0	0	0	83	1
	31	4767	3	1.8	0	0	0	0	0
	32	3120	2	1.5	0	0	0	0	0
	33	7075	3	1.9	0	0	0	33	1
	34	7981	3	2.0	0	2117	1	0	0
	35	4767	2	2.0	10000	900	2	200	1
	36	38221	3	2.0	0	0	0	0	0
	37	112583	6	2.2	0	183	1	267	1
	38	75133	4	2.0	0	2150	1	48	1
	39	6983	3	2.3	0	0	0	33	1
	40	4083	2	2.5	108333	55000	2	4167	1
	41	2123	2	2.7	0	0	0	0	0
	42	4333	2	2.3	0	0	0	60	1
	43	23167	2	2.1	41667	41667	2	0	0
	44	128450	5	3.0	288833	87167	5	0	0
	45	11600	3	3.2	110833	41833	2	267	1
	46	58550	2	2.5	118833	66000	3	0	0
	47	10340	3	3.0	8333	0	1	0	0
	48	69583	6	3.0	222000	113500	4	0	0
	49	12267	3	3.0	75333	46833	2	0	0
	50	109317	5	3.0	333500	176333	7	0	0
	51	154567	6	3.0	356583	201317	8	100	1
	52	498900	10	3.0	579667	203333	10	533	1

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1898	1	2078	2	3.3	0	0	0	50	1
	2	4317	2	2.6	0	0	0	33	1
	3	5667	2	1.9	0	0	0	90	1
	4	8817	2	3.0	110833	75000	3	100	1
	5	4967	3	2.5	117667	89667	3	0	0
	6	21633	2	2.5	416667	146500	7	0	0
	7	677	1	3.0	381833	247250	9	0	0
	8	69150	2	3.0	371167	311567	10	0	0
	9	126533	5	3.0	621167	322500	12	183	1
	10	138567	5	3.0	666000	319000	14	417	1
	11	424933	12	3.0	115250	36667	3	117	1
	12	35783	4	3.0	101667	103333	3	35	1
	13	83250	4	3.0	619167	521167	13	167	1
	14	11960	2	3.4	76000	80000	2	0	0
	15	8100	2	4.0	33000	1000	2	100	1
	16	63050	3	4.0	134667	1667	3	50	1
	17	27300	1	4.0	184917	0	3	433	1
	18	15683	3	4.0	282000	189000	6	0	0
	19	19267	2	4.0	309500	305500	10	100	1
	20	1033	2	3.9	92667	8333	3	0	0
	21	6540	2	3.2	40000	0	1	0	0
	22	2180	2	3.2	0	0	0	300	1
	23	4933	2	1.8	0	167	1	630	1
	24	4700	2	2.8	0	167	1	200	1
	25	2083	2	1.8	0	0	0	0	0
	26	41033	3	2.2	201250	184667	5	50	1
	27	4217	2	2.0	0	0	0	0	0
	28	4000	1	1.8	0	0	0	0	0
	29	10805	3	2.2	0	0	0	50	1
	30	3583	2	1.6	0	0	0	0	0
	31	5070	2	2.2	0	0	0	0	0
	32	4217	2	1.7	0	0	0	0	0
	33	10578	2	1.7	0	8333	1	0	0
	34	740	2	2.0	0	0	0	0	0
	35	5813	2	1.9	43500	39333	2	0	0
	36	8950	3	2.4	0	0	0	0	0
	37	8683	3	2.0	0	0	0	67	1
	38	2558	2	2.7	28500	7500	2	0	0
	39	120450	4	3.0	284083	359583	10	0	0
	40	4550	2	3.0	13333	58333	2	33	1
	41	56390	4	3.5	10833	46667	2	0	0
	42	1650	2	4.0	17500	17567	2	0	0
	43	107267	5	4.0	289667	161250	7	0	0
	44	3383	2	4.0	55500	41667	2	0	0
	45	4442	2	4.0	72500	12000	2	0	0
	46	1805	2	4.0	4833	0	1	0	0
	47	5750	2	3.8	0	0	0	50	1
	48	3567	2	3.3	242000	211333	5	133	1
	49	7117	2	3.2	0	0	0	67	1
	50	2483	1	4.0	82667	174333	4	217	1
	51	89002	4	4.0	74333	141667	3	0	0
	52	216220	5	4.0	919400	976600	24	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1899	1	1517	1	2.5	0	0	0	0	0
	2	3183	1	3.1	0	0	0	142	1
	3	4283	2	1.6	0	0	0	133	1
	4	6343	2	3.3	90000	136833	3	0	0
	5	7783	2	2.3	0	0	0	33	1
	6	11393	2	2.1	266167	209000	5	0	0
	7	10367	3	2.1	0	0	0	0	0
	8	31707	2	2.9	197667	142333	4	133	1
	9	13140	3	3.0	74000	84400	2	0	0
	10	4883	2	2.5	134667	219167	5	0	0
	11	28867	3	3.0	153500	207667	5	0	0
	12	130050	4	2.9	233167	567833	12	0	0
	13	164740	5	3.0	683100	525400	16	0	0
	14	22480	3	2.1	140200	81000	3	120	1
	15	12383	2	2.3	38333	22333	2	0	0
	16	12017	3	2.8	0	0	0	50	1
	17	7783	1	2.7	129833	155167	3	0	0
	18	18850	2	2.4	0	13500	1	0	0
	19	1150	2	2.3	0	9500	1	250	1
	20	13195	2	2.2	0	483	1	0	0
	21	19314	3	2.1	0	0	0	0	0
	22	83450	4	2.8	120000	30167	2	0	0
	23	13433	2	2.3	51167	4167	2	33	1
	24	12417	3	2.2	0	0	0	0	0
	25	45433	3	3.0	133333	66667	2	0	0
	26	177500	5	2.8	705667	719167	16	33	1
	27	39757	2	2.6	68333	16667	2	0	0
	28	246633	6	3.4	97867	0	1	16833	1
	29	166925	4	3.6	17200	0	1	17983	1
	30	7868	2	3.0	0	0	0	333	1
	31	111667	4	3.5	10000	0	1	11233	1
	32	49360	3	3.6	0	400	1	0	0
	33	166550	6	3.3	0	0	0	850	1
	34	5083	3	2.9	0	0	0	0	0
	35	5317	2	3.0	114417	55500	3	0	0
	36	6350	1	2.9	0	0	0	0	0
	37	31350	4	3.5	0	0	0	483	1
	38	162050	7	3.5	0	0	0	183	1
	39	470633	12	3.6	51000	18333	2	0	0
