Bank of Canada Oversight Activities during 2007 under the Payment Clearing and Settlement Act

Walter Engert and Dinah Maclean

This report reviews the Bank of Canada's oversight activities during 2007 pursuant to the Payment Clearing and Settlement Act (PCSA). This is the third in an annual series of reports aimed at improving the transparency and accountability of the Bank's activities in this area.[1]

The Bank of Canada has had formal responsibