LIVING WITH DOLLARIZATION AND THE ROUTE TO DEDOLLARIZATION

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Abstract:

Financial dollarization in Latin America has been growing over time in spite of a major reduction in inflation and a shift toward central bank independence. After discussing the key stylized facts of dollarization and dedollarization in the region, we discuss the risks that this process poses to the region. In particular, we explore the validity of concerns about the effectiveness of monetary policy in a dollarized economy and about a loss of seigniorage revenue in such an economy. After concluding that to a large extent these concerns lack empirical support, we focus on the main reason for concern: increased vulnerability due to the dollarization of public and private debt. We emphasize the importance of precautionary/regulatory measures attempting to limit the scope of mismatches originating from liability dollarization, and of developing financial instruments designed to hedge against currency risk. Moreover, we deal with the experience of policies directly aimed at deepening domestic financial markets in local currency assets and in gradually lengthening the maturity of these assets. We find particular interest in drawing some important lessons from the experience of dedollarization in Israel for Latin America.

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1. Introduction

Financial dollarization has been growing in Latin America over time in spite of a major reduction in inflation and a shift toward fiscal consolidation and central bank independence. Although in principle dollarization can exacerbate a typical Latin American economy's vulnerability to adverse shocks (as e.g. sudden stops), it is likely to remain a key feature of reality in the region. In fact, it is quite hard to think of political-economy incentives strong enough for policymakers to come up in the near future with explicit policy programs designed to actively reduce dollarization in the region.

It then follows that if the phenomenon of dollarization is there to remain in the region, then it would be important to discuss how "to live" with it while attenuating its potential harmful effects and also how to possibly reduce its depth.

After discussing the key stylized facts of dollarization and dedollarization in the region, we discuss the risks that this process poses to the economies in the region. It turns out that there is no strong evidence to support the notion that dollarization seriously weakens the effectiveness of domestic monetary policy or the ability to raise seigniorage revenue. Instead, there are good reasons to believe that the main policy concerns about dollarization have to do with increased vulnerabilities due to dollarized public and private sector debt. In particular, sudden stops in capital inflows that are accompanied by a marked economic slowdown and a sharp depreciation of the domestic currency can set in motion a set of very difficult dynamics for public and private sector debt.

For this research project, we conducted a **special survey** of a set of policy makers in Latin American countries in order to understand efforts done to dedollarize or to deal with dollarization. The results of the survey—whose questionnaire appears in the Appendix--suggest that countries with high levels of dollarization are **not** adopting active and direct policies to reduce the level of dollarization. "Dedollarization" is expected to be a side effect

of prudent fiscal and monetary policies, complemented with efforts to develop local currency debt markets or markets for CPI indexed financial instruments. Nonetheless policy makers are very aware of the risks of dollarization, however, it is surprising that very few countries are adopting policy measures to directly deal with them. The rest of countries, those with moderate levels of dollarization, appear satisfied with their current levels of dollarization.

Among the various ways discussed in the paper as to how to live with dollarization, we emphasize the importance of precautionary/regulatory measures attempting to limit the scope of mismatches originating from liability dollarization, and of developing financial instruments designed to hedge against currency risk. We also discuss how partial dedollarization can be enhanced by having policies directly aimed at deepening domestic financial markets in local currency assets and in gradually lengthening the maturity of these assets. We find particular interest in drawing some important lessons from the experience of dedollarization in Israel for Latin America.

The paper is organized as follows. Section 2 deals with the main stylized facts of dollarization in Latin America. Section 3 highlights what we consider to be the main policy concerns about dollarization. Sections 4 and 5 focus on how to live with dollarization and on the main lessons from failed attempts at dedollarization. Section 6 draws the main lessons from Israel's experience. Section 7 concludes the paper.

2. Dollarization trends in Latin America: some stylized facts

Dollarization of private and public sector assets and liabilities is wide spread throughout Latin America. As part of a comprehensive set of structural reforms—some which came in the aftermath of financial crisis and hyperinflation--many Latin American countries liberalized and reformed their financial markets. In the process strong linkages to the US dollar were developed frequently through the adoption of strong pegs or quasi-fixed exchange rate arrangements, in a context of increased capital mobility. In many countries restrictions to

hold financial assets abroad, to move assets freely across the border, or to issue liabilities in foreign currency both locally or across the border, were lifted and competition between domestic and foreign currencies increased. In many cases this led to the dollarization of deposits and loans in the domestic financial system, to significant holdings of financial assets abroad, and in general to the issuance of foreign denominated liabilities of the private and public sectors.

Table 1 reports several measures of financial dollarization in Latin American countries with less-than-full dollarization, i.e. those that have not adopted the dollar as legal tender. A first view of the data reveals that in some form or another dollarization is a generalized phenomenon throughout the region. While some countries such as Brazil, Chile, Colombia or Venezuela have successfully contained the degree of dollarization in the domestic financial sector, financial dollarization tends to appear in the form of dollarization of public sector liabilities or in the form of dollar denominated offshore deposits and loans. Hence, even in cases of moderate "domestic" dollarization (following the terminology of Reinhart, Rogoff and Savastano (2003)) such as Colombia, vulnerabilities associated with dollarization may still arise since the corporate sector may be exposed to balance sheet effects of exchange rate fluctuations via foreign indebtedness[1].

Compared to other emerging markets countries, dollarization in Latin America in any of its forms is high. While on average in non Latin American emerging markets the share of dollar denominated deposits and loans round 22% and 19% respectively, in Latin America the average figures are around 37% and 40%. Moreover in some countries such as Bolivia, Costa Rica, Nicaragua, Paraguay, Peru and Uruguay more than half of deposits and of loans are denominated in dollars.

The dollarization of public sector liabilities is even higher in Latin America compared to other emerging markets. While in the rest of the emerging world the share of dollar

denominated public sector liabilities rounds 40%, in Latin America the average figure exceeds 75% and more than 90% in several cases.

While on average the dollarization of financial sector deposits and loans rose significantly during the 1990s with a sharp increase after the 1998 world financial markets crisis (figure 1), the dollarization of public sector liabilities has remained relatively constant (figure 2). If anything the share of dollar denominated public debt has fallen slightly as domestic bonds markets developed during the 1990s.

Very High Dollarization: The Cases of Bolivia and Peru

High levels of inflation, low credibility about domestic macroeconomic policies, and chronic volatility associated with monetary financing of budget deficits induced a switch to dollar denominated assets. Here we expand on the cases of Bolivia and Peru--typical cases of financial dollarization in Latin America--which reflect this pattern closely[2]. As macroeconomic imbalances materialized during the 1980s asset substitution led to larger holdings of dollar denominated deposits. However, despite the fact that macroeconomic balance was regained and that inflation was tamed dollarization rates have remained high.

Both Bolivia and Peru are cases where dollarization boosted as the authorities increasingly relied on monetary financing of the fiscal deficit. In Bolivia, during the 1970s and 1980s, fiscal policy was led by the premise that state enterprises (particularly in the mining industry) and large public investments, financed mainly through foreign bank credit, were growth-promoting vehicles. At the beginning of the 1980's terms of trade deteriorated significantly (mainly because of a fall in the price of tin -the country's principal export at the time), during a time of a significant hike in international interest rates. The combination of both factors produced a severe debt sustainability problem that led authorities to reschedule

[1] In fact a recent study by Fergusson, Echeverry, Steiner and Aguilar(2003) suggest that exchange rate depreciations during the 1990s decreased profitability of firms holding dollar denominated debt.

[2] Uruguay is also a similar case. A detailed discussion on Uruguay can be found in Licandro and Licandro (2003)

their foreign debt payments in 1981 (note that this happened two years before debt problems were spread through out the region).

Due to the lack of external funding and the high fiscal deficits that were being run, central bank financing became the major funding vehicle for the government, leading to a hyperinflation episode in the middle of the decade. Financial dollarization rose as inflation expectations reacted in the late 1970s (figure 3).

In August 1985, authorities adopted a stabilization package aimed at targeting the fiscal deficit and increasing monetary policy independence. Privatizations, elimination of subsidies, a freeze of public sector wages, a tax reform, financial, commercial and capital controls liberalization, in addition to a law of central bank independence, were the major components of the package. Inflation and the fiscal deficit were successfully reduced, but the dollarization of deposits continued growing rapidly until the early 1990's where it stabilized in levels close to 80% of total deposits.

The Peruvian experience is quite similar. Up to 1990 the Peruvian Central Bank frequently financed the public sector and a whole range of state owned development banks to promote the development of certain sectors. In the 1970s and 1980s fiscal financing became the major component of monetary issuances. During the 1970s and early 1980s, Central Bank transfers to development banks were the principal source of monetary financing to the public sector. Later, after the debt crisis in 1985, the lack of financing sources for the public sector increased the dependency on central bank credit. Between 1985 and 1990 an additional expansionary source was set. In order to favor exports and subsidize imports of primary goods, a differential exchange rate regime was introduced, leading to further monetary expansion. The combination of the above led inflation to rise from one-digit levels to hyperinflation by the end of the 1980s. Macroeconomic imbalances were closely followed by the dollarization of the Peruvian financial system. In order to avoid wealth losses due to the

persistently high levels of inflation of the 70s and 80s a process of substitution towards dollar denominated assets took place (figure 4).

While in both cases, as well as in many other Latin American experiences, inflation was stabilized and macroeconomic accounts were returned to order, dollarization remained high. Standard portfolio theory has been used to explain such observed hysteresis in dollarization. Ize and Levy Yeyati(1998 and 2003) for example use a static CAPM model with risk averse borrowers and lenders to explain it. They argue that domestic residents prefer to denominate contracts in foreign currency when its purchasing power in terms of domestic consumption in stable relative to that of domestic currency. In this setup expected real exchange rate volatility relative to inflation volatility is the relevant driving force of dollarization. They find that in several of the dollarized South American countries real exchange rate volatility has declined as much or more than inflation volatility. Moreover, they argue that real exchange rate volatility is anchored by a long-term purchasing power condition, while future inflation is uncertain despite current low levels of inflation.

In addition to portfolio considerations, persistent dollarization in Latin America can also reflect lack of credibility of monetary policy[3]. In this sense dollarization is a form of protection against debt repudiation via inflation. This view might appear less relevant today given the history of low inflation that many Latin American countries started to built during the 1990s, however it remains important given the high level of indebtedness of the region and the current stress affecting fiscal accounts.

Accounting for the dollarization of public debt remains a tougher challenge. Many of the determinants discussed in the literature on financial sector dollarization have been used to explain the dollarization of public sector debt. Claessens, Klinglebiel and Schmukler (2003) find that country size matters for the development of bond markets, suggesting that there might be economies of scale in the development of the infrastructure of local bond markets,

[3] See Calvo and Guidotti (1990) for a discussion.

including the fixed costs of establishing clearing and settlement systems and developing the legal framework for issuing and trading. Additionally they find that inflation affects the development of local currency public bond markets adversely, that flexible exchange rate arrangements tend to promote domestic currency bond markets and that institutional development in the form of better democratic institutions affects positively. In a study about the determinants of what they have labeled original sin (the impossibility of issuing external debt in domestic currency) Eichengreen, Haussman and Panizza (2003) find that only the size of the country matters and to a lesser degree inflation history. Other possible determinants explored by the authors but that do not turnout significant in their regressions include exchange rate variability, the exchange rate regime, institutions, trade openness, and fiscal policy among others.

3. Why should policy makers care about dollarization?

Having documented the fact that in spite of the major decline in inflation there has been a deepening of the dollarization phenomenon in Latin America, it is well to deal with any **policy concerns** that could possibly be derived from this fact. Several concerns emerge when discussing dollarization. On the one hand there is concern that dollarization can reduce the effectiveness of monetary policy. On the other there is concern about the risks that dollarization poses for macroeconomic and financial stability and performance.

Conventional views about partial dollarization relate it to monetary policy ineffectiveness. The main rationale of such view is that under currency substitution the domestic central bank is not able to influence the relevant interest rate for consumption and investment decisions. Despite a significant volume of literature suggesting a significant reduction in monetary policy effectiveness in (partially) dollarized economies, empirical evidence **does not** provide support to this view. Reinhart et al (2003) do not find significant differences between the ability of monetary policy to contain inflation or to stabilize output

across countries with different degrees of dollarization. Table 2 summarizes some evidence in this respect for Latin American countries. Regardless of the degree of dollarization, inflation has fallen throughout the region and differences in current inflation rates are not significant across different groups of countries when classified by level of dollarization. Similar results hold for GDP growth and its volatility, which are similar across groups of countries with different levels of dollarization.