	40	303067	8	4.3	139900	33067	3	117	1
	41	917	1	4.2	25333	8000	2	117	1
	42	3200	1	3.3	0	0	0	33	1
	43	1683	1	4.0	0	0	0	483	1
	44	2667	1	3.3	6917	16667	2	0	0
	45	1617	1	4.1	0	0	0	0	0
	46	6100	1	3.3	16667	0	1	0	0
	47	3167	1	1.7	0	0	0	0	0
	48	45342	5	5.7	179833	217667	5	50000	1
	49	12383	2	5.0	12500	25000	2	0	0
	50	179067	6	6.0	76333	100417	3	1167	1
	51	376250	8	6.0	259333	292083	10	2950	1
	52	122450	8	6.0	735750	494875	19	60	1

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1900	1	13200	3	5.8	72800	63167	4	133	1
	2	3400	1	4.5	27833	8000	2	33	1
	3	7983	1	3.3	0	2083	1	0	0
	4	1033	1	2.6	0	0	0	0	0
	5	2333	1	3.3	34583	8417	2	33	1
	6	5967	2	3.9	31667	47167	2	0	0
	7	4700	1	3.3	26667	79167	2	83	1
	8	23833	3	4.0	405000	370167	11	0	0
	9	1350	1	4.0	322500	358167	10	0	0
	10	214967	5	4.0	499000	603667	19	50	1
	11	279433	6	4.0	1385117	930667	30	0	0
	12	14983	3	4.0	510833	549833	12	67	1
	13	32933	3	4.0	601200	542917	16	333	1
	14	2033	1	3.3	58333	10000	2	0	0
	15	526820	10	3.2	297200	67700	5	0	0
	16	123060	6	4.0	299600	41400	4	154	1
	17	375917	11	4.0	119833	54500	2	33	1
	18	171633	7	4.0	85000	32333	2	0	0
	19	38767	4	4.0	0	0	0	480	1
	20	6133	2	3.3	0	0	0	0	0
	21	13550	3	3.0	0	0	0	0	0
	22	8133	1	2.6	0	0	0	0	0
	23	5800	1	1.9	0	0	0	0	0
	24	4970	2	2.7	0	0	0	0	0
	25	3100	1	2.8	0	0	0	0	0
	26	43467	3	3.2	551667	474667	12	0	0
	27	6600	2	2.0	0	0	0	0	0
	28	9750	2	2.5	0	0	0	0	0
	29	147377	5	2.3	0	2333	1	115583	3
	30	192833	4	4.0	149167	236833	5	0	0
	31	211033	7	4.0	190250	316550	7	200	1
	32	164420	6	4.0	347200	189100	6	0	0
	33	9200	2	3.3	321167	26833	2	0	0
	34	2850	2	3.3	0	0	0	0	0
	35	5683	2	3.3	45000	62167	2	50	1
	36	2917	2	2.7	0	0	0	0	0
	37	7600	2	4.0	176500	83000	3	0	0
	38	22150	2	4.0	28333	0	1	0	0
	39	134117	6	4.1	318333	334000	9	0	0
	40	14350	3	4.0	0	8133	1	67	1
	41	17083	3	3.3	0	4500	1	0	0
	42	15860	2	2.7	0	0	0	0	0
	43	25183	2	3.3	0	16667	1	0	0
	44	9217	3	3.3	21667	25917	2	0	0
	45	17033	3	4.0	30833	26667	2	0	0
	46	23190	3	4.0	121583	69000	3	0	0
	47	11017	2	3.3	33333	34767	2	0	0
	48	298850	8	4.1	124333	123250	4	0	0
	49	7667	2	2.7	0	0	0	183	1
	50	16233	2	3.3	10000	3733	2	0	0
	51	297167	6	4.0	0	1217	1	483	1
	52	342340	9	4.3	846000	874060	19	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1901	1	13560	3	3.6	40000	1200	2	0	0
	2	5500	2	4.8	0	417	1	0	0
	3	20550	1	3.0	174167	33333	2	0	0
	4	3783	1	2.8	0	10000	1	0	0
	5	3600	1	4.9	325200	274300	7	0	0
	6	6283	2	3.4	65783	40500	2	0	0
	7	2222	1	4.8	443583	271900	10	0	0
	8	129917	3	4.3	415083	132483	6	0	0
	9	403083	8	4.4	770967	152283	8	117	1
	10	7450	2	4.0	208117	32850	2	0	0
	11	3300	1	1.3	86450	60350	2	0	0
	12	40517	2	3.9	371950	251267	9	0	0
	13	135033	4	4.1	776333	519500	14	0	0
	14	23140	2	3.3	692400	341800	9	0	0
	15	8800	3	3.9	255750	324750	5	0	0
	16	2193	1	3.4	8333	0	1	167	1
	17	20233	2	3.3	521000	793833	13	0	0
	18	5733	2	3.4	256917	298000	6	0	0
	19	917	1	2.7	14167	0	1	0	0
	20	37067	2	3.3	407167	534167	9	0	0
	21	5433	2	3.3	82500	35500	2	0	0
	22	8660	3	3.2	48400	81460	2	0	0
	23	3200	1	2.2	0	0	0	0	0
	24	2317	1	2.5	0	0	0	0	0
	25	12350	2	2.9	0	0	0	0	0
	26	162050	3	3.6	803833	870967	19	0	0
	27	3883	1	2.3	0	0	0	0	0
	28	11633	3	2.4	54167	13333	2	100	1
	29	21183	3	2.5	248000	70000	4	0	0
	30	8250	2	3.0	31833	0	1	0	0
	31	31083	3	2.5	204667	343500	7	0	0
	32	7180	1	2.4	20000	6000	2	0	0
	33	3117	1	1.8	0	0	0	0	0
	34	11083	1	1.8	0	0	0	0	0
	35	5700	2	2.4	0	0	0	0	0
	36	9233	1	2.2	0	6333	1	0	0
	37	1355	1	1.8	0	0	0	0	0
	38	2217	2	2.0	0	0	0	0	0
	39	27997	2	3.0	172833	115833	4	167	1
	40	8900	3	2.9	156333	45000	3	0	0
	41	2933	2	3.0	8333	0	1	0	0
	42	4325	2	2.9	0	0	0	0	0
	43	26433	2	2.9	149667	31667	3	192	1
	44	304993	7	2.2	39500	6667	2	0	0
	45	2658	1	3.3	17833	0	1	33	1
	46	182	1	2.7	210833	104667	4	0	0
