



**Remarks by David Longworth  
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to the Financial Markets Association of Canada  
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### **Financial System Policy Responses to the Crisis**

Good afternoon. It's a pleasure to be here.

With your professional interests in foreign exchange, money markets, capital markets, and derivatives, I'm sure the past year and a half has been exciting and interesting – if those are the right words. We've been living through a period of astonishing financial turbulence, historic marketplace losses, and serious threats to financial stability. The real economy is being affected by this financial turmoil, and Canada is now in the second quarter of a painful recession.

As a result of the crisis, financial decisions are more difficult. Investment plans have been scaled back. And confidence has fallen. I think it fair to say that confidence will return when people have the sense that policy-makers have not only put into place appropriate policies to mitigate the effects of the recession, but have also implemented sound policies to stabilize the global financial system and to promote long-term stability and growth.

In Canada and other major economies, central banks have lowered policy interest rates aggressively, and governments have announced sizable fiscal stimulus packages. The effects of these actions will begin to be felt in the second half of this year and will build through 2010. But to ensure our *long-term* economic well-being, financial and credit markets need to return to good health and stay in good health. To that end, we need policies that promote a stable, efficient, and sustainable financial system.

That is what I would like to discuss today. Specifically, I'd like to talk about two different kinds of financial system policy: one that has changed in response to the extraordinary events of the past year and a half, and one that needs to change to enhance the stability of the financial system. First I'll describe how the Bank of Canada has changed its liquidity policies and practices, especially since September 2008. Then I'll describe developments in the thinking on the procyclicality of the financial system – particularly that of financial markets and financial market prices.

## **The Bank of Canada's Liquidity Policy Response to the Crisis**

Last August, about one year into the crisis, I provided an overview of the changes that the Bank had made to its liquidity policies.<sup>1</sup> Since the onset of the crisis in August of 2007, there has been a general global decline – and in some cases, a complete disappearance – of liquidity in key funding markets. Liquidity is essential for both the efficiency and the stability of the financial system, and this decline, especially in bank-funding liquidity, has been of great concern to central banks. The liquidity of bank-funding markets is related to the liquidity of asset markets in general, and problems in one market can spill over into the other.

It was in this context that the Bank for International Settlements' Committee on the Global Financial System (CGFS) made recommendations aimed at strengthening the effectiveness of central banks in dealing with liquidity problems, including pressures in funding-markets.<sup>2</sup> Two recommendations focused on the central bank's ability to conduct liquidity operations effectively, even when liquidity in key markets is severely constrained. In concrete terms, this means that central banks should be prepared, if necessary, to take steps that go beyond adjusting the aggregate supply of bank reserves to meet changes in demand. These steps include providing an increased volume of term funds, conducting operations against a broad range of collateral, and conducting operations with a broad range of counterparties. This is precisely what the Bank of Canada and other central banks have been doing over the past year and a half.

From August 2007 to August 2008, the Bank of Canada made two significant changes to support liquidity, and thereby the stability of the Canadian financial system and the efficient functioning of financial markets. First, we introduced a term purchase and resale agreement (PRA) facility to purchase securities from primary dealers and resell them to the original owners at term. Second, we broadened the range of securities acceptable as collateral for the Standing Liquidity Facility (SLF) – the overdraft facility accessible to participants in the Large Value Transfer System (LVTS) – to include certain types of asset-backed commercial paper (ABCP) and U.S. Treasuries.

Since August 2008, the Bank has both expanded its liquidity facilities and introduced new ones.

With regard to expansion: the regular term PRA facility has been the “workhorse” of the Bank's liquidity program since the onset of the crisis. It was reintroduced in September 2008, following a pause, starting in June, that followed improvements in funding conditions. The term of PRAs was increased from one month to both one and three months, and the frequency of term PRA operations was increased to weekly (from biweekly in the spring). In addition, we substantially increased the size of this term

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<sup>1</sup> See D. Longworth, “Work in Progress: The Bank of Canada's Response to the Financial Turbulence” (speech to the Canadian Association for Business Economics, Kingston, Ontario, 26 August 2008). Available at: < <http://www.bankofcanada.ca/en/speeches/2008/sp08-10.html> >.