Reinhart et al (2003) also explore if dollarization leads to significant differences in the ability to raise revenue from seigniorage. The average revenue from money creation among Latin American countries during the mid 1990s and early 2000s, ranged from 0.8% to 3.3% percent of GDP (table 3). These figures are generally independent of the degree of dollarization. An important trend that is worth mentioning is that independent of the monetary policy carried out in each country and the degree of dollarization, seigniorage financing has been notably reduced throughout the region.

The upshot from this discussion is that the ability to carry out an effective monetary policy does **not** seem to be a major cause of concern about dollarization. As Calvo and Reinhart(2002) and Haussman, Panizza and Stein(2001) point out, dollarization limits the ability of central banks to increase interest rates to defend the currency due to *fear of floating*, however this does not necessarily imply that it damages their ability to control inflation. As a matter of fact, a relatively well-operating inflation-targeting scheme is working since early 2002 in Peru, one of the most highly dollarized economies in the globe, with quite satisfactory results thus far.

If dollarization is of great concern for policy makers, it is probably so due to a different reason, namely, that it can exacerbate a given country's vulnerability to adverse shocks. In what follows we deal with two such main vulnerabilities, one arising from liability dollarization of the private sector, and the other one having to do with public debt dynamics.

A recent strand of literature, mostly motivated by the "Tequila" crises of 1994-95, the Asian meltdown of 1997 and subsequent crises has emphasized the importance of such vulnerabilities raised by dollarization. These events led many observers to suggest that the presence of debt denominated in foreign currency can reverse the expansionary impact of exchange rate depreciations common to the standard Mundell-Flemming framework.

Moreover analysts have suggested that dollarization itself can play a leading role in provoking self-fulfilling crises[4]. Calvo, Izquierdo and Mejia (2003) for example, provide empirical evidence of the importance of liability dollarization as a predictor of sudden stops in capital flows for a sample of emerging market countries.

Krugman (1999a), Aghion, Bachetta and Banerjee (2001, 2003), and Cespedes, Chang and Velasco (2002) were among the first to utilize what is now known as the open economy Bernanke-Gertler-Gilchrist framework to show that, in presence of foreign currency debt, currency depreciations may be contractionary[5]. From an empirical standpoint two recent studies (Céspedes, 2003, and Galindo, Panizza, and Schiantarelli, 2003) use macroeconomic data to investigate whether the presence of dollar debt affects the relationship between economic activity and exchange rate depreciation. Both papers find that the presence of dollar debt reduces (up to the point of possibly making it negative) the expansionary effect of currency depreciations. In their baseline regression for instance, Galindo et al. find that depreciations are expansionary in countries with low levels of dollarization and that depreciations become contractionary in countries that have a substantial share of dollarization[6].

[4] Discussions can be found in Dornbusch (1998), Krugman (1999a, 1999b) and Calvo, Izquierdo and Talvi (2003).

[5] Cespedes, Chang and Velasco (2002), for instance, show that the presence of liability dollarization (dollarization here stands for choosing debt denominated in any foreign currency) does not necessarily lead to contractionary depreciations. In particular, they show that depreciations can be contractionary only in presence of very large levels of foreign currency debt and large imperfections in the international capital markets. They find that the steady-state levels of debt and risk premia that are necessary to generate contractionary depreciations are unrealistically large.

[6] In their study the authors analyze public sector dollarization as well as dollarization of deposits.

In addition to cross country studies several papers have focused on vulnerabilities raised by dollarization at a firm level perspective. There are a limited number of papers that focus on emerging market countries and use firm-level data to explore the issue of debt dollarization. Typically they analyze two related questions: (i) Do firms try to hedge by borrowing in foreign currency when they produce tradable goods and in domestic currency when they produce non-tradable? (ii) Do firms with foreign currency debt suffer negative balance sheet effects from devaluations?

Bleakley and Cowan (2002) attempt to answer both questions by using a sample of firms from five Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico) over the 1991-1999 period. They find that firms tend to match the currency composition of their liabilities with their ex-ante sensitivity of revenues to the real exchange rate. In other words, firms that produce tradable goods tend to hold more dollar debt than forms that produce non-tradable. As a consequence of matching, Bleakley and Cowan find no evidence in support of a negative balance sheet effect. On the contrary, they find that currency depreciations tend to benefit more firms with a larger share of foreign currency debt.

In contrast to Bleakley and Cowan a series of studies focusing on the impact of debt dollarization at the firm level for individual countries provides opposite results. Balance sheet effects of exchange rate fluctuations appear to be highly significant in countries with different degrees of dollarization. Fergusson, Echeverry, Steiner and Aguilar (2003) find that, despite the fact that dollarization is low in Colombia, firms that borrow in dollars are not fully hedged and suffer from economic fluctuations. Bonomo, Martins and Pinto (2003) and Carranza, Cayo and Sanchez-Galdon (2003) find similar results for Brazil -another country with relatively low dollarization- and the highly dollarized Peru, respectively.

In a study of the Asian crisis, Harvey and Roper (1999) find that balance sheet effects associated with debt dollarization played a significant role in propagating the crisis. They argue that Asian corporations were highly leveraged in foreign currency at a time of declining

profitability and were betting on currency stability. In turn the crisis was greatly exacerbated by these bets.

Aguiar (2002), Pratab, Lobato and Somuano (2003), and Martinez and Werner (2002) focus on the Mexican experience and find that Mexican firms tend to partially hedge the currency composition of their liabilities. However, Aguiar provides *prima facie* evidence for the fact that firms are not fully hedged by showing that the currency depreciation during the Tequila crisis led to a reduction of net worth with a consequent drop in investment. Martinez and Werner find weak evidence of hedging before the Tequila crisis but they suggest that the flexible exchange rate system adopted by Mexico in the aftermath of the crisis increased the incentives for hedging and hence reduced mismatches in firms' balance sheets.[7]

In short, firm-level evidence suggests good rationales for financial dollarization to be a cause of policy concern, **especially in countries with fairly underdeveloped derivatives markets**, as most of those in the Latin American region (see table 4). Currency derivatives are shallow markets, leaving exports as the main alternative to hedge dollar denominated obligations. Balance sheet effects at the firm level can have adverse effects on investment and growth directly, as well as through increasing overall financial sector fragility even in countries in which domestic financial sector loans are not dollarized. In such cases firms indebted abroad can default not only on their foreign but also on their domestic obligations, hurting the local financial system as well.

Several concerns regarding the vulnerability of the financial system emerge with dollarization. While empirical evidence suggests that dollarization can reduce the adverse effect of high inflation on financial intermediation[8], there are significant valid concerns with respect to its impact on financial fragility. Dollarized financial systems are particularly subject to solvency and liquidity risks. The main source of fragility is brought through

[7] This evidence is supportive of models that emphasize the moral hazard role of fixed exchange rate regimes, see for instance Burnside, Eichenbaum, and Rebelo (1999).
[8] See De Nicoló, Honahan and Ize (2003)

currency mismatches in the event of large exchange rate depreciations. While regulations have limited significantly the extent to which banks can have currency mismatches in their balance sheets, the indirect effects of portfolio deterioration remain present. In a way, the currency mismatch is transferred to borrowers, but the financial institution still bears the currency mismatch risk especially if the borrower is unhedged[9]. As noted by De Nicolo et al (2003) such form of credit risk may be associated to an increased risk of deposit withdrawals that can lead to bank runs in response or in anticipation of a devaluation.

In summary, the foregoing empirical evidence surveyed suggests that from the perspective of firm performance and the health of the financial sector there are good reasons for caring about dollarization.

Public debt dynamics can be another source of concern about dollarization. Just imagine an economy facing an adverse shock such as a sudden stop in capital inflows—e.g., giving rise to domestic currency depreciation together with a slowdown in economic activity and in tax revenues--in the presence of a high share of total public debt issued in foreign currency terms. Clearly, the almost built-in rise in the public debt-to-GDP ratio can be accompanied by a set of perverse debt dynamics. In fact, Calvo, Izquierdo and Talvi (2002) show that the dollarization of public debt played a significant role in explaining the Argentine crash. Dollarized public sectors are exposed exactly to the same problems of non-tradable firms indebted in foreign currency. In the case of Argentina the authors argue that the country was fiscally weak, not because of the size of their fiscal deficit, but mostly because of the composition of its debt. Given their high level of dollarization the fluctuation in the real exchange rate that accompanied the sudden stop in capital flows turned an apparently sustainable fiscal situation into an unsustainable one.

We now turn to a discussion of how to deal with the foregoing concerns about dollarization.

[9] De Nicoló et al (2003) show empirical results suggesting that in fact highly dollarized economies are more prone to

4. Living with dollarization

For the reasons developed in the previous section, coping with the risks of dollarization can become a high-priority policy objective. While some countries such as Brazil, Colombia, Mexico and Venezuela have tried to avoid domestic financial dollarization by banning or highly restricting the possibility of issuing deposits in foreign currency, most countries have allowed for currency diversification within the domestic financial sector. Note that despite the fact that currency diversification is restricted in Brazil, Colombia, Mexico and Venezuela, residents have diversified via off shore accounts (table 5). The figures reported in table 5 underestimate the size of offshore accounts given that they do not include deposits in non-BIS reporting banks. Deposits in fiscal or tax "paradises" can be substantial. However, despite this limitation of the data, it is remarkable how the share of deposits abroad to some extent can substitute dollar deposits in shore. While, at least to our knowledge, there is no systematic study on the impact of off shore deposits on financial development, it is likely that to some extent, allowing some currency diversification in shore might lead to some expansion of credit. This though, remains to be tested.

The question of interest of this section is how countries that allow domestic financial intermediation in foreign currency deal with the potential risks described above. **The surprising answer, as reported in table 6, is that only in very few cases prudential regulation directly addresses risks related to dollarization[10].**

While in all countries regulation imposes restrictions on the direct exchange rate risk exposure in the balance sheet of financial institutions, it does not deal with possible deleterious effects of borrowers dollarization on the quality of loans. Only in Costa Rica,

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solvency problems and increase deposit volatility.

[10] Information reported in table 5 is based on our survey to Latin American policy makers. We surveyed policy makers in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Paraguay, Peru, Uruguay and Venezuela

according to our survey, are the authorities studying the possibility of assigning specific provisions to dollar denominated loans. In Chile, Colombia, Costa Rica, Peru and Uruguay banks are encouraged to incorporate exchange rate risk in the valuation of credit risk, **however there are no systematic guidelines for doing so and no specific criteria to attach specific provisions to these risks.** Because in most countries provisioning rules are determined based on accruals rather than forward looking criteria there is no systematic way of dealing with borrowers currency mismatches and reduce the impact of exchange rate fluctuations on banking stability.

While the adoption of Basel II, IRB types of regulations could ease the current lack of direct prudential action with respect to currency mismatches, it is **unlikely** that the use of internal credit risk assessment models will be generalized throughout the region. Given the lack of data in some countries and questionable technical quality at some banks and banking superintendencies, we believe it is **not** likely that in the near future most banks will have the methods and mechanisms to adequately assess such risks individually. Given that, and the need to develop a prudential framework that deals with the risks of domestic dollarization, **the introduction of tighter prudential requirements on foreign currency loans** in the form of specific rules, such as ceilings on certain exposures, or general provisions on foreign currency loans could be considered. In more sophisticated markets, or at least for more sophisticated banks, such as developed country origin foreign banks that operate in the region, the use of internal credit risk models could be allowed, as long as the domestic regulators are certain that they effectively deal with the currency mismatch problem.

With respect to liquidity risk, the most dollarized countries have tried to deal with it by imposing higher reserve requirements on dollar denominated liabilities. In this sense regulation has been aimed at letting banks bear the full risk and cost of assuming dollar denominated liabilities.

In Bolivia, for example, differential reserve requirements have been in place for a long time. Virtually no fixed term deposit in domestic currency or in inflation-indexed units with maturity lower than 720 days has a reserve requirement. All deposits in foreign currency have a 10% reserve requirement, except those with maturity greater than 720 days. Demand deposits in either currency have a 10% requirement.

The Peruvian case, once again is similar. In order to reduce liquidity risk, maintaining relatively high levels of reserves is a policy objective. As in Bolivia, differential reserve requirements between foreign currency and domestic currency deposits are applied. On average domestic currency deposits have an 8%requirement, while foreign currency deposits have a 20% requirement. These rates have been effective since 1998, however differential requirements have been in place since the 1980s.