	47	3417	2	4.0	52667	75000	2	0	0
	48	9967	2	3.9	212417	281250	6	600	1
	49	11550	2	3.3	76667	51000	2	57	1
	50	10667	1	3.2	136333	132333	4	0	0
	51	121617	3	4.0	261833	228500	7	183	1
	52	37833	4	4.0	1366500	990767	30	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1902	1	2100	1	2.9	13750	0	1	0	0
	2	5433	1	2.6	5000	0	1	33	1
	3	5733	2	3.5	25000	0	1	0	0
	4	7367	2	2.3	56000	41667	2	0	0
	5	4383	1	3.5	543417	367333	11	0	0
	6	3283	1	3.1	309167	33333	2	0	0
	7	178650	4	3.0	671917	329000	10	0	0
	8	31183	3	3.0	640583	200667	10	0	0
	9	16450	2	3.0	964667	436833	17	0	0
	10	3330	1	3.0	913583	187917	10	0	0
	11	28700	2	3.0	1014583	258500	11	0	0
	12	14383	2	3.0	1018667	357750	13	0	0
	13	20640	2	3.0	1317600	581700	19	0	0
	14	980	1	2.4	258000	30000	2	0	0
	15	6783	2	2.5	592250	91417	6	33	1
	16	2933	1	3.0	920583	301583	13	0	0
	17	8233	2	2.5	628667	379167	12	0	0
	18	1817	1	3.0	821333	258833	12	0	0
	19	11783	1	2.5	392950	48667	5	0	0
	20	4000	2	2.5	651950	146450	8	33	1
	21	2900	1	3.0	298300	73800	5	0	0
	22	2567	1	3.0	735250	169167	11	0	0
	23	42467	1	3.0	624550	73833	8	0	0
	24	6133	1	2.0	655917	54585	4	0	0
	25	4200	1	2.5	415667	75000	3	0	0
	26	160650	5	3.0	1444500	790250	21	0	0
	27	983	1	3.0	823667	209167	10	0	0
	28	1967	1	1.8	363833	8333	4	0	0
	29	3950	1	2.5	274333	0	2	0	0
	30	3033	1	3.0	179833	2083	2	0	0
	31	4150	1	2.5	605500	207250	9	0	0
	32	3975	1	3.0	613000	90250	6	0	0
	33	12333	2	3.0	474700	45167	5	0	0
	34	5733	2	2.5	230983	0	2	33	1
	35	12392	2	3.0	618250	173667	9	0	0
	36	10367	2	3.0	397500	0	3	0	0
	37	4500	1	2.5	386883	0	3	0	0
	38	12033	2	3.0	138900	0	1	0	0
	39	335633	9	3.0	335733	60500	5	83	1
	40	317600	8	3.3	361150	55333	4	0	0
	41	6767	1	3.7	108150	0	1	0	0
	42	2133	1	3.3	82983	0	1	0	0
	43	3333	1	3.3	146317	3333	2	0	0
	44	1560	1	4.0	595380	281800	10	0	0
	45	28033	2	3.8	87150	0	1	0	0
	46	15650	2	3.3	70483	0	1	0	0
	47	2517	1	3.2	102817	0	1	50	1
	48	186000	4	3.3	693900	363750	12	0	0
	49	2850	2	3.3	348467	16250	3	0	0
	50	23617	2	4.0	334317	36667	5	50	1
	51	122367	3	4.0	596817	92000	9	0	0
	52	256457	5	3.9	1354714	647500	20	57	1

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1903	1	10733	1	2.5	76667	1800	2	0	0
	2	2650	1	2.7	101667	0	1	0	0
	3	93183	3	3.3	247833	171000	4	0	0
	4	2733	1	3.0	18333	0	1	0	0
	5	37217	1	3.8	706000	299833	9	0	0
	6	1950	2	4.0	458833	41667	4	0	0
	7	2275	1	4.0	769567	304417	11	0	0
	8	1967	2	4.0	842983	536667	16	0	0
	9	23500	1	4.0	1237667	863000	24	0	0
	10	3417	2	3.3	1623733	529833	20	0	0
	11	12833	2	3.3	1418467	351667	18	0	0
	12	2833	2	4.0	940167	192000	12	0	0
	13	7150	1	4.0	1363667	609167	20	0	0
	14	8217	2	3.8	816333	323333	12	33	1
	15	66620	3	3.2	605500	300400	9	0	0
	16	40060	3	4.0	555000	78402	5	0	0
	17	1000	1	4.0	304750	32667	5	0	0
	18	17533	3	4.0	873250	391333	14	0	0
	19	73233	2	4.0	3110667	1231167	29	0	0
	20	15667	2	2.7	1974750	335333	12	0	0
	21	18722	2	3.3	271833	27500	2	0	0
	22	67700	3	3.5	267000	70833	4	0	0
	23	20800	3	3.5	283200	79600	3	0	0
	24	3467	1	2.3	0	0	0	0	0
	25	26465	2	2.1	0	0	0	0	0
	26	162183	4	3.2	578833	448500	8	0	0
	27	5800	2	2.5	566500	452500	10	0	0
	28	7267	1	1.8	3167	0	1	0	0
	29	9300	1	1.8	0	0	0	0	0
	30	2183	1	1.9	0	0	0	0	0
	31	5683	2	2.5	405833	55750	4	0	0
	32	4380	2	2.8	126000	21900	2	0	0
	33	15817	2	2.5	25000	0	1	0	0
	34	3800	1	3.0	0	650	1	0	0
	35	2467	1	1.5	0	0	0	0	0
	36	5183	1	2.8	15833	0	1	0	0
	37	4033	2	3.3	0	0	0	0	0
	38	33767	1	3.3	0	0	0	33	1
	39	211200	7	4.0	132167	62500	2	300	1
	40	175000	5	4.0	384333	136833	6	0	0
	41	10550	2	2.6	0	0	0	0	0
	42	6147	2	3.9	0	0	0	0	0
	43	5083	1	3.3	0	0	0	0	0
	44	20897	2	4.0	202667	79167	4	200	1
	45	16450	2	4.0	16667	16667	2	0	0
	46	265083	6	3.3	94500	1583	2	200	1
	47	2333	1	2.7	13333	0	1	67	1
	48	67567	4	3.3	207500	184833	4	0	0