<sup>2</sup> Bank for International Settlements (BIS), “Central Bank Operations in Response to the Financial Turmoil” (CGFS Papers No. 31, BIS, 2008). Available at: < <http://www.bis.org/publ/cgfs31.pdf?noframes=1> >.

financing from \$4 billion in the spring of 2008 to about \$35 billion currently. The value outstanding peaked at \$37 billion in December 2008. And we expanded the list of eligible counterparties to include not only primary dealers, but also all participants in the LVTS. Finally, we expanded the list of eligible securities for the term PRAs to include bank-sponsored ABCP and certain U.S. Treasury securities, consistent with the expansion of SLF collateral mentioned earlier.

The Bank of Canada has also introduced three new liquidity facilities since last summer, one of which is an expansion and replacement of another [Table 1: Bank of Canada Liquidity Facilities Introduced since 2007Q4].

The Term Loan Facility was introduced in November. The aim of this facility is to give LVTS participants increased flexibility in efficiently managing their balance sheets. It allows direct LVTS participants to use their non-mortgage loan portfolios, which consist of high-quality but illiquid assets, as collateral for term loans. Two billion dollars is auctioned weekly for a 28-day term. The maximum amount outstanding at any one time was about \$4.2 billion. Although the Term Loan Facility has had the highest take-up of the new facilities, its use has been relatively modest, largely because the minimum bid rate is the Bank Rate<sup>3</sup> [Chart 1: Weekly Par Value Outstanding for BoC Liquidity Facilities].

At the same time, we introduced a term PRA facility for private sector money market instruments, the aim of which was to support liquidity in the markets for these instruments. Bankers' acceptances and promissory notes, as well as commercial paper, including bank-sponsored asset-backed commercial paper, were eligible securities for this facility. Primary dealers could participate, as well as federally or provincially regulated market participants who demonstrated significant activity in private money markets. This facility was designed as a backstop facility, with a high minimum bid rate of 75 basis points above the overnight indexed swap rate. Given its backstop nature, this facility was rarely used. Of the \$1 billion offered in the weekly auction for 14 days, a maximum of only \$25 million was taken up in any one week.

With these new and expanded facilities in place in Canada, and with improvements in liquidity facilities at other central banks and actions taken by governments to stabilize the financial system, there has been a noticeable general improvement over the past four months in money markets in Canada and elsewhere [Charts 2 and 3: Spreads between Interbank Offered Rates and Overnight Index Swap Rates]. Since the beginning of the year, there has also been some improvement in corporate bond issuance. Nevertheless, there continue to be problems in financial markets. In particular, liquidity in secondary markets for fixed-income instruments remains poor; repo-rate spreads for private sector instruments – if a quote can even be obtained – are, in many cases, much higher than before the market turmoil began;<sup>4</sup> commercial paper issuance has declined; and there have been no public offerings of term asset-backed securities in months.

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<sup>3</sup> The Bank Rate is 25 points above the target for the overnight rate. When the expected target for the overnight rate is significantly lower than the current target, the “penalty” is effectively larger when the term goes past the next fixed announcement date.

<sup>4</sup> Even before the financial turmoil, the repo market in Canada for private sector instruments was very thin.

It was against this background that, as part of its provision of liquidity to support the efficient functioning of the market for private sector securities, the Bank announced, on 23 February, a new term PRA facility for private sector instruments. The new facility expands upon and replaces the previous term PRA facility for private sector money market instruments. The terms and conditions for the facility were announced on 6 March.<sup>5</sup> The first auction will be held on 17 March. This liquidity facility should indirectly support credit in Canada by helping to improve secondary-market liquidity and to reduce credit spreads. This, in turn, should help stimulate the issuance of new corporate instruments [Chart 4: Canadian Corporate Bond Index Option-Adjusted Spreads].

The new term PRA facility for private sector instruments is aimed at a broader set of market participants who do not have access to the regular term PRA facility. They can access the facility on an indirect basis via primary dealers. Relative to the previous term PRA facility for private sector money market instrument, there are four major changes:

- i) the set of eligible securities has been expanded to include eligible corporate bonds (those with at least a BBB rating, and including certain callable bonds) in addition to private sector money market instruments;
- ii) the set of potential eligible counterparties now also includes federally or provincially regulated market participants who can demonstrate significant activity in the corporate bond market, in addition to the main participants in the money markets;
- iii) the minimum bid rate has been significantly reduced, as befits a facility that is not designed to be just a backstop; and
- iv) the term of the transactions has been extended to 1 and 3 months from two weeks.