As in Bolivia and Peru, Paraguay has adopted differential reserve requirements. It is notable however, that aside from this measure, very little has been done in Paraguay to deal with the financial vulnerabilities associated to dollarization.

5. The route to dedollarization

Dedollarizing an economy can be a very difficult and very costly task. It is usually the side effect, or endogenous outcome, of a persistent process of disinflation and stabilization rather than being the main objective of a policy program. In fact very few countries in the globe have been able to do so. This is true both from the perspective of dedollarizing the financial sector as well as dedollarizing public sector debt.

Financial sector dedollarization

In order to identify successful experiences of dedollarization of the financial sector, we construct a database for over 90 countries around the world on dollarization of financial

sector deposits and loans[11]. Based on this data we explore which countries have successfully dedollarized their financial systems. We define dedollarization as: i) having initial high dollarization (over 40% of deposits or loans), ii) reducing dollarization to 20% or less and iii) maintaining those levels for at least five consecutive years. Using this criteria we identify only **three countries** as successful dedollarizers: Chile, Israel and Poland (figure 5).

Reinhart et al (2003) note that for the sample of countries for which they had data available (eighty five countries), **only four** have been able to dedollarize their financial system successfully: Israel, Mexico, Poland and Pakistan. They define dedollarization as a case in which deposit dollarization falls by 20%, they settle at a level below 20%, and remain bellow that level. Mexico does not turn out in our criteria, given that the initial level of dollarization was low; the share of dollar deposits only reached 25% at the beginning of the 80s. The other three countries had these shares well above 40%.

We will discuss Israel in detail in the following section. The case of Chile is amply analyzed in Herrera and Valdés (2003), and hence will not be analyzed here. However, it is worth noting that Chile is an interesting case of dedollarization. While the share of dollar denominated deposits in Chile never exceeded any worrisome level, the share of dollar denominated loans averaged 45% at the beginning of the 1980's and was reduced to less than 10% by the end of the 1990s. While in Chile and Israel dedollarization has been a long process, other countries have tried to adopt faster ways to dedollarize. Pakistan is one of such cases. In 1998 deposits were forcedly converted to domestic currency. The same happened in Argentina in 2001. While these experiences are fairly recent and hence difficult to evaluate, there are other experiences in Latin America that suggest that this is not necessarily an optimal strategy. The cases of Bolivia and Peru, once again, are clear examples of unsuccessful currency conversions of deposits.

[11] Our principal sources of data are Arteta (2003) and Honohan and Shi (2003), which we complement with information from Latin American countries' bank superintendencies.

In 1982 Bolivian authorities attempted to "dedollarize" the economy by converting dollar denominated financial instruments to pesos bolivianos at an exchange rate below the prevailing one in the market. Capital controls, price controls, and interest rate caps were also imposed at the time. Real negative interest rates prevailed in Bolivia during the high-inflation period of the early 1980s. In response to this and the prohibition of holding dollar denominated deposits in shore, off shore deposits grew significantly, and financial intermediation declined sharply. In 1985, when the stabilization package aimed at targeting the fiscal deficit and increasing monetary policy independence was adopted, the ban on foreign currency deposits was also lifted. Inflation and the fiscal deficit were successfully reduced and financial intermediation restarted as financial dollarization grew.

The Peruvian case is fairly similar. In an attempt to reduce dollarization, dollar deposits were converted in 1985 into domestic currency deposits. However, due to the negative impact of this policy on financial intermediation two years later deposits in foreign currency were once again allowed. By the end of the decade foreign currency deposits represented nearly 60% of total deposits.

In both cases the combination of persistent high inflation and a ban on foreign currency deposits had a sharp hit on financial intermediation. In order to regain some financial depth redollarization was allowed.

Public Debt Dedollarization in Latin America

Reverting high levels of dollarization in the financial system is a long-term process. As discussed previously not many countries have been successful in doing so. There are a few experiences in Latin America where public debt dollarization has been partially reverted. The most notable is perhaps the Mexican case. As noted in figure 6 the composition of debt in Mexico has had a dramatic change since the mid 1990s. External dollar denominated debt accounted for more than 80% of total indebtedness in 1995 and has reduced its participation to nearly 50% of total debt in 2002. Budgetary needs are funded entirely in local markets.

While debt management strategies have been important in explaining this pattern of debt composition, underlying fundamentals have been the most critical aspect in generating domestic currency debt markets.

Mexico has reduced its vulnerability to international capital markets crises substantially in the past years by reducing its share of dollar denominated public debt. This has been the result of strong and consistent fiscal consolidation accompanied by a prudent monetary policy. The fiscal deficit has been decreasing and the central bank has kept inflation within its target. In addition the integration of Mexico to the US and Canada has increased the countries' growth potential. In response, the ratio of debt to GDP has reached the lowest levels in the past 30 years, and interest rates have achieved historical lows.

The Mexican government has been very active promoting the development of long-term domestic local currency debt markets. In fact as shown in panel (b) of figure 6 the share of fixed rate debt has been rising since 2000 reaching 16% of internal debt in 2001. As macroeconomic stability has been achieved the share of fixed rate debt in total internal debt has been rising. The government strategy in this respect has been to start issuing fixed-rate debt with 3, 5 and 10 years maturity gradually. This way not only interest rate risk is reduced, but also a yield curve that can help develop other financial instruments is being set. The government expects that the development of a yield curve can foster the development of long-term private markets as well as a liquid derivatives market. Given that long-term markets are not deep enough yet, the strategy to move towards fixed long-term debt has been a slow process. As markets become deeper, authorities are expecting to decrease the share of floating term debt. Again, the main strategy to increase the breadth of these markets is to maintain sound fiscal and monetary policies aimed at promoting stability.

There have been developments of inflation-indexed securities as well. However given price stability, the share of such instruments is not particularly large. Demand for such debt has come mainly from pension funds and insurance companies.

Regulation has played an important role in explaining the shift in currency composition. The issuance of external debt has been constrained by a yearly ceiling imposed in the budget by congress. In addition congress has approved an active strategy to reduce foreign indebtedness during the 2001-2003 period. Part of the current strategy includes increasing the average maturity of foreign debt, increase the scope of investors, anticipate debts amortizations, and repurchase debt among others.

Not many other countries in Latin America have been able to follow Mexico's path. Probably one of the most interesting cases in which the composition of debt has changed is that of Brazil. However, and as opposed to Mexico, this has not represented significant currency shifts, nor has been accompanied by a significant reduction in overall indebtedness. What is most significant is a shift from external to internal debt, however within internal debt foreign currency indexed debt has gained participation.

Due to recent political uncertainty and a increase in international capital markets risk perceptions[12], the overall level of indebtedness has increased and the current composition of debt is such that the country's fiscal accounts are highly exposed to short-term interest rate fluctuations. Following the launch of the real plan in 1994, the share of fixed-rate debt increased significantly. However, this rise turned to be unsustainable as emerging markets faced turbulence after the sudden stop in capital flows that followed the Russian crisis in 1998. As a result the stock of fixed-rate debt has fallen significantly and the share of foreign exchange linked internal debt and debt indexed to the SELIC rate have risen. Overall, as shown in panel b of figure 7, despite the reduction in external debt, dollarization of total public debt has not changed substantially.

Like Brazil, other countries in the region have increased the depth of local public debt markets. However, many of them are currently facing deep sustainability problems linked to the fact that the increase in the share of domestic debt markets did not represent an overall

[12] See Calvo and Talvi (2002) for a discussion.

reduction in the size of public dollar indebtedness, but rather was the result of finding needs to access additional funding for expenditure increases. While the fiscal situation is not resolved, it is difficult to assess if these have in fact been successful cases of public debt dedollarization.

Current Policies to Dedollarize in Latin America

Our survey conducted with policy makers in Latin American countries, reveals that in highly dollarized countries there is currently no policy initiative aimed at directly reducing the levels of financial dollarization. Policy is aimed towards developing capital markets in domestic currency or in indexed units in such a way that dollarization can be reduced at a time in which sound monetary and fiscal policies gain credibility. Table 7 reports some of the answers of policy makers of highly dollarized economies to questions of the survey.

CPI Indexation of Financial Instruments as a Substitute for Dollarization

It is interesting to note that in the cases of Bolivia and Uruguay there is an active policy to reduce public sector dollarization through the development of CPI indexed debt instruments. This option is currently under study in Costa Rica. Our survey of policy-makers' views suggests that in this sense they seem to prefer CPI indexation to dollarization. Except for Chile and to a lesser extent Colombia, CPI indexation in Latin America is relatively low as shown in table 8. Countries like Peru have considered the option, but have preferred to focus on the development of nominal bonds, rather than CPI indexed bonds. According to our survey of Central Banks (table 9) the main problems faced by Latin American countries with the issuance of CPI indexed instruments are the instability of inflation, real exchange rate depreciation, the lack of development of secondary markets, and the potential balance sheet effects that can arise when only financial sector assets, but not liabilities, are indexed.

Latin American countries have had multiple experiences with CPI indexation in the past. The most successful case, which will not be reviewed here in detail, is the Chilean one[13]. Indexation of financial contracts, both at the public and private sector levels, became widely used since the 1970s. The key to the success of the Chilean experience has been the credibility that index itself has developed as well as the credibility in monetary and fiscal policies. CPI indexation rules have not changed since the adoption of the UF (unidad de fomento - CPI indexed unit). Moreover the UF has grown in a context of low inflation and a credible fiscal and monetary stance. Once the financial crisis was resolved in the early 1980s domestic financial intermediation grew consistently in a stable macroeconomic environment. The rise of long-term institutional investors, as well as the fact that authorities committed to an indexation rule allowed the rapid development of CPI indexed financial markets. Currently, and despite the fact that regulation allows Chilean banks to issue dollar denominated deposits, confidence in macroeconomic policy and in the UF has kept high levels of financial dollarization. Nearly 40% of deposits in the financial sector, and 55% of loans are in CPI indexed units.

The successful experience of Chile however has not been replicated in other countries. Colombia for example was another country where CPI indexed financial instruments gained great importance. In the early 1970s CPI indexation started to be used strongly by financial intermediaries to develop long-term housing credit. While long-term loans in CPI indexed units (UPAC) grew significantly during the 70 and 80s, deposits remained at a very short maturity. The lack of long-term institutional investors limited the possibility of matching maturities for Colombian financial intermediaries. Fluctuations in the real exchange rate led to liquidity effects at the financial intermediary level that forced the Central Bank to provide liquidity frequently in a way altering the conduct of monetary policy. When the Central Bank needed to push interest rates up, financial intermediaries would experience a raise in

[13] See Herrera and Valdés for a very complete analysis on CPI indexation in Chile.

the cost of liabilities (interest rate denominated short term liabilities) vis a vis the return an assets (CPI indexed long-term assets). The negative liquidity effect generated, forced the central bank to supply liquidity to these intermediaries and hence revert the initial decision to increase the interest rate, in order to avoid financial stress. To combat this, the policy response was to change the formula used to calculate the variation of the UPAC. In fact, between 1972 and 1994 the formula was changed 19 times, in order to avoid the negative liquidity effects described above. In 1994 authorities decided to eliminate CPI variations from the UPAC, and linked it entirely to interest rate fluctuations. In 1998, and following the sudden stop in international capital flows, the currency was attacked and initially defended by the central bank by increasing interest rates. The result was a huge increase in non-performing UPAC indexed loans, a collapse of mortgage credit and a costly financial crisis.

The lack of long-term demand for CPI indexed financial instruments, as well as low credibility associated to frequent changes in the indexation rule limited severely the behavior of financial indexation in Colombia. Recently a new attempt to reuse financial indexation has been made. This time, pension funds have become a greater player in the attempt to develop CPI indexed financial markets[14].

Argentina, Brazil and Uruguay also have had repeated experiences with CPI indexed financial instruments. In Jimenez (1993) the major difficulties with the development of CPI indexation in these countries is analyzed. He concludes that the lack of development of these instruments in the late 1980s and early 1990s was associated with the inexistence of demand for long-term indexed assets, the difficulty to agree on a common indexation measure (demanders and suppliers of financial instruments are affected by different prices), lack of legal protection of the indexation unit (in many cases the indexation unit was challenged in court, in others it the indexation unit was not defined in any law), uncertainty about possible changes in the indexation unit, a significant lag between the realization of

inflation and the moment the fluctuation affects the unit (2 or 3 months), and a preference toward foreign assets in foreign currency vis a vis domestic assets[15].