	49	68800	3	4.0	4167	9000	2	0	0
	50	12000	2	2.7	35000	0	1	0	0
	51	41550	2	3.3	15833	20333	2	0	0
	52	48238	2	4.3	912813	906563	19	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1904	1	6350	1	1.8	0	0	0	0	0
	2	7633	1	2.6	115000	45000	2	0	0
	3	3650	2	3.3	8333	0	1	0	0
	4	1775	1	3.3	0	0	0	0	0
	5	8167	2	3.5	54167	10000	2	0	0
	6	2900	1	2.3	0	0	0	0	0
	7	5517	2	3.4	145167	6667	2	0	0
	8	2410	1	3.9	6667	0	1	0	0
	9	3767	2	3.3	213333	41667	2	0	0
	10	6383	1	3.0	38333	0	1	0	0
	11	6750	2	3.3	0	0	0	0	0
	12	4133	1	3.0	0	0	0	0	0
	13	31445	2	3.9	219500	71167	2	0	0
	14	3920	2	3.0	581200	400800	8	0	0
	15	3180	1	3.2	0	0	0	0	0
	16	2200	1	3.3	285667	234667	5	0	0
	17	5517	3	2.0	0	0	0	0	0
	18	21483	1	3.0	122167	120833	2	0	0
	19	3117	2	2.7	0	0	0	0	0
	20	8267	2	2.0	0	0	0	0	0
	21	2133	1	1.3	0	0	0	0	0
	22	14460	1	0.8	0	26000	1	0	0
	23	27433	1	2.2	223167	109167	3	0	0
	24	2650	2	3.0	102500	0	1	0	0
	25	5233	2	1.4	0	0	0	0	0
	26	90650	3	2.5	359500	150333	5	0	0
	27	68117	2	3.0	1001000	592833	14	0	0
	28	10600	1	2.3	152500	12500	2	0	0
	29	2583	1	3.1	84500	35333	2	0	0
	30	38517	1	2.6	110833	29167	2	83	1
	31	217450	4	2.7	551167	251083	10	333	1
	32	57300	3	3.1	105000	33200	2	0	0
	33	137283	3	3.0	131833	6667	2	0	0
	34	4517	2	2.5	0	0	0	0	0
	35	833	1	1.0	0	0	0	0	0
	36	15133	2	2.5	185667	183333	4	0	0
	37	3783	2	3.1	3333	0	1	0	0
	38	23033	2	3.0	3333	0	1	0	0
	39	39567	2	2.6	3333	0	1	0	0
	40	7233	1	3.0	152500	70833	2	33	1
	41	16183	2	2.2	5000	0	1	0	0
	42	7567	2	2.7	0	0	0	0	0
	43	2317	2	2.0	0	0	0	0	0
	44	16967	2	2.5	491333	238333	7	0	0
	45	86650	3	3.0	112500	33333	2	83	1
	46	144833	4	3.0	120833	20000	2	0	0
	47	154033	3	3.0	0	0	0	1017	1
	48	222917	6	3.0	60833	74167	2	0	0
	49	396417	8	2.5	16667	40150	2	333	1
	50	3067	2	1.5	0	0	0	0	0
	51	30583	2	2.9	15000	5833	2	0	0
	52	19573	2	3.2	809636	659273	14	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1905	1	3600	1	1.9	16667	5167	1	0	0
	2	6083	2	2.3	0	0	0	50	1
	3	4067	2	1.9	0	0	0	0	0
	4	3217	2	2.5	43833	72667	2	0	0
	5	1900	1	3.0	75833	121667	2	0	0
	6	29233	1	3.0	228333	87500	3	0	0
	7	49417	1	2.3	60000	85000	2	0	0
	8	27317	2	2.7	667000	347250	10	0	0
	9	3883	1	2.6	151333	15000	2	0	0
	10	98283	2	2.6	203483	29333	2	0	0
	11	195050	5	2.7	476500	238000	6	733	1
	12	19567	2	2.5	322667	117167	5	0	0
	13	62283	2	2.7	432000	256333	7	8	0
	14	6333	1	0.8	34833	25000	2	0	0
	15	5717	2	1.4	0	0	0	0	0
	16	4160	2	1.0	0	0	0	0	0
	17	79380	2	2.2	541200	364200	8	0	0
	18	36467	1	1.5	142000	33500	2	0	0
	19	50533	3	1.7	206000	73667	2	0	0
	20	52950	3	2.4	13333	6333	2	0	0
	21	49925	2	2.0	0	0	0	0	0
	22	4200	1	1.9	171667	98833	3	0	0
	23	16083	1	1.1	0	0	0	0	0
	24	76940	2	1.7	0	0	0	0	0
	25	40167	2	2.3	25167	24000	2	0	0
	26	31633	2	2.8	1272167	897167	21	0	0
	27	717	1	0.6	0	0	0	0	0
	28	2250	1	1.5	0	7917	1	0	0
	29	2567	1	1.3	0	2833	1	0	0
	30	9300	2	2.3	8333	29167	2	0	0
	31	12200	1	1.5	0	0	0	0	0
	32	53440	1	1.8	97960	70000	2	0	0
	33	8433	2	2.0	0	0	0	0	0
	34	48467	2	1.8	0	0	0	0	0
	35	19700	1	1.9	8333	0	1	0	0
	36	10900	2	2.1	0	0	0	193	1
	37	60133	2	1.8	0	0	0	0	0
	38	156667	5	3.0	0	500	1	33	1
	39	333283	8	2.6	312500	300000	5	50	1
	40	34817	2	3.9	8333	0	1	0	0
	41	90967	1	2.6	148333	0	1	0	0
	42	89850	3	4.0	21000	25000	2	33	1
	43	352017	6	3.3	298667	194083	5	133	1
	44	78583	3	4.1	254667	87000	4	0	0
	45	47467	2	2.7	0	0	0	267	1
	46	233250	4	4.0	24167	0	1	458	1
	47	365033	6	4.0	0	0	0	600	1
	48	86250	2	3.3	13333	0	1	50	1
	49	58633	1	3.0	0	0	0	0	0
	50	177283	4	4.0	205083	59250	3	4167	1
	51	655483	9	4.3	189167	58333	2	1067	1
	52	329375	8	4.8	1745750	1018000	23	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1906	1	39250	2	3.8	0	0	0	0	0
	2	35817	2	3.9	0	4167	1	50	1
	3	472283	7	4.0	243250	55333	3	183	1
	4	239150	3	3.3	7167	0	1	0	0
	5	208067	4	4.1	175000	65833	2	0	0