I should note that the Bank is currently in a consultation process with regard to the possible inclusion of term asset-backed securities as eligible securities for this facility.

An additional liquidity facility that we have in place is a US\$30 billion swap line with the U.S. Federal Reserve. Swap lines help to avoid bottlenecks in the international distribution of liquidity and potentially enable domestic institutions to obtain liquidity in foreign currency, in this case, in U.S. dollars. This facility has not been needed at any time throughout the crisis, however, and it may not need to be used, because most Canadian banks have U.S. branches or subsidiaries and thus have access to U.S.-dollar funding through the Fed's discount window.

The Bank of Canada continues to closely monitor the state of liquidity in financial markets, and we will continue to provide exceptional liquidity to the Canadian financial system as long as conditions warrant. In addition, as the Governor outlined in his speech on 19 November 2008, the Bank is looking carefully at what it should be doing for the longer term to provide for continuously open markets.<sup>6</sup>

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<sup>5</sup> See < [http://www.bankofcanada.ca/en/notices\\_fmd/2009/not060309\\_final\\_pra.html](http://www.bankofcanada.ca/en/notices_fmd/2009/not060309_final_pra.html) >.

<sup>6</sup> M. Carney, "Building Continuous Markets" (speech to the Canada-United Kingdom Chamber of Commerce, London, England, 19 November 2008). Available at: < <http://www.bankofcanada.ca/en/speeches/2008/sp08-14.html> >.

I will turn now to the second set of policies: those that affect the stability of the overall financial system. Here I will focus on policies that can affect the degree of procyclicality of financial market prices.

### **Financial System Stability – a Macroprudential Approach to the Procyclicality of Financial Market Prices**

Until recently, most financial system policy has focused on individual institutions, with the aim of limiting the damage that could be caused by distress *at a given institution* – the so-called “microprudential” approach.

Over the past few years, interest has been growing in a “macroprudential” approach to regulating the financial system.<sup>7</sup> This approach aims to prevent or limit damage *to the financial system as a whole*, thereby avoiding or reducing the economic costs that attend financial instability. Such an approach is needed because systemic risks arise from the collective actions of institutions and markets. But developing an effective macroprudential approach is easier said than done. It depends crucially on understanding complex relationships across institutions and markets, and how various factors can amplify the *procyclicality* of the financial system – that is, the tendency of the system’s behaviour to amplify financial and economic cycles.

A sound macroprudential approach to analysis and regulation needs to focus on all aspects of the financial system, including amplification mechanisms within the system, and the possibility of contagion. To date, much of the discussion on how to move forward on the macroprudential agenda has focused on financial institutions: how they relate to one another and how their behaviour is influenced by overall capital requirements and loan-loss provisioning practices.<sup>8</sup> Much less has been said about the implications of the behaviour of institutions for the behaviour of financial markets and financial market prices. This is what I will focus on today.

In particular, regulations and market practices regarding capital for trading book activities, for risk-management systems within institutions,<sup>9</sup> and for margin requirements can – especially if they are too focused on short-run volatility – lead to procyclicality in asset prices and a general amplification of the procyclicality of the financial system as a whole.

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<sup>7</sup> An early description of macroprudential policy concerns can be found in: Bank for International Settlements, *Recent Innovations in International Banking* (prepared by a Study Group established by the Central Banks of the Group of Ten Countries, Basel, Switzerland, 1986). A fuller description of the macroprudential approach is given by Claudio Borio in “Towards a Macroprudential Framework for Financial Supervision and Regulation?” (BIS Working Paper No. 128, February 2003). Available at: < <http://www.bis.org/publ/work128.pdf?noframes=1> >.

<sup>8</sup> Bank of Canada Governor Mark Carney addressed procyclical capital adequacy in “From Hindsight to Foresight” (speech to Women in Capital Markets, Toronto, Ontario, 17 December 2008). Available at: < <http://www.bankofcanada.ca/en/speeches/2008/sp08-16.html> >.

<sup>9</sup> Some of the lessons that the current crisis holds for risk management can be found in P. Duguay, “Financial Stability through Sound Risk Management” (speech to the Risk Management Association, Toronto Chapter, Toronto, Ontario, 8 January 2009). Available at: < <http://www.bankofcanada.ca/en/speeches/2009/sp09-1.html> >.