While we believe that developing CPI-indexed domestic financial instruments could be a useful policy avenue at a time of high and volatile inflation and constrains to capital mobility, a different set of circumstances prevails at the present time, when for many countries inflation has become low and stable and there has been a considerable opening up of the capital account. The current trend in countries such as Chile and Peru is to develop and deepen a market in **domestic nominal (non-indexed) financial assets**, much as it exists in the advanced economies. From this perspective, it might be a sounder strategy to dedollarize by helping develop these markets rather than by taking the "intermediate" step of shifting to CPI indexation. Yet, one would need to see the full analytics and economic tradeoffs associated with these various strategies before one could reach normative conclusions on this issue.

6. Lessons from Israel's dedollarization for Latin America

Exploring the main features of Israel's "successful" dedollarization is highly relevant for Latin American economies for a variety of reasons. First, this country's gradual process of disinflation and stabilization—which brought the rate of inflation down from about 400 percent per year in 1984 to single digits in the late 1990s (see Leiderman (1999))--has many elements in common with those seen in various Latin American countries. Second, as shown by the composite dollarization index developed by Reinhart et al (2003), Israel's level and structure of dollarization is **very similar** to that of leading Latin American economies such as Brazil, Chile, and Mexico, as also is the widespread existence of indexation to the movements in the price level. Third, as in Latin America, **there has been no**

[14] See Cardenas and Badel (2003) and Lora and Sanchez(1993) for details on the colombian experience with CPI indexation.

comprehensive policy plan directly attempting to dedollarize the economy. Instead, dedollarization has been the side effect, or endogenous outcome of persistent stabilization and disinflation. This has been coupled with a relatively active policy of changing the composition of public sector deficit finance toward nominal, local currency, assets and with the introduction of foreign-exchange risk hedging instruments such as derivatives.

The evidence of deposits dedollarization is depicted in Figure 8. Perhaps the most direct way to summarize this evidence is to indicate how impressive has been the rise in the share of local-currency denominated bank deposits in total deposits, from 3 percent in 1984, the year of highest inflation, to 38 percent nowadays. Dollar-denominated deposits accounted for 39 percent of total deposits in 1984, and their share of the total decreased to 17 percent in 2002. Less impressive though has been the decrease in CPI-indexed deposits, from 58 percent of the total to 45 percent of the total in 2002.

That the phenomenon of indexation or dollarization can be stubborn or inertial is also illustrated by Figure 8. In spite of the fact that Israel has had more than half a decade with very low, single-digit, rates of inflation in the context of a properly operating inflation targeting regime, and in spite of the important developments toward fiscal consolidation over that time period, it is still the case that the majority of bank deposits are held in some form of indexed deposits, be it to the CPI or in dollarized form. Thus, there seems to be a ratchet effect in the process of indexation and/or dollarization. **This process seems to rapidly develop when inflation accelerates to relatively high levels, but it does not immediately disappear once inflation has been brought down.** Clearly, one possible explanation for this asymmetry has to do with the fact that disinflation—if and when effected—is not perceived as a fully credible and persistent development by the public. It is only with time, and if low inflation and a stable macro environment are maintained that there is a chance of seeing some marked decrease in the degree of indexation or dollarization. It is

[15] Canavese (1993) and Rama and Forteza (2003) describe this in detail for the Argentine and Uruguayan cases

in this sense that economies remain "addicted to dollars," to use an expression put forward by Reinhart et al (2003) in spite of the disappearance of those factors that initially led to the dollarization phenomenon.

Although there was no direct policy attempt at dedollarizing the economy, a most active policy in this direction was conducted in the setting of the **composition of public sector issuance**; see Figure 9. Here a conscious effort was made to deepen the market for local-currency denominated bonds. In fact, while in 1985 there were no such bonds being issued as part of public sector deficit finance, and all the bonds issued were either indexed to the CPI or in foreign-currency terms, **most of the current deficit financing needs are met through issuance of local currency nominal bonds**.

While it is reasonable to ask what has been the fiscal cost associated with this strategy, getting a quantitative answer is not easy. The main reason for this is that precisely at a time that this debt "nominalization" was being effected, Israel was going through a disinflation episode--shifting from double-digit to single-digit inflation rates—which as expected resulted in relatively high ex-ante (and ex-post) real interest rates (see Leiderman (1999)). In particular, while the average yearly real rate of return on indexed bonds for the period from 1995 to the present was 4.8 percent, nominal bonds yielded an average yearly real return of 8.8 percent. A priori, it is difficult to disentangle which part of the nominal bonds "premium" reflected risk factors associated with the "new" asset and which part had to do with the disinflation process per-se. We believe it is reasonable to posit that for a country that has already reached relatively low and stable inflation (as e.g. a few economies in Latin America), the cost associated with developing domestic nominal assets instead of dollar-denominated or CPI-indexed ones would be **lower** than for a country that is in the midst of a disinflation process.

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respectively.

Israel's policy activism in developing a market for domestic nominal assets showed up also in the growing **lengthening of the maturity** of domestic nominal bonds issued by the Treasury. Back in 1995—the first year in which 2-year nominal bonds were introduced, all of the nominal bonds had such a longest maturity. Yet, looking at Figure 10 one can see that over time the government increased issuing longer paper, which now has a longest maturity of 10 years. In fact, 90 percent of public sector bonds issuance in 2002 was done in the form of nominal bonds with maturities above 5 years. The same development can be seen in Figure 11 which shows how the average maturity of nominal bonds has increased from 2 years in 1995 to 6.5 years in 2002. No doubt, **for an observer of the Israeli economy at the beginning of the 1990s it would have seem quite imaginary to think of 10-year nominal bonds being held so widely in Israel toward the end of that decade!**

That these government issued nominal bonds are quite liquid can be seen in Figure 12 which shows that they were the most popular traded asset in the Tel-Aviv Securities Exchange, over and beyond the role of stocks and indexed bonds.

It is fair to characterize as quite low the degree of dollarization-induced vulnerability of the Israeli banking system to adverse shocks. First, there is an active role by the banks supervision authority to ensure that banks maintain covered positions in their foreign exchange activities. Accordingly, there is no sizeable gap between their foreign-currency denominated assets and liabilities. As far as dollarized credit is concerned, its current share of total banking credit is 37% and has remained at similar levels in recent years. About 24% of total banking credit is indexed to the CPI, while 39% of the total is denominated in domestic currency, nonindexed, terms. The large share of foreign-currency denominated credit in part reflects the openness of the economy, with a relatively large sector of importers and exporters. Private banks attempt to make sure that these agents maintain covered credit positions which is not difficult given the nature of their international business. For borrowers whose activities do not directly deal with foreign exchange, banks are typically

asked to require active hedging of the currency risks or a more rigid set of collateral requirements on the loans. As a matter of fact, there has been a very active role by the central bank in promoting markets in financial derivatives, and in particular those instruments designed to deal with exchange rate risk. In fact, the growth in trading volumes in foreign-exchange derivatives has been enormous. The annual volume raised from USD 5.5 billion (i.e., 5.7 percent of GDP) in 1996 to USD 130 billion in 2003 (which amount to 117 percent of GDP). While the Bank of Israel had a leading role in initiating this market, right now the vast majority of the trading is done within the private financial sector alone.

In summary, the evidence from Israel is quite in line with what in our view can be expected to happen in a typical Latin American partially dollarized economy during the remainder of this decade. **First**, we have seen that the persistence of low and stable inflation, in the backdrop of fiscal consolidation, gave rise to an endogenous, and rather slow process of dedollarization. That is, the latter was more a side result of stabilization rather than an outcome of a policy program with that explicit aim. Dedollarization has been stronger in the deposits side than in the liability side. **Second**, as inflation decreased the authorities increasingly relied in nominal local-currency bonds issuance as a way to finance the budget deficit. Over time, the maturity of these bonds has been increased, and the longest (and highly liquid) maturity is now 10 years. **Third**, banking supervision took a key role in ensuring that commercial banks had fully covered foreign-currency positions; with assets equaling liabilities in that denomination. In addition, general guidelines were provided to ensure that those borrowing in foreign-currency credit mainly belong to the international trade sector or have properly hedged their currency risks. Although this process of dedollarization has evolved in a gradual way, there is no doubt in our mind that it has produced a major fall in the degree of dollarization-induced vulnerability faced by the country especially in reaction to adverse shocks.

7. Conclusions

Our survey and research delivers six main conclusions. **First**, Latin American economies have shown thus far a strong degree of financial dollarization persistence. In spite of a major disinflation and a shift toward sound policy fundamentals, dollarization has remained very high. **Second**, although the authorities in the region have become increasingly aware that high dollarization has its considerable risks and can exacerbate a typical Latin American economy's vulnerability to adverse shocks (such as e.g. sudden stops), there are no current policy direct initiatives to reduce the level of dollarization. The latter is seen more as a side effect of sound policies and fundamentals than as a policy objective. **Third**, key among all economic risks or concerns about high financial dollarization is the perverse debt dynamics that can arise in response to adverse shocks in economies with a high degree of public and private sector dollarized indebtedness and where derivatives markets (e.g. for hedging currency risks) remain underdeveloped. **Fourth**, we found that only in very few cases prudential regulation directly addresses the foregoing key risks. It is in this context that we believe the introduction of tighter prudential requirements on foreign-currency loans as well as the enhancement of local markets in financial derivatives should be considered. **Fifth**, although policy makers in some countries are currently considering a shift to CPI-indexed financial instruments as a step to attenuate the degree of dollarization, the existence of sound fundamentals and of low and stable inflation in many countries allows them to consider instead a shift to domestic nominal financial assets, as those which prevail in advanced economies. **Sixth**, as Israel's experience (which has many similarities with the Chilean case) suggests, even if there is no direct policy initiative aimed at dedollarizing the financial system, when sound fundamentals are in place

the authorities can play an active role in developing a market in domestic nominal assets such as government bonds, and in lengthening the maturity of these assets over time. Israel's experience is also useful in illustrating how banking supervision took various measures aimed at ensuring proper coverage of banks foreign-currency positions and at developing various domestic financial derivative instruments.

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Appendix - Survey to Central Banks

1. Does banking regulation restrict banks from taking deposits in dollars or other foreign currency? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

a. What is the share of deposits in foreign currency in the banking system? If possible, please provide a time series of this variable.

2. Does regulation restrict banks from issuing other liabilities in foreign currency? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

a. What is the share of other liabilities in foreign currency in the banking system? If possible, please provide a time series of this variable.

3. Does regulation impose restrictions on banks to offer guarantees on loans in foreign currency taken by their clients, in order to avoid contingent liabilities in foreign currency? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

4. Does regulation restrict banks from lending in foreign currency? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

a. What is the share of foreign currency loans with respect to total loans in the banking system? If possible, please provide a time series of this variable.

5. Does regulation restrict banks from holding other assets denominated in foreign currency? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

a. What is the share of foreign currency claims (excluding foreign currency loans) with respect to total claims (excluding loans) in the banking system? If possible, please provide a time series of this variable.

6. Does regulation restrict currency mismatches in banks? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

7. If a bank does not have a currency mismatch in its balance sheet, but lends in foreign currency, the mismatch can be transferred to the borrower increasing his credit risk (when the borrower's income is in domestic currency). For example, when the borrower's primary activity is in the non-tradable sector taking a loan in dollars generates a currency risk that can affect his ability to repay his loan. Does regulation deal with this type of mismatch? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

8. Do regulation and supervisory practices require banks to monitor and verify the borrower's cash flow? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

9. Do banks in your country use internal risk models? (For example models that allow banks to perform stress tests under different exchange rate or other relevant variable scenarios?) Does regulation require banks to use these models? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

10. Is some type of regulatory incentive for banks to use hedging instruments in place? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

11. Are there ways to verify mismatches in off balance sheet operations? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

12. Are there specific regulations that deal with off shore exposure of banks? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

13. Does prudential regulation treat assets in foreign and domestic currency in different ways (for example different provisions or different capital requirements)? Please explain.

a. If there are differences, since when are they in place?

14. Does your country have deposit insurance? If so:

a. Is the coverage partial or total? If partial, what is the coverage?

b. Is there any difference in the coverage of deposits in foreign and domestic currencies?

i. If there are differences, since when are they in place? Please explain.