	6	186450	4	4.7	260617	218667	6	0	0
	7	102283	4	4.1	305283	322500	8	0	0
	8	114600	4	4.0	298500	196333	6	0	0
	9	40033	4	3.3	123333	251667	4	0	0
	10	26083	2	2.6	59933	70167	2	0	0
	11	135450	4	3.9	76667	130167	3	0	0
	12	205933	4	3.2	100167	134667	3	67	1
	13	50217	3	3.9	175000	168167	4	100	1
	14	55250	2	2.5	0	0	0	0	0
	15	23000	2	2.7	0	0	0	360	1
	16	419760	6	3.5	205800	118000	3	0	0
	17	336800	6	3.6	49500	87000	2	2917	1
	18	54450	4	3.8	168000	86000	2	0	0
	19	36883	2	3.3	0	10167	1	0	0
	20	5333	1	3.2	0	0	0	0	0
	21	12667	1	2.0	0	0	0	0	0
	22	57600	2	5.0	293750	387333	6	0	0
	23	12880	2	3.8	0	0	0	0	0
	24	48150	2	2.6	0	0	0	0	0
	25	37550	3	3.4	0	0	0	0	0
	26	37367	3	3.6	574667	949500	16	0	0
	27	4233	1	2.9	0	0	0	0	0
	28	26983	1	2.6	0	0	0	0	0
	29	28450	2	3.4	0	0	0	0	0
	30	13933	3	3.5	76667	120667	2	33	1
	31	3917	1	3.1	58333	8333	2	50	1
	32	28580	1	2.4	0	0	0	0	0
	33	24283	2	2.7	8333	0	1	0	0
	34	40883	2	3.3	0	0	0	0	0
	35	56283	3	2.8	16667	0	1	50	1
	36	28083	4	2.9	0	8333	1	0	0
	37	266267	5	3.8	39167	32833	2	0	0
	38	524767	9	4.0	50333	0	1	267	1
	39	301650	8	4.0	262333	117500	4	33	1
	40	351383	8	4.0	8333	0	1	450	1
	41	591183	7	3.7	0	0	0	583	1
	42	2717	1	2.8	75000	21667	2	0	0
	43	22433	1	6.1	167500	210000	5	0	0
	44	28250	1	4.1	198500	184167	5	250	1
	45	48367	1	6.1	37500	16667	2	0	0
	46	180917	5	6.0	26667	0	1	50	1
	47	5917	1	4.1	15000	3433	2	0	0
	48	23325	2	6.0	62167	107167	2	0	0
	49	12533	1	5.0	0	7167	1	0	0
	50	249100	3	5.9	23333	16667	2	0	0
	51	665300	9	5.0	23333	58333	2	0	0
	52	46280	3	6.4	740600	1039400	22	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1907	1	2260	1	4.5	0	0	0	0	0
	2	24567	2	4.3	6667	0	1	0	0
	3	7083	1	4.3	0	0	0	0	0
	4	250667	4	4.2	131333	158333	4	0	0
	5	118717	3	5.2	214500	466167	9	1667	1
	6	80683	3	4.8	118333	156667	3	0	0
	7	190133	4	5.1	106833	81500	2	850	1
	8	206200	4	4.2	66667	76833	2	0	0
	9	181367	3	4.3	160167	435333	7	0	0
	10	46600	2	5.0	16667	0	1	0	0
	11	772250	14	5.0	24167	50000	2	83	1
	12	107617	5	5.0	41667	0	1	0	0
	13	222140	7	5.0	205000	80000	3	2140	1
	14	2660	1	4.0	0	0	0	0	0
	15	23033	2	3.5	0	0	0	0	0
	16	22375	2	3.9	0	0	0	0	0
	17	4000	1	2.0	0	0	0	0	0
	18	31900	2	2.8	0	0	0	0	0
	19	12750	1	2.3	0	0	0	0	0
	20	21217	2	3.0	0	12500	1	0	0
	21	92220	2	3.1	91600	185000	3	0	0
	22	19700	1	3.2	85000	37500	2	0	0
	23	172250	3	3.8	0	0	0	0	0
	24	31733	3	3.8	0	13167	1	50	1
	25	225817	4	4.0	0	58333	1	0	0
	26	343817	7	4.3	365583	1154950	16	0	0
	27	19377	2	3.8	0	7917	1	0	0
	28	2750	1	1.8	0	0	0	0	0
	29	23517	2	3.3	0	0	0	0	0
	30	60733	2	3.2	0	0	0	0	0
	31	101400	3	3.3	75000	66667	2	0	0
	32	27300	3	3.1	0	0	0	0	0
	33	199500	5	4.4	0	0	0	83	1
	34	561033	11	4.5	0	633	1	167	1
	35	3067	1	4.5	0	0	0	0	0
	36	3100	1	4.3	0	0	0	0	0
	37	5917	2	3.6	0	0	0	350	1
	38	3383	1	3.5	0	0	0	0	0
	39	12933	2	4.0	9667	56667	2	0	0
	40	59067	2	3.4	3333	16667	2	0	0
	41	50100	2	2.8	0	0	0	0	0
	42	50050	2	2.9	0	0	0	0	0
	43	406750	8	3.8	16667	0	1	0	0
	44	718850	11	5.4	117500	109167	2	1600	1
	45	214467	4	5.3	73333	42500	2	83	1
	46	54500	2	5.8	39167	9167	2	0	0
	47	100750	3	7.0	128333	53500	4	150	1
	48	5117	1	4.7	28333	13333	2	0	0
	49	50083	2	6.3	0	0	0	0	0
	50	31933	1	5.3	0	0	0	0	0
	51	35717	2	6.6	10500	12500	2	0	0
	52	164250	3	7.4	485417	1324500	19	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1908	1	1100	1	4.1	0	0	0	0	0
	2	47733	1	4.2	0	0	0	0	0
	3	5433	1	3.3	0	0	0	0	0
	4	69017	2	3.9	0	0	0	0	0
	5	236867	3	3.9	100333	26333	2	0	0
	6	144100	3	3.9	59833	30833	2	0	0
	7	252283	4	4.0	45000	38500	2	0	0
	8	224500	3	4.0	86500	106000	3	0	0
	9	281733	5	4.2	266000	255833	7	0	0
	10	153383	3	3.0	105333	62500	3	217	1
	11	184033	3	3.8	151167	196167	5	0	0
	12	79050	3	3.4	113500	297667	5	0	0
	13	147500	5	3.3	269833	552000	10	1417	1
	14	2133	1	2.9	69167	81000	2	0	0