Let me explain. The value-at-risk (VaR) methodology has come to dominate not only risk-management systems within institutions, but also the setting of capital requirements on their trading books by the Basel Committee on Banking Supervision,<sup>10</sup> and the way that institutions think about setting margin requirements in their securities-financing operations or the initial margin for over-the-counter derivatives. The VaR methodology essentially uses recent historical data to estimate the losses on the trading book (typically over a one- to sixty-day period) that would come from a negative shock whose size would be exceeded only (say) an estimated one per cent of the time.

Problems can arise if most participants in a given market use the same short historical period to calculate a simple VaR, which is then used to carry out risk management within institutions for a given allocation of economic capital, to calculate regulatory capital requirements, and to set margin requirements for counterparties. When that happens, the dynamics of asset prices could be most unfortunate in response to a significant shock.

Consider first the case of an improvement in the fundamentals of a given asset. This would lead to an increase in the market price of that asset and, typically, to a reduction in the volatility of its price as well. This, in turn, would lead to a lower VaR for the existing portfolio. As a result, the capital requirements would fall, a bigger trading book could be held for a given allocation of economic capital, and margin requirements could be lowered for counterparties. Those counterparties, in turn, would participate more actively in markets.<sup>11</sup> Market liquidity would increase as more trading occurred in a growing range of assets. Perceived risk would fall as asset prices rose and volatility continued to fall. A “virtuous circle” for prices and volatility would result, not unlike what was seen in the 2003–06 period. As a result, however, assets may become overvalued as risks become underpriced.

Next, consider what would happen if there was a downward shock to asset prices, resulting from a change in fundamentals, or an increase in volatility, resulting from the withdrawal of a major institution from trading. In this case, everything would work in reverse. The rise in VaR would mean a reduction in the size of trading books for a given allocation of economic capital. Margin requirements for counterparties would be raised.<sup>12</sup> Institutions would therefore sell assets, driving prices down further and increasing volatility. A vicious circle would result (as it did in the lead-up to the rescue of Bear Stearns and particularly following the failure of Lehman Brothers). For those of you active

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<sup>10</sup> The 1996 “market risk amendment” to the Basel I Framework included a VaR-based methodology to set capital requirements for the trading books of banks.

<sup>11</sup> For useful information on “liquidity spirals,” see M.K. Brunnermeier and L.H. Pedersen, “Market Liquidity and Funding Liquidity,” *Review of Financial Studies* (forthcoming).

<sup>12</sup> Margin requirements have risen enormously since the beginning of the financial turbulence in August 2007. This was documented, for instance, in the IMF’s October 2008 *Global Financial Stability Report* (Chapter 1, Box 1.5, 41–43). Available at:

< <http://www.imf.org/external/pubs/ft/gfsr/2008/02/pdf/text.pdf> >

in foreign exchange markets, I would note that following the Asian crisis of 1997–98, some of these same factors were thought to have contributed to that crisis.<sup>13</sup>

Now, the assumption that most market participants use the same risk-management systems based on short historical samples is very much an exaggeration. Some researchers, however, have argued that enough institutions follow very similar risk-management systems that the dynamics described above can happen, and indeed have happened, in the real world in response to sizable shocks.<sup>14</sup> Moreover, in its *Global Financial Stability Report* issued in the second half of 2007, the International Monetary Fund concluded – based on simulations it carried out, which seemed realistic based on observed risk-management practices – that “seemingly prudent behavior by individual firms, reacting to similar market-risk systems, could serve to amplify market volatility in periods of stress beyond what would otherwise have occurred.”<sup>15</sup> Observations and anecdotal information following the failure of Lehman Brothers suggest that this behaviour of firms was very important in amplifying price volatility in the autumn of 2008. Analysis of such behaviour strongly suggests the need for a macroprudential approach.

#### *Policy proposals to deal with procyclicality in financial markets stemming from VaR*

I would now like to turn to what can be done to reduce the procyclicality in financial markets that comes from the use of VaR-based methodologies that are too dependent on short historical samples.

Two main principles have been proposed. The first is that, in parallel with the probability of default on credit exposures on the banking book being calculated on a “through-the-cycle” basis, VaR for the trading book also be calculated on a through-the-cycle basis. One implication of this principle is that all historical data should be exploited to calculate the distribution of possible losses for a given asset or asset class. The second principle is that a “stress VaR” – a VaR calculated on the basis of assumed stress conditions – should be used, especially to consider the heightened correlation of losses across various assets or asset classes. It is well known that correlations among losses in categories of risky assets increase dramatically (sometimes approaching one), when the financial system is under great stress.