15. Is the use of inflation indexed financial instruments a common practice?

a. If used by the banking system:

i. What is the share of loans and deposits of the banking system in these instruments?

ii. Since when are they being used?

iii. If possible, please explain what led to the creation and use of these instruments, and explain the role of any government agency in such process.

iv. What do you believe are the major obstacles to develop or deepen the market for these instruments in your country?

v. Do you know of any failed attempt implementing these types of instruments in your country? Please describe them and document them the best you can.

vi. Please describe the precise characteristics of these instruments (indicator to which they are indexed, lag, etc.).

b. If used by the public sector (bonds):

i. What is the share of public debt in these instruments?

ii. Since when are they being used?

iii. If possible, please explain what led to the creation and use of these instruments, and explain the role of any government agency in such process.

iv. What do you believe are the major obstacles to develop or deepen the market for these instruments in your country?

v. Do you know of any failed attempt implementing these types of instruments in your country? Please describe them and document them the best you can.

vi. Please describe the precise characteristics of these instruments (indicator to which they are indexed, lag, etc.).

16. If your country has private pension funds:
a. What restrictions on holding currency assets are imposed by regulation?
b. What restrictions on holdings of indexed financial instruments are imposed by regulation?
c. Is there any regulatory incentive for pension funds to hold domestic currency or inflation indexed assets? If so, please explain the regulation in detail or attach it to your answers. Since when is this regulation in place? What motivated it?

17. In what currency or unit of account are the following prices denominated?
a. Housing / other real estate
b. Vehicles
c. Home Rentals
d. Public utilities
e. Cellular phone charges
f. Wages
g. Is there any other good/service which price is indexed to any specific measure including the exchange rate?

18. In what currency do the following transactions take place?
a. Housing / other real estate
b. Vehicles
c. Home Rentals
d. Public utilities
e. Cellular phone charges
f. Wages
g. Is there any other good/service in which transactions take place in other currency different to domestic currency?

19. If changes in the way that the prices mentioned above are indexed (including dollar indexation) have taken place, please indicate the moment in which they took place and what led to these changes.

20. If your country has a high degree of financial dollarization (by financial dollarization we mean that residents hold assets and liabilities denominated in foreign currency):

a. Do you know of any initiative aimed at reducing it? If so:

i. What were (are) its main components?
ii. Do you consider that these initiatives were (have been) successful? Please explain.
iii. What were (have been) the major difficulties that limited the success of the strategy?

b. If not:

i. Are authorities satisfied with the current degree of financial dollarization?
ii. Do authorities have some position with respect to the optimal degree of financial dollarization?
iii. Does the current level of financial dollarization affect monetary and fiscal policies in any way? Please discuss.

iv. Has any strategy to reduce financial dollarization been considered? Please discuss.
v. Have regulations intending to deal with dollarization been considered or imposed? Please describe and discuss.

21. If there is no financial dollarization in your country:

a. In your opinion, why hasn't it occurred?
b. Is this an optimal situation, or do you think that a greater degree of financial dollarization is desirable?
c. What do you think have been the disadvantages of not having financial dollarization? Are you aware of any studies analyzing these issues in your country? If so, please provide some references.

9. Tables

Table 1. Dollarization Indicators in Latin America

Country	Deposits dollarization [a]	Loans dollarization [a]	Public debt dollarization [b]
ARGENTINA	14%	20%	96%
BOLIVIA	92%	96%	95%
BRAZIL	0%	0%	49%
CHILE	15%	14%	45%
COLOMBIA	1%	5%	59%
COSTA RICA	46%	55%	53%
GUATEMALA	10%	25%	88%
HONDURAS	34%	26%	95%
MEXICO	10%	32%	42%
NICARAGUA	71%	84%	98%
PARAGUAY	64%	57%	NA
PERU	74%	79%	92%
URUGUAY	85%	61%	96%
VENEZUELA	0%	1%	67%
Average LAC	**37%**	**40%**	**75%**
Average other emerging [c]	**22%**	**19%**	**39%**

Notes: [a] USD deposits/total deposits and USD loans/total loans in the domestic financial system. Data for 1999, 2001, 2002 and 2003; Source: Arteta(2003), Honohan(2003) and Bank Superintendencies. [b] USD debt/total public sector debt. Data for 2001 and 2002; Source: Calvo, Izquierdo and Mejia(2003) and Central Banks and Finance Ministries. [c] Includes: Bulgaria, Czech Republic, Hungary, Israel, Korea, Malaysia, Morocco, Nigeria, Philippines, Poland, Russia, Slovak Republic, Thailand and Turkey.

Table 2: Inflation and GDP growth in Latin America

	Inflation						GDP Growth					
Country	76-85		86-95		96-02		76-85		86-95		96-02	
	Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.
Brazil	151.1%	56.0%	1083.7%	976.6%	7.6%	4.0%	4.4%	4.9%	3.0%	2.6%	2.6%	1.8%
Venezuela	11.1%	4.7%	41.9%	20.9%	37.2%	30.4%	1.6%	4.1%	3.4%	5.2%	1.0%	4.2%
Colombia	23.4%	5.1%	25.0%	3.7%	13.1%	5.8%	3.7%	2.1%	4.5%	1.2%	1.1%	2.5%
Guatemala	9.5%	5.3%	18.7%	12.9%	7.7%	2.1%	2.3%	4.0%	3.6%	1.3%	3.5%	1.0%
Chile	81.2%	60.4%	16.8%	5.4%	4.5%	1.7%	1.8%	6.9%	7.7%	2.7%	3.7%	2.7%
Mexico	39.4%	28.1%	46.9%	46.1%	15.5%	10.1%	4.5%	4.3%	1.7%	3.7%	4.0%	2.7%
Average (Dollarization of Deposits < 10%)					14.3%						2.6%	
Argentina	286.4%	214.6%	617.3%	1115.7%	3.5%	9.9%	-0.3%	5.3%	2.8%	5.9%	-0.3%	6.6%
Honduras	8.4%	4.3%	14.9%	11.3%	14.0%	5.9%	3.8%	4.4%	3.4%	2.6%	2.9%	2.5%
Costa Rica	22.3%	26.3%	18.2%	5.7%	12.0%	2.8%	2.8%	5.0%	5.0%	2.0%	4.1%	3.3%
Average (Dollarization of Deposits > 10% and < 50%)					9.8%						2.2%	
Paraguay	14.7%	8.1%	23.2%	7.5%	8.8%	1.9%	6.5%	5.4%	3.6%	1.9%	1.0%	1.4%
Peru	73.0%	39.6%	1227.8%	2428.7%	5.2%	4.0%	1.6%	4.8%	2.2%	8.2%	2.7%	2.6%
Nicaragua	40.4%	63.4%	2706.1%	3646.5%	9.7%	3.1%	n.a.	n.a.	n.a.	n.a.	4.5%	2.0%
Uruguay	54.1%	15.9%	70.7%	23.0%	12.5%	9.0%	1.4%	5.2%	4.0%	3.7%	-0.5%	6.0%
Bolivia	1232.7%	3673.1%	39.9%	83.2%	4.9%	4.1%	1.2%	3.3%	3.2%	2.3%	3.0%	1.8%
Average (Dollarization of Deposits > 50%)					8.2%						2.2%	
Regional Average					11.2%						2.4%	

Source: IFS and authors calculations.

Table 3: Seigniorage Revenues in Latin America by Degree of Dollarization

Country	75-85	86-95	96-02
Brazil	5.2%	99.4%	2.1%
Venezuela	2.0%	2.7%	2.7%
Colombia	3.2%	2.9%	0.8%
Guatemala	1.5%	1.5%	1.4%
Chile	17.2%	7.5%	2.9%
Mexico	7.6%	2.3%	1.3%
Average (Dollarization of Deposits < 10%)			1.9%
Argentina	44.7%	60.8%	0.9%
Honduras	0.9%	1.8%	3.3%
Costa Rica	5.0%	4.6%	0.8%
Average (Dollarization of Deposits > 10% and < 50%)			1.7%
Paraguay	2.8%	2.8%	0.3%
Peru	10.7%	97.1%	1.6%
Nicaragua	11.6%	739.2%	3.2%
Uruguay	7.0%	12.3%	2.3%
Bolivia	125.3%	2.5%	0.8%
Average (Dollarization of Deposits > 50%)			1.7%
Regional Average			1.7%

Source: IFS and authors calculations.

Notes: Seigniorage revenues are calculated as the ratio of base money growth to GDP.

Table 4: Derivatives Markets in Latin America

	(a)	(b)	(c)=(b)/(a)
Brazil	4,844	1,881	38.83%
Chile	2,328	635	27.28%
Colombia	394	82	20.81%
Mexico	8,574	4,186	48.82%
Peru	241	36	14.94%
TOTAL LAC	16,381	6,820	41.63%
Israel	738	414	56.10%
TOTAL S.E. ASIA	192,880	129,462	67.12%
TOTAL OECD	1,354,260	1,021,257	75.41%
WORLD TOTAL	1,617,917	1,186,072	73.31%

(a) = Foreign exchange turnover (Includes spot, outright forward and exchange swap transactions).

(b) = Over the counter foreign exchange derivatives (Includes outright forwards, foreign exchange swaps, currency swaps, and other products).

Source: BIS

Table 5: Off Shore Dollarization in Latin America

Country	Inshore dollar deposits + offshore deposits [a]	Inshore dollar loans + offshore loans [b]
ARGENTINA	61.45% [c]	74.18% [d]
BOLIVIA	94.13% [d]	96.65% [f]
BRAZIL	17.14% [c]	38.46% [d]
CHILE	32.53% [c]	43.26% [d]
COLOMBIA	30.87% [e]	40.86% [d]
COSTA RICA	67.93% [e]	52.60% [d]
GUATEMALA	38.18% [e]	22.58% [d]
HONDURAS	66.43% [e]	40.24% [d]
MEXICO	35.65% [e]	44.12% [d]
NICARAGUA	79.23% [e]	83.10% [d]
PARAGUAY	83.32% [c]	55.46% [f]
PERU	80.81% [c]	87.46% [d]
URUGUAY	91.60% [d]	61.17% [f]
VENEZUELA	60.50% [d]	26.41% [f]
Average LAC	**59.98%**	**54.75%**
Average other emerging [g]	**39.30% [d]**	**36.01% [f]**

Notes: a Offshore deposits + USD inshore deposits/offshore deposits + total inshore deposits; Source: BIS. b Offshore loans + USD inshore loans/offshore loans + total inshore loans; Source: Global Development Finance(2003). c Data for 2002 d 2001 e 2003 f 1999 g Includes: Bulgaria, Czech Republic, Hungary, Israel, Korea, Malaysia, Morocco, Nigeria, Philippines, Poland, Russia, Slovak Republic, Thailand and Turkey.

Table 6: Prudential Regulation In Latin America

	Argentina	Bolivia	Brazil	Chile	Colombia
Does regulation impose restrictions of foreign currency deposits?	No	No	Yes. To take deposits or to issue other liabilities in foreign currency, financial institutions are required the authorization of the National Monetary Council (CMN). The CMN currently authorizes only few specific items, listed in the foreign exchange regulation .	No. Banks are allowed to receive deposits in foreign exchange or index-linked to the dollar	Yes. Foreign currency deposits can only be issued to firms in export processing zones, international transportation agencies, travel and tourism agencies, firms that offer port services, diplomats and employees of multilateral agencies working in Colombia.
Does regulation impose restrictions of foreign currency loans?	No	No	Yes	Only for housing loans, which are not allowed to be done in foreign currency.	No
Does regulation impose limits on other assets or liabilities in foreign currency	No	No	Yes	No	Banks can issue debt abroad or domestically with participants of the exchange rate market. Such debt must be used for loans in foreign currency with the same or shorter maturity (that require previous Central Bank authorization), or to cover positions in derivatives. There are no restrictions for holding other assets in foreign currency.
Does regulation impose restrictions on currency mismatches	Yes. Foreign exposure cannot exceed 30% of regulatory capital.	Yes. Net foreign assets cannot exceed 80% of capital minus fixed assets, nor be lower than -20%.	Yes. Foreign exchange exposure cannot exceed 30% of Reference Capital.	Yes, banks are limited to have a net foreign exchange exposure, weighted for currency risk, above 20% of their capital, except for branches of foreign banks which can also hedge the foreign currency risk of their capital base.	Yes. Net foreign assets (including off balance sheet items, contingent liabilities, and foreign currency indexed instruments executable in pesos) cannot exceed 20% of core capita, nor be lower than -5%. The difference between liquid foreign denominated assets and liabilities cannot exceed 50% of core capital.
Does prudential regulation allow for different provisions for dollar denominated assets vis a vis local currency denominated ones?	No	No	No	No	Only if the bank considers that the loan in foreign currency is risky
Does regulation deal with borrowers mismatches?	No	No	No	There is a recomendation of the Superintendency of Banks to take into account borrower mismatches when clasifyng the riskiness of loans (required provisions)	Yes if they affect credit risk. Banks are required to use internal credit risk models that incorporate currency risk explicitly.
Does regulation require monitoring of borrowers cash flow?	Yes	Yes	Yes	Only related to the prior point.	Yes
Does regulation deal with off balance sheet mismatches?	Partially	No	Yes	No	No

Source: Survey to Central Banks

Table 6: Prudential Regulation In Latin America (Cont.)