	15	51067	1	2.4	49167	33333	2	0	0
	16	13383	1	2.3	20833	50000	2	0	0
	17	98700	3	2.5	105000	79800	2	0	0
	18	20980	2	2.9	64000	80200	2	0	0
	19	50500	2	1.8	0	0	0	0	0
	20	90000	1	1.5	0	0	0	0	0
	21	44533	1	2.1	0	0	0	0	0
	22	39200	2	2.3	0	0	0	33	1
	23	29850	1	1.5	0	0	0	0	0
	24	86580	2	1.5	0	0	0	0	0
	25	17850	2	2.1	0	0	0	0	0
	26	18400	2	2.2	160000	135500	3	0	0
	27	57000	3	1.9	395583	553167	8	0	0
	28	36250	2	1.7	44167	6667	2	0	0
	29	4000	1	1.6	0	0	0	0	0
	30	61483	2	1.4	0	0	0	0	0
	31	11167	2	1.3	0	0	0	0	0
	32	17120	2	1.3	0	0	0	0	0
	33	52417	2	1.8	0	0	0	100	1
	34	1867	1	1.6	0	0	0	0	0
	35	4867	2	1.6	0	0	0	333	1
	36	5500	1	1.5	0	0	0	0	0
	37	32017	1	1.1	0	0	0	0	0
	38	3500	1	1.5	0	0	0	0	0
	39	9317	2	2.2	0	0	0	0	0
	40	12367	1	1.2	0	0	0	0	0
	41	15567	1	1.5	0	0	0	0	0
	42	4383	2	1.6	0	0	0	0	0
	43	22800	2	1.5	0	0	0	50	1
	44	19883	2	2.5	73833	62500	2	0	0
	45	32983	2	1.9	0	0	0	50	1
	46	56417	2	2.3	0	0	0	250	1
	47	69933	2	2.3	50000	23333	2	0	0
	48	338850	5	2.3	128333	63167	2	500	1
	49	82483	3	2.5	0	817	1	0	0
	50	201300	4	2.0	0	0	0	600	1
	51	374350	4	2.1	16667	36667	2	833	1
	52	171663	4	2.9	776313	1247188	19	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1909	1	93200	1	2.0	0	0	0	0	0
	2	19350	1	2.5	27917	0	1	0	0
	3	147883	4	2.3	15000	11333	2	0	0
	4	35983	2	2.3	43333	10000	2	0	0
	5	52250	1	1.5	49167	43833	2	0	0
	6	51750	1	1.4	0	4833	1	150	1
	7	48233	1	2.3	0	0	0	0	0
	8	105000	2	1.8	0	0	0	0	0
	9	182817	3	2.9	142750	253833	5	0	0
	10	30500	2	2.5	11667	8333	2	233	1
	11	235150	3	2.5	49833	25000	2	0	0
	12	142783	3	3.0	23333	34167	2	5500	1
	13	34083	2	2.5	93667	265667	3	0	0
	14	57517	2	2.8	59167	313667	3	0	0
	15	71460	3	1.7	0	0	0	0	0
	16	8300	2	1.6	0	0	0	0	0
	17	62350	2	1.8	0	0	0	50	1
	18	43150	2	1.6	0	0	0	0	0
	19	38050	1	1.6	0	0	0	0	0
	20	28033	1	1.5	51667	118333	2	0	0
	21	33376	1	1.5	0	0	0	0	0
	22	233933	3	1.9	169083	359833	7	0	0
	23	34560	2	2.0	0	0	0	0	0
	24	97467	2	1.8	0	8333	1	183	1
	25	21450	1	1.7	0	9333	1	0	0
	26	149017	3	2.0	70000	361333	4	0	0
	27	117983	3	2.2	361333	1143500	16	0	0
	28	35267	2	2.1	0	5500	1	0	0
	29	8250	2	2.0	0	11667	1	0	0
	30	27500	2	1.9	0	8833	1	0	0
	31	11582	1	1.3	0	0	0	0	0
	32	21740	1	2.0	0	0	0	0	0
	33	13600	2	1.8	0	0	0	0	0
	34	3900	2	1.5	0	0	0	0	0
	35	11900	1	1.0	0	0	0	383	1
	36	5717	2	1.4	0	0	0	0	0
	37	33117	2	1.3	0	0	0	0	0
	38	21567	1	1.3	0	0	0	0	0
	39	7967	2	2.0	0	0	0	0	0
	40	11167	1	0.3	0	0	0	0	0
	41	51017	3	2.1	0	0	0	867	1
	42	107650	4	2.8	0	19167	1	283	1
	43	14650	1	3.3	16667	0	1	117	1
	44	266283	4	5.1	254167	211667	4	167	1
	45	58450	1	2.5	0	0	0	0	0
	46	9133	1	4.2	25000	0	1	0	0
	47	33600	1	4.1	0	0	0	0	0
	48	168750	3	2.8	43667	22250	2	183	1
	49	1583	1	3.3	0	0	0	0	0
	50	1183	1	3.2	16667	91667	2	0	0
	51	330867	4	4.5	33333	55000	2	67	1
	52	96311	2	4.9	268222	1361889	14	0	0

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1910	1	127067	2	3.5	0	0	0	0	0
	2	27250	1	2.4	0	8167	1	0	0
	3	1200	1	1.8	0	0	0	0	0
	4	27600	1	3.3	135333	74333	2	0	0
	5	9283	1	1.6	0	0	0	0	0
	6	52017	1	1.8	0	0	0	0	0
	7	9650	1	2.7	0	0	0	0	0
	8	43000	2	2.2	0	0	0	167	1
	9	11317	2	2.2	0	0	0	617	1
	10	4100	2	2.8	0	0	0	0	0
	11	75083	3	2.9	63167	25833	2	52300	1
	12	100820	2	4.2	13000	123000	2	0	0
	13	113900	3	4.3	294200	446200	6	0	0
	14	72683	2	3.4	666667	24168	2	0	0
	15	9583	1	2.0	0	0	0	0	0
	16	49217	2	2.7	25000	0	1	0	0
	17	353617	4	3.4	186667	267500	4	0	0
	18	1850	1	1.8	0	0	0	0	0
	19	3183	1	3.3	8333	0	1	550	1
	20	82050	2	4.1	88750	400775	9	0	0
	21	123717	3	4.5	311667	526833	9	183	1
	22	121750	3	3.2	182000	61500	2	50	1
	23	139050	3	2.7	98333	25000	2	5583	1
	24	331817	4	3.1	75000	50000	2	3000	1
	25	77083	2	2.0	66667	149167	2	0	0
	26	150350	3	3.0	535167	1427167	19	0	0
	27	4883	2	2.5	0	0	0	0	0
	28	72100	2	1.9	0	0	0	0	0
	29	47867	3	2.2	0	0	0	0	0
	30	32317	2	2.7	0	0	0	0	0