Unfortunately, there are many firms that either do not perform such calculations or do not act upon them. Were all firms to undertake and act upon such calculations when short-run volatility decreased, VaR calculations would not decrease, because through-the-cycle stress VaRs would not be affected. As a result, the amplification mechanisms affecting

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<sup>13</sup> See, for example, A. Persaud, “Sending the Herd Off the Cliff Edge: The Disturbing Interaction Between Herding and Market-Sensitive Risk Management Practices” (BIS Papers, No. 2, Proceedings of a Workshop held at the Bank for International Settlements, April 2001). Available at: < <http://www.bis.org/publ/bppdf/bispap02l.pdf> >.

<sup>14</sup> See A. Persaud (previous footnote) and the Committee on the Global Financial System, “A Review of Financial Market Events in Autumn 1998” (CGFS Publications No.12, Bank for International Settlements, 1999). This latter text has a section (see page 14) on the over-reliance on quantitative tools.

<sup>15</sup> International Monetary Fund, “Do Market Risk Management Techniques Amplify Systemic Risks?” in *Global Financial Stability Report* October 2007, 52–76.

prices and volatility described above would not be at play in boom times. In times of decreasing asset prices, some amplification could occur if the decreases were large enough. But to the extent that firms were allowed to undertake their own through-the-cycle stress VaR calculations, there would probably be much less similarity in their calculations than there is now, when there is a much greater effect coming from those institutions that are effectively acting on the basis of short-sample VaRs. Thus, there would likely be less amplification.

Now to specific policy proposals. First, such through-the-cycle stress VaRs could also form the basis for capital requirements set by the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO) for the trading books of banks and securities dealers. Recently, the BCBS has proposed a small step in this direction by adding a stress VaR to the calculation of its trading-book capital. Second, regulators could encourage an improvement in internal risk-management procedures in the institutions they regulate to emphasize through-the-cycle VaR. Third, minimum margin requirements for securities-financing operations and initial margin for over-the-counter derivatives transactions could be set on the basis of through-the-cycle calculations and expected to remain constant.<sup>16</sup> Regulation might be required to accomplish this.

Finally, the IMF has noted that having some institutions that are not subject to regulatory capital requirements for their trading books is helpful because these institutions will have more independence in the way that they carry out their risk management.<sup>17</sup> This independence of action would tend to increase market liquidity, reduce volatility, and therefore reduce procyclicality. However, sharp procyclical increases in margin requirements tend to preclude these typically leveraged institutions from participating and providing needed market liquidity at the times it's most needed.

If all these specific proposals were put in place, there would likely be a significant reduction in the procyclicality of asset prices – particularly the procyclicality that stems from the drying up of liquidity in a period of falling prices and spiking volatility.

## **Conclusion**

A strong economy requires a sound financial system. It's important to make sure that the policies that shape that system are designed not only to help financial markets operate effectively, but also to support stability over the long term.

Liquidity is essential to a well-functioning economy, and central banks have an important and evolving role in helping to maintain the liquidity of key markets. Over the past year

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<sup>16</sup> The Counterparty Risk Management Policy Group has urged market participants to establish margin requirements and initial margins that are stable over the cycle. CRMPG, "Containing Systemic Risk: The Road to Reform" (Report of the CRMPG-III 6 August 2008).

<sup>17</sup> "Because they are not required to calculate and hold a minimum of economic capital, such pools of private capital can have the freedom to take advantage of the possible herd behaviour of others that could result from those that apply more rigid risk management procedures required of regulated institutions." IMF, *Global Financial Stability Report* October 2007, 72.



and a half, the Bank of Canada has introduced new liquidity facilities and expanded existing ones. Although some markets remain impaired, these facilities have helped to restore liquidity in a number of key markets. We continue to monitor the situation carefully, and we will continue to provide exceptional liquidity to the Canadian financial system as long as conditions warrant.

Macrofinancial stability is equally essential to a well-functioning economy, and central banks are in a unique position to promote it through the development of macroprudential policy, especially in the area of reducing the procyclicality of financial markets. While much work remains to be done, there is a growing appreciation of the importance of this issue.

The progress that we have made and are making to develop effective financial system policy will help to return markets to better health. It will also help to restore confidence, and to build a stronger, more sustainable economy in the years to come.