	Costa Rica	Mexico	Paraguay	Peru	Uruguay	Venezuela
Does regulation impose restrictions of foreign currency deposits?	No	Yes	No	No	No	Partially. Deposits have to be withdrawn in domestic currency.
Does regulation impose restrictions of foreign currency loans?	No	Yes. There are limits on foreign currency liabilities that a bank can hold.	No	No	No (Under Consideration)	No
Does regulation impose limits on other assets or liabilities in foreign currency	No	No	No	No	No	No
Does regulation impose restrictions on currency mismatches	Yes. Net foreign assets must be positive and cannot exceed 100% of capital	Yes. Banks can hold long or short positions in foreign exchange for up to 15% of their total capital.	Yes. Net foreign assets cannot exceed 12% of previous month's risk weighted assets and cannot be lower than 8%.	Yes. Net foreign assets cannot exceed 100% of capital, and cannot be lower than -2.5%. In addition the capital requirement on assets affected by currency risk is 9.1%.	Yes, banks have a ceiling. Credit risk, however is not yet considered.	Yes. Net foreign assets cannot exceed 12% of the bank's capital.
Does prudential regulation allow for different provisions for dollar denominated assets vis a vis local currency denominated ones?	No, but imposing greater provisions on dollar denominated debt to borrowers in the non-tradable sector is currently being studied.	NA	No	Only if the bank considers that the loan in foreign currency is risky	No	No
Does regulation deal with borrowers mismatches?	Yes if the bank considers that it affects credit risk.	Not specifically	No	Yes if the bank considers that it affects credit risk.	Partially, since it allows for private valuation of risks.	No
Does regulation require monitoring of borrowers cash flow?	No	Yes	Yes	Yes	As above	Yes
Does regulation deal with off balance sheet mismatches?	No	Yes	Yes	Yes	No	No

Source: Survey to Central Banks

Table 7: Dedollarization Initiatives in Latin America

	Bolivia	Costa Rica	Paraguay	Peru	Uruguay
Is there an initiative to dedollarize the economy?	Yes	Yes	No	Yes	Yes
What are the main components?	• The reduction of inflation • The government has introduced debt denominated in CPI-indexed units to offer alternatives to dollar indexation (since 2001). • Since 2003, public debt cannot be indexed to the dollar • Reserve requirements have been adjusted to favor the use of domestic currency.	• Research on causes and consequences of financial dollarization. • Equalize reserve requirements on deposits in colones and dollars (deposits in Colones used to be higher) • Improve credit screening process of non exporter borrowers Charging higher provisions on dollar debt is under study. • The possibility of issuing CPI-indexed debt is currently under study	NA	• The reduction of inflation to international levels. • The adoption of inflation targeting regime • The development of capital markets in domestic currency. The central bank has issued nominal papers at 1 and 2 years maturity.	• Recreation of domestic currency markets by introducing a CPI indexed unit of account for public debt and financial assets. • Strengthening of the safety net of the financial system including: higher liquidity requirements for dollar operations, higher capital requirements for dollar loans to non tradable sectors and the creation of a deposit insurance scheme with higher premium in USD
What are the main problems that the initiative has faced?	• CPI indexation was adopted in a period of exchange rate depreciation, favoring the use of the dollar • The financial system has been in distress	• There is a high spread between colones and dollar lending rates (9 points) that stimulates borrowing in dollars. • Depositors search for a safe currency • Costa Rica's immersion in the global economy requires a certain degree of dollarization	NA	• Economic agents are uncertain about future inflation	• Public banks, which are large, are the leaders in local currency markets and usually use them to extract funds to subsidize specific areas. There is no political support to reform public banks. • There is a perception that the cost of credit could be increased with tighter regulations, hence reforms in this area lack political support especially because the public sector is the largest non tradable sector.

Source: Survey to central banks

Table 8: CPI Indexation in Latin America

	Share of Inflation Indexed Deposits	Share of Inflation Indexed Loans	Share of internal public debt in indexed instruments	Definition of indexation measure
Argentina[a]	5%	NA	94%	Indexed to CER (Coeficiente de Estabilización de Referencia) based on the previous month's CPI
Bolivia	0.5%	0.1%	9%	Previous month's twelve-month variation of the CPI.
Brazil	0%	0.3%	13% indexed to inflation	Indexed to one of various Brazil's inflation indexes (IGP-M, IGP-DI, IPCA, INPC)
Chile	27.3%	58.0%	73.1%	Previous month's monthly variation of the CPI.
Colombia	0.3%	21.2%	46.0%	Previous month's monthly variation of the CPI.
Costa Rica	0%	0%	20.0%	
Mexico	0.3%	9.3%	8.2%	Last reported variation in CPI.
Paraguay	0%	0%	0%	
Peru	0%*	0%	0.6%	Previous month's monthly variation of the CPI.
Uruguay	NA	NA	33.9%	Previous month's monthly variation of the CPI.
Venezuela	0%	0%	0%	

Source: Survey to central banks.

[a] The data is after pesoification in 2002

*Peruvian banks issue bonds in CPI indexed units. Currently these account for nearly 4% of total bond issuance.

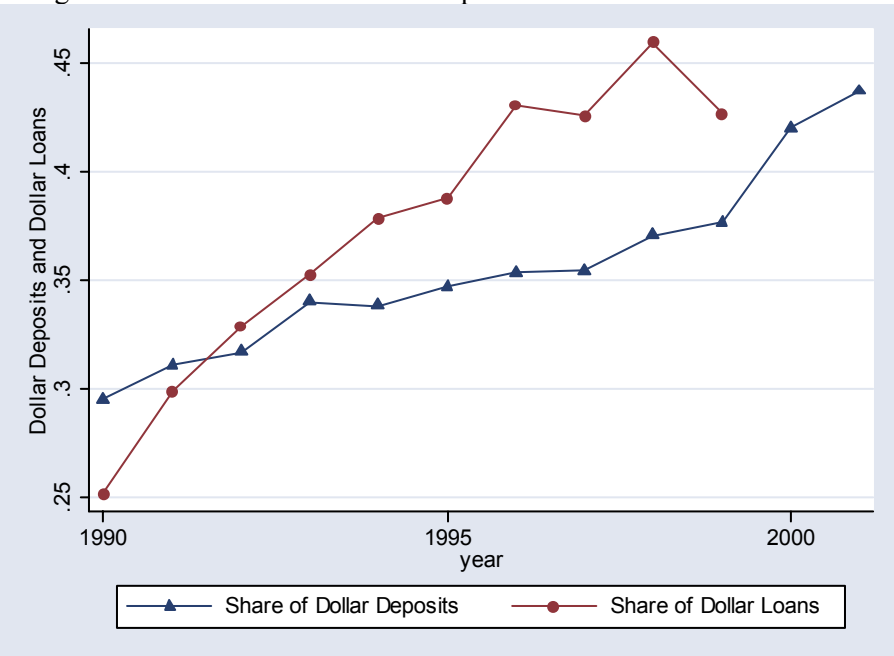
Table 9: CPI Indexation in Latin America

	Does the financial sector use CPI indexed instruments?	Does the public sector issue debt in CPI indexed instruments?	Main problems developing and implementing CPI indexed instruments
Argentina	Yes, since 2002	Yes, since 2002	
Brazil	Yes, since the 1980s	Yes, since the 1980s	
Bolivia	Yes, since 2002	Yes, since 2003	• Depreciation has been higher than inflation • Little information on these instruments is available
Chile	Yes	Yes	• None
Colombia	Yes, since 1972	Yes	• Inflation volatility is high and discourages investors • Lack of institutional investors with liabilities linked to inflation • Lack of development of CPI indexed financial liabilities. This generated mismatches in banks balance sheets, and constant intervention of the central bank to provide liquidity • The formula to compute the index was changed more than 15 times in 20 years
Costa Rica	No	Yes, since 1994	• Bonds were issued by the government and were purchased by other public sector institutions
Mexico	Yes, since 1995	Yes, since 1996	
Paraguay	No	No	
Peru	Yes, since 1994	Yes, since 2002	• The secondary market is very shallow • Main objective is to develop nominal bonds market rather than CPI indexed market
Uruguay	Yes, since 2002, but a very small scale	Yes, since 2002	• Public banks, which are large, are the leaders in local currency markets and usually use them to extract funds to subsidize specific areas. There is no political support to reform public banks. • There are learning costs involved in using new units of account • The US dollar has traditionally been used to denominate financial assets
Venezuela	No	No	

Source: Survey to central banks

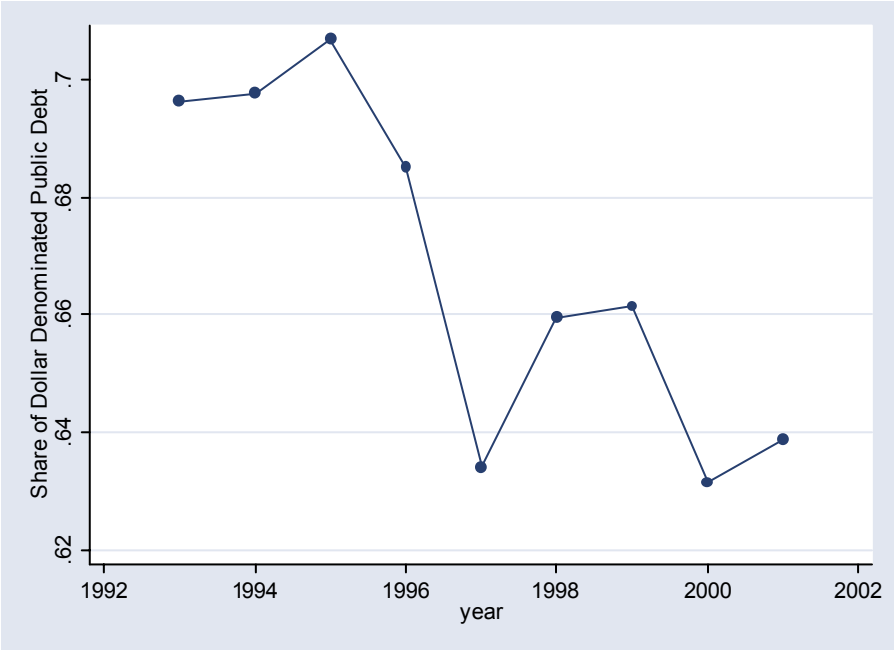
1. Graphs

Figure 1: Dollarization Trends of Deposits and Loans in Latin America



Sample includes: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Guatemala, Mexico, Nicaragua, Peru, Paraguay, Uruguay and Venezuela.
Sources: Arteta (2003) and Honohan and Shi (2002)

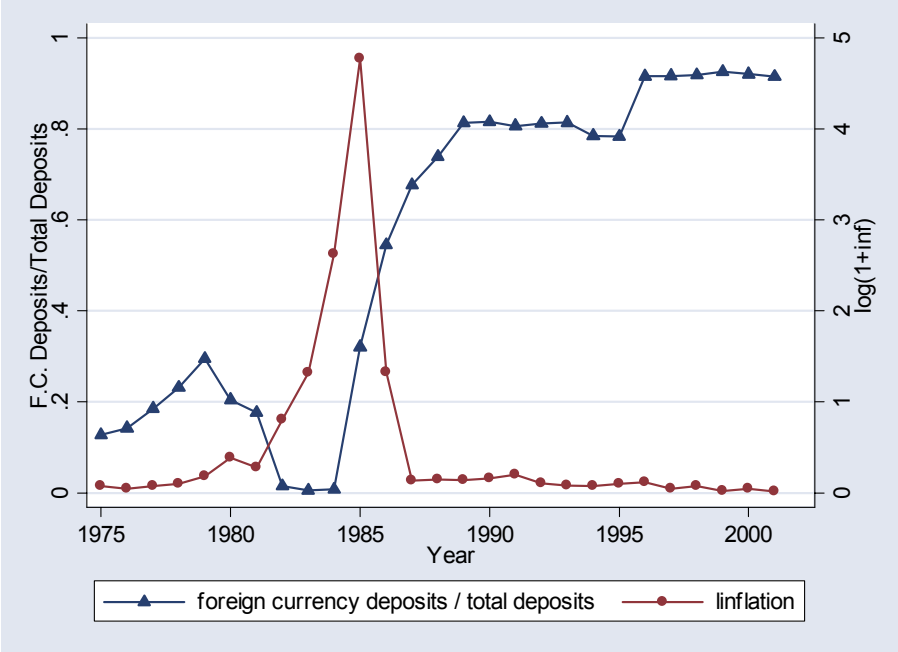
Figure 2: Dollarization Trends of Public Sector Debt in Latin America



Source: Calvo, Izquierdo and Mejia(2003). Sample includes: Argentina, Brazil, Chile, Colombia, Mexico and Peru.

Figure 3: Macroeconomic Imbalances and Dollarization in Bolivia

(a) Dollarization and Inflation



(b) Dollarization and Fiscal Deficit

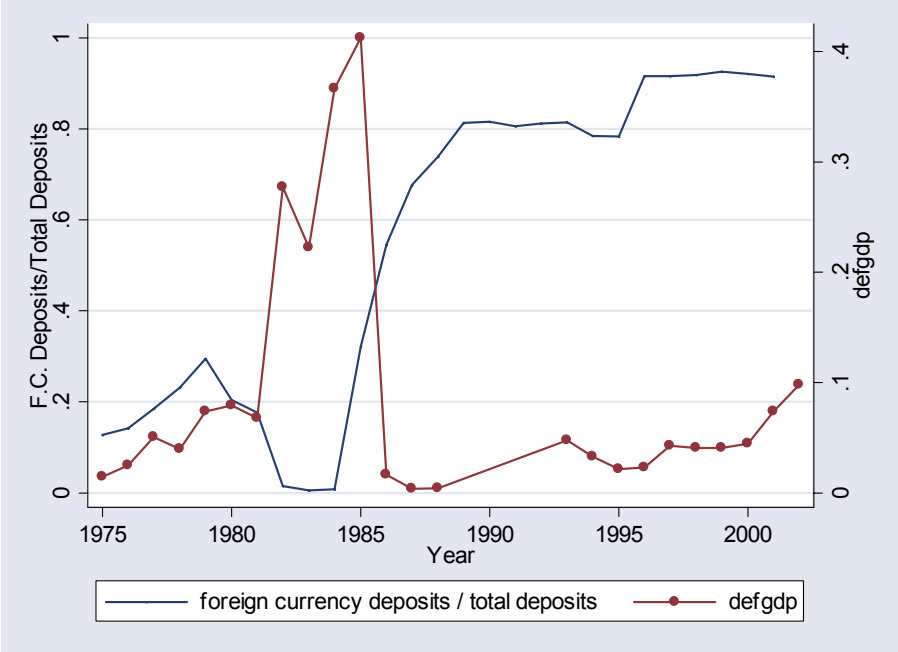
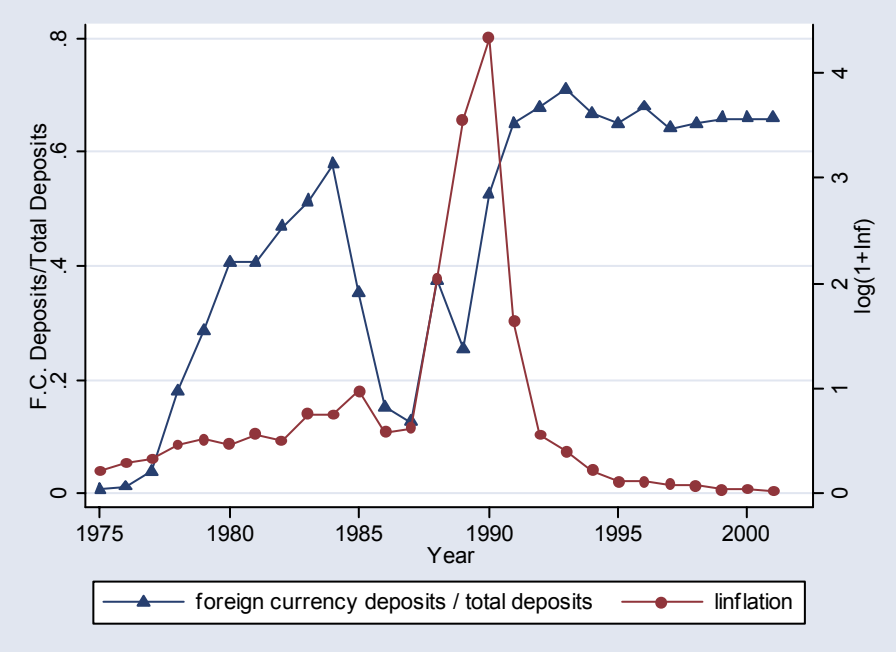


Figure 4: Macroeconomic Imbalances and Dollarization in Peru

(a) Dollarization and Inflation



(b) Dollarization and Fiscal Deficit

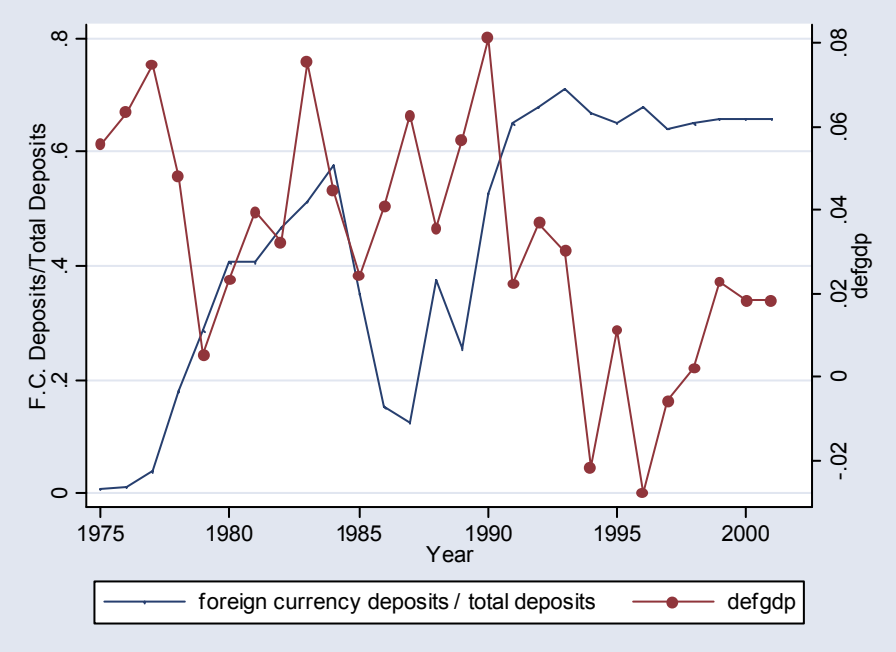
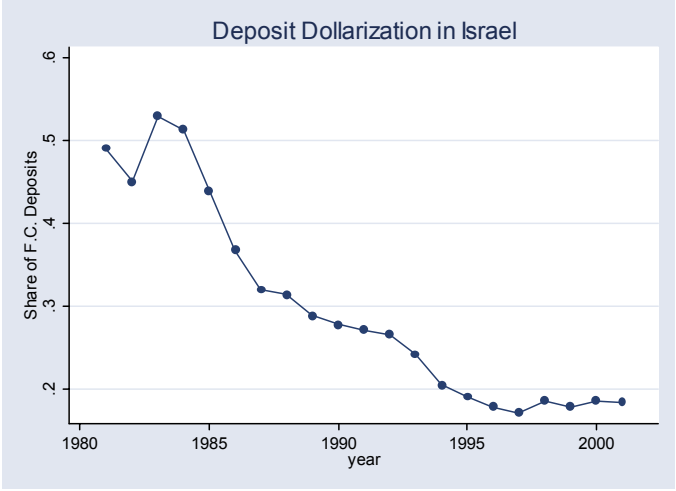


Figure 5: Dedollarization Around the World



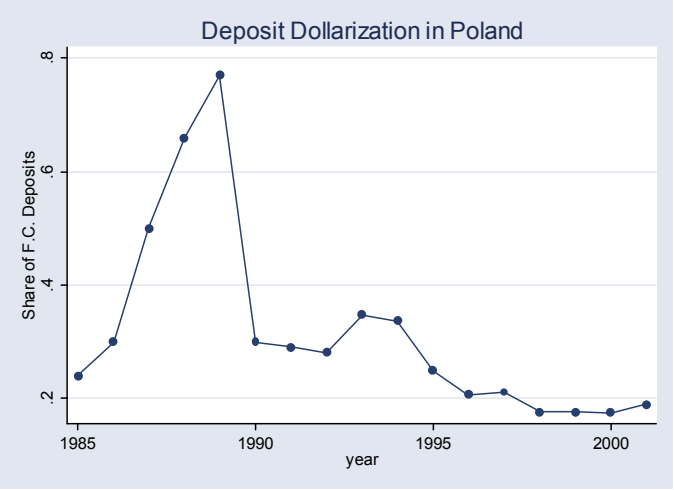
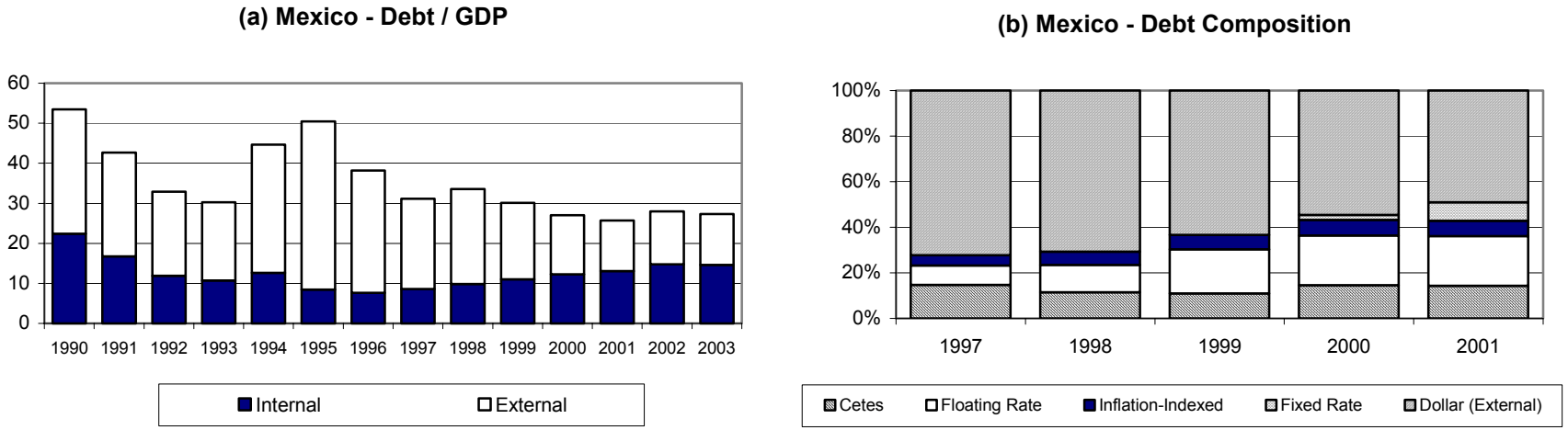
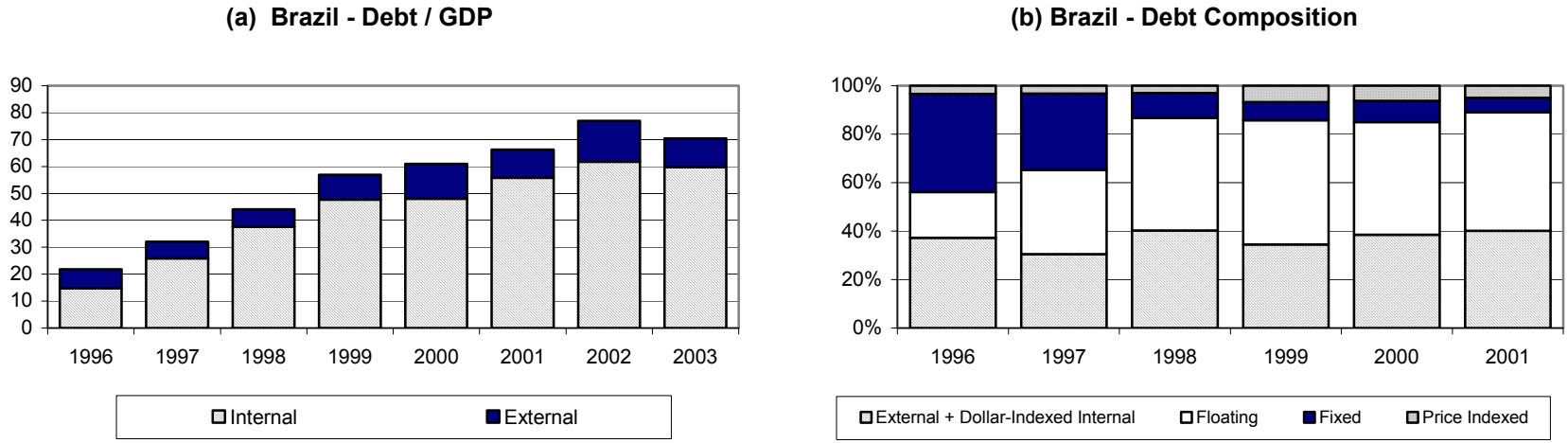


Figure 6: Public Debt in Mexico



Source: (a) Secretaria de Hacienda y Crédito Público, Mexico, and (b) IMF/World Bank(2003)

Figure 7: Public Debt in Brazil



Source: (a) Ministerio da Fazenda, Brazil, and (b) IMF/WB (2003)

Figure 8: Dedollarization in Israel - Currency Composition of Deposits

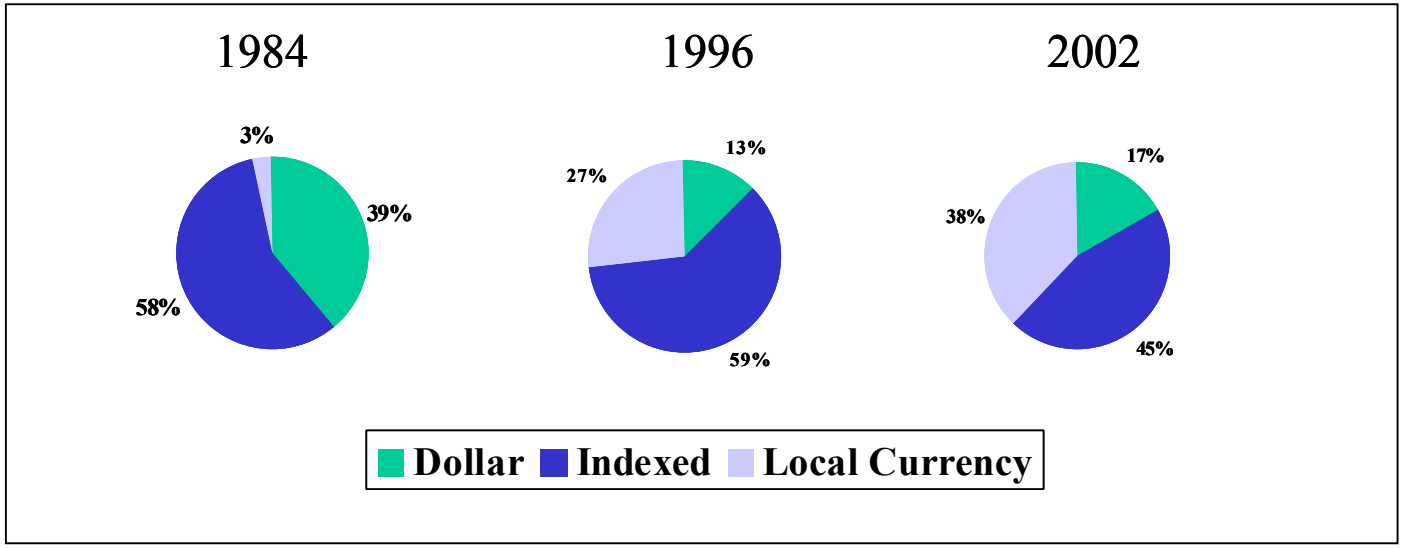


Figure 9: Dedollarization in Israel: Composition of Public Sector Issuance

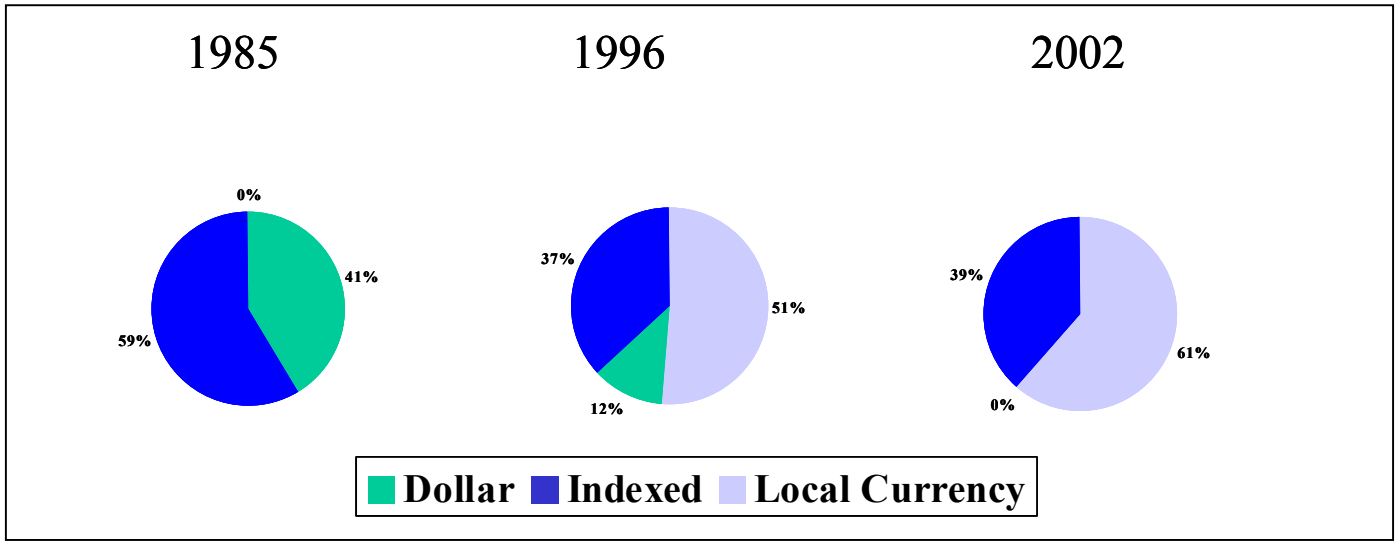


Figure 10: Israel: Maturity Composition of Local Currency Bonds Issuance

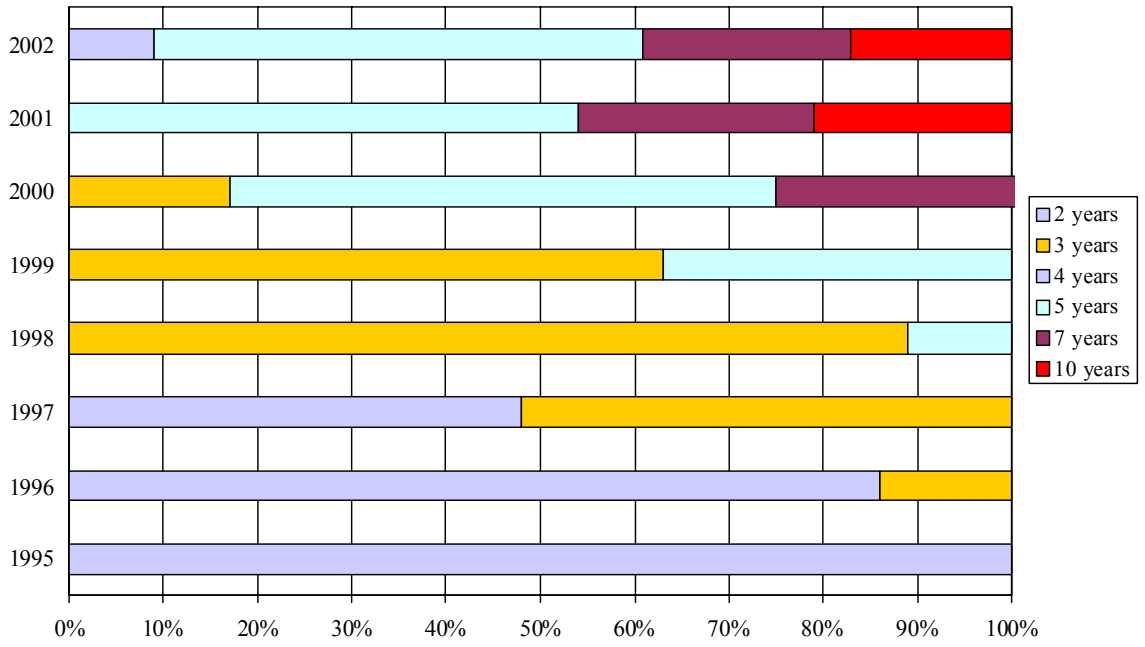


Figure 11: Israel: Average Maturity of Local Currency Bonds Issuance

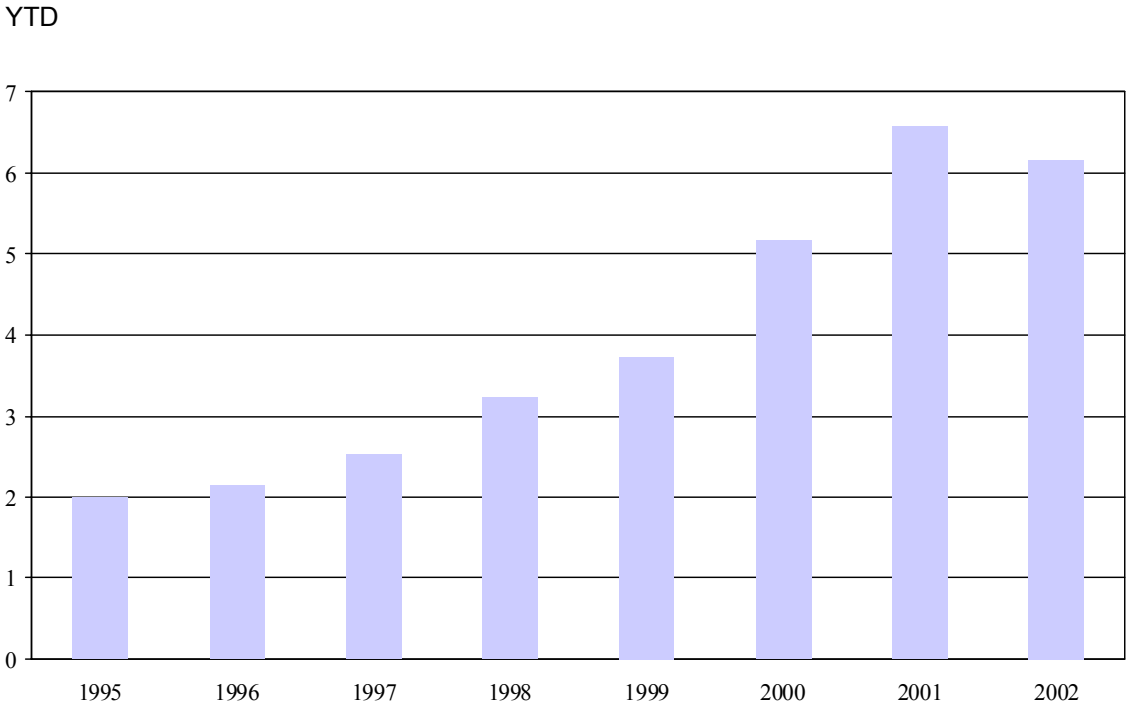


Figure 12: Israel: Asset composition of Daily Traded Volumes at the Tel-Aviv Stock Exchange