	31	18700	2	1.4	0	840	1	0	0
	32	33050	2	1.7	0	0	0	0	0
	33	21500	2	2.8	0	0	0	183	1
	34	294433	4	3.0	20833	29167	2	183	1
	35	126217	5	3.0	0	0	0	283	1
	36	65650	3	3.0	0	0	0	0	0
	37	4267	1	2.0	0	0	0	0	0
	38	32667	3	2.5	0	0	0	0	0
	39	248083	5	2.9	0	5333	1	833	1
	40	87833	3	3.0	0	0	0	0	0
	41	42583	2	3.0	0	0	0	0	0
	42	11800	1	2.2	0	0	0	0	0
	43	12133	1	4.2	113333	483333	6	0	0
	44	32600	2	4.2	19167	58333	2	0	0
	45	70300	1	3.3	25000	33333	2	0	0
	46	71617	1	4.3	8333	91667	2	0	0
	47	87217	2	4.2	85667	275500	4	0	0
	48	76600	2	3.2	8333	57367	2	0	0
	49	18317	1	3.4	0	5833	1	0	0
	50	86150	2	3.9	0	0	0	0	0
	51	245017	3	4.3	71667	236833	3	883	1
	52	24850	2	5.0	1088250	2655250	23	325	1

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1911	1	68833	1	3.2	0	0	0	0	0
	2	35333	1	1.9	0	0	0	0	0
	3	29183	1	3.0	0	0	0	0	0
	4	101283	2	4.2	42667	170833	3	0	0
	5	81833	2	3.1	0	0	0	0	0
	6	14533	1	2.2	0	0	0	0	0
	7	13883	2	2.7	0	0	0	0	0
	8	37100	1	1.2	23333	5833	2	0	0
	9	100767	2	3.8	176667	80000	3	0	0
	10	1425517	6	3.2	172500	119167	3	0	0
	11	72433	2	3.0	37500	27500	2	0	0
	12	295900	4	3.4	221750	519833	7	0	0
	13	21067	2	3.3	105000	102500	3	0	0
	14	63467	3	3.0	110833	418667	6	0	0
	15	141880	2	3.1	224200	560600	6	0	0
	16	23040	1	2.8	25000	0	1	0	0
	17	2000	1	3.2	190667	629333	7	0	0
	18	5600	1	1.3	0	0	0	0	0
	19	63867	2	2.3	0	0	0	0	0
	20	2350	1	1.7	0	0	0	0	0
	21	26483	1	2.0	22500	79167	2	0	0
	22	1233	1	2.2	0	0	0	0	0
	23	38640	1	2.6	0	0	0	0	0
	24	44750	3	1.5	0	0	0	0	0
	25	8400	2	3.1	12500	0	1	0	0
	26	111817	3	3.3	369833	1728667	17	0	0
	27	28417	2	2.3	0	0	0	50	1
	28	36533	1	0.9	0	0	0	0	0
	29	22667	1	1.5	0	0	0	0	0
	30	7917	2	2.3	0	0	0	0	0
	31	9917	2	1.5	0	0	0	0	0
	32	20980	2	2.1	0	0	0	0	0
	33	4033	2	1.9	0	0	0	0	0
	34	12033	1	2.0	0	0	0	0	0
	35	6883	1	1.8	25000	0	1	67	1
	36	63333	2	2.5	0	0	0	33	1
	37	340683	7	3.0	0	0	0	567	1
	38	315333	3	2.3	0	0	0	4917	1
	39	39733	2	3.4	41833	73333	2	483	1
	40	9850	2	3.3	0	0	0	0	0
	41	3817	2	3.9	0	300	1	0	0
	42	6017	2	3.9	0	0	0	0	0
	43	24400	2	2.9	0	0	0	0	0
	44	15883	2	3.0	250	0	1	0	0
	45	31533	2	2.4	0	0	0	667	1
	46	7350	2	3.1	0	0	0	0	0
	47	28067	1	3.3	24167	8333	2	0	0
	48	20017	1	2.7	23333	16667	2	0	0
	49	118033	3	3.4	500	16667	2	1100	1
	50	582133	7	4.0	16667	33333	2	3600	1
	51	619850	8	4.3	72500	373167	4	1600	1
	52	311150	5	4.5	651250	2633500	24	25	1

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1912	1	19483	1	2.3	8333	4167	2	0	0
	2	48667	2	4.2	98000	21667	2	0	0
	3	286283	5	4.0	25000	99167	2	583	1
	4	224717	3	4.0	77500	223667	3	500	1
	5	39517	2	3.9	56667	392333	5	0	0
	6	475133	5	2.4	0	54833	1	1133	1
	7	306517	4	3.6	0	25000	1	1300	1
	8	509333	7	3.6	11667	27500	2	800	1
	9	599333	7	3.6	67500	355167	5	100	1
	10	367950	6	3.6	26500	87000	2	83	1
	11	903817	13	3.5	8333	87500	2	9817	1
	12	254367	6	2.9	8333	4167	2	2167	1
	13	63850	3	3.6	23333	404333	3	0	0
	14	65660	2	2.9	20000	55600	2	0	0
	15	89620	3	3.5	27000	40000	2	0	0
	16	20283	2	2.9	16667	41667	2	100	1
	17	45917	1	2.4	13333	245500	2	0	0
	18	15650	1	2.6	0	0	0	0	0
	19	14533	2	2.1	0	0	0	0	0
	20	40550	2	1.5	4167	0	1	500	1
	21	320983	6	3.0	10000	34333	2	67	1
	22	990680	10	3.0	26000	56600	2	4120	1
	23	633	1	1.0	0	0	0	0	0
	24	99933	3	3.0	13333	20000	2	667	1
	25	220517	4	2.5	0	0	0	333	1
	26	245833	4	3.3	326167	1698833	16	217	1
	27	9867	2	2.0	0	0	0	0	0
	28	122350	3	2.5	3333	0	1	50	1
	29	357200	5	3.1	16667	0	1	1517	1
	30	532467	7	2.5	0	0	0	1750	1
	31	110167	2	3.2	35333	60000	2	0	0
	32	63490	2	2.4	0	0	0	0	0
	33	246600	7	3.1	0	0	0	2717	1
	34	353000	6	3.0	0	0	0	2447	1
	35	193833	5	3.7	0	0	0	333	1
	36	1383	1	1.9	0	0	0	0	0
	37	5450	1	3.1	0	0	0	0	0
	38	4100	2	2.7	0	0	0	0	0
	39	7217	2	2.9	0	0	0	33	1
	40	3317	1	3.2	0	0	0	33	1
	41	131642	3	4.2	0	0	0	833	1
	42	48067	2	3.2	0	0	0	967	1
	43	19467	1	3.1	0	0	0	0	0
	44	127817	3	5.1	124333	494333	6	0	0
	45	145617	2	4.1	0	0	0	67	1
	46	143450	2	4.1	0	0	0	167	1
	47	41683	1	3.3	0	0	0	0	0
	48	51533	2	5.0	0	254833	2	0	0
	49	12367	1	3.3	0	0	0	467	1
	50	202933	4	5.0	0	3833	1	2225	1
	51	516250	6	4.2	0	0	0	750	1
	52	199283	4	5.4	72833	2166833	17	83	1

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1913	1	550	1	2.4	0	0	0	0	0
	2	5917	2	3.2	0	0	0	117	1
	3	32483	1	2.4	20000	14167	2	0	0
	4	166967	4	4.8	0	98500	1	3050	1
	5	313283	5	5.3	16667	602000	5	133	1
	6	296000	4	4.2	28333	121667	2	2067	1
	7	398750	7	4.9	0	0	0	933	1
	8	286183	6	4.2	0	89667	1	465	1
	9	639450	9	5.0	25000	268167	3	650	1
	10	376617	5	4.9	8333	44000	2	567	1
	11	656417	10	5.0	0	0	0	378	1
	12	341020	6	5.0	7000	113600	2	4060	1
	13	164300	3	4.1	38000	609400	5	0	0
	14	5767	2	3.9	0	0	0	83	1
	15	9500	2	3.7	0	0	0	0	0
	16	11267	2	3.5	0	0	0	0	0
	17	3317	2	3.5	0	0	0	0	0
	18	15650	1	2.8	14167	157667	2	0	0
	19	44867	1	2.1	0	0	0	0	0
	20	63860	2	3.3	10000	16000	2	0	0
	21	2350	1	2.3	0	0	0	0	0
	22	517	1	2.3	8333	62500	2	0	0
	23	102617	2	2.3	24167	55833	2	1333	1
	24	212433	5	3.8	0	0	0	92	1
	25	96233	2	3.8	0	0	0	0	0
	26	242550	4	4.9	17500	833167	6	517	1
	27	18633	2	3.8	172250	691333	8	233	1
	28	1050	1	2.3	0	0	0	800	1
	29	19850	2	4.1	0	0	0	0	0
	30	1817	1	3.8	0	0	0	0	0
	31	150	1	2.5	33333	83333	2	0	0
	32	2140	1	1.8	0	0	0	0	0
	33	41383	2	3.4	0	0	0	0	0
	34	96333	2	2.6	0	0	0	33	1
	35	1283	1	3.0	0	0	0	0	0
	36	900	1	3.3	0	0	0	0	0
	37	2000	1	2.0	0	0	0	33	1
	38	21083	2	2.8	0	0	0	133	1
	39	26317	2	3.8	25000	195833	2	1283	1
	40	71050	3	3.7	0	16667	1	0	0
	41	44983	2	4.0	0	0	0	83	1
	42	3157	2	3.4	0	0	0	1475	1
	43	1267	1	2.4	0	0	0	0	0
	44	391050	4	3.3	108333	232333	3	1117	1
	45	27600	1	3.4	0	0	0	0	0
	46	58117	1	4.2	0	13333	1	0	0
	47	316717	4	4.2	0	30000	1	1500	1
	48	184283	1	2.6	3333	150000	2	0	0
	49	40233	1	2.5	0	0	0	0	0
	50	4650	1	4.3	0	0	0	0	0
	51	772900	7	4.9	0	0	0	3050	1
	52	452214	5	5.3	272071	1724143	15	1600	1

	WEEK	TVB (£)	TNT	R (%)	VAOS (£)	TVA (£)	TNAT	TVR (£)	TNR
1914	1	5133	1	4.4	0	0	0	0	0
	2	22283	1	1.4	0	0	0	0	0
	3	717	1	0.8	0	0	0	0	0
	4	71933	2	2.6	0	0	0	0	0
	5	257017	5	2.7	0	0	0	0	0
	6	43150	1	1.0	0	0	0	0	0
	7	107333	3	2.3	0	0	0	1550	1
	8	93917	4	1.4	0	0	0	6317	1
	9	109467	2	2.8	0	63333	1	117	1
	10	35633	1	2.3	0	0	0	0	0
	11	111783	2	1.9	0	16667	1	0	0
	12	494800	5	2.8	25000	86167	2	1683	1
	13	3883	1	3.0	58333	371917	4	567	1
	14	33217	1	1.5	0	0	0	0	0
	15	140	1	0.4	0	0	0	0	0
	16	7760	1	0.8	0	0	0	0	0
	17	3017	1	1.3	0	0	0	200	1
	18	2150	1	2.8	109167	353333	3	0	0
	19	2117	1	1.5	0	8333	1	1317	1
	20	21167	1	2.6	2500	46667	2	2000	1
	21	521917	6	3.0	0	104167	1	7500	1
	22	464517	5	2.5	12500	225500	2	5667	1
	23	33620	1	1.7	0	0	0	2000	1
	24	2767	1	2.0	0	0	0	0	0
	25	3600	1	1.0	0	0	0	0	0
	26	120550	2	2.6	57500	1017833	8	0	0
	27	70233	1	1.8	41667	1287833	9	0	0
	28	33833	2	1.8	0	0	0	0	0
	29	1117	1	1.7	0	0	0	0	0
	30	25283	1	2.4	75000	66667	2	167	1
	31	2053750	22	5.5	286833	2311167	16	6567	2
	32	170300	6	5.5	74750	721500	5	0	0
	33	4017300	39	5.0	0	21167	1	21683	7
	34	4790467	67	5.0	14667	53167	2	110283	17
	35	3437067	63	5.0	0	0	0	293250	24
	36	1902267	38	5.0	0	0	0	84233	17
	37	516767	19	5.0	0	0	0	46617	12
	38	670733	20	5.0	0	0	0	94350	13
	39	910300	24	5.0	0	0	0	101983	15
	40	1925833	53	5.0	0	0	0	205817	32
	41	529467	26	5.0	0	0	0	83000	15
	42	1065600	31	5.0	0	0	0	56150	19
	43	535767	23	5.0	0	0	0	37667	11
	44	347383	18	5.0	0	0	0	23717	9
	45	332000	14	5.0	0	0	0	19833	8
	46	159933	11	5.0	0	0	0	18850	8
	47	105133	9	5.0	0	0	0	6233	3
	48	62417	8	5.0	0	0	0	11117	3
	49	18133	4	4.2	0	0	0	4000	2
	50	5083	2	5.0	0	0	0	2017	2
	51	9867	2	5.0	0	0	0	2450	2
	52	5163	1	3.8	0	0	0	1331	1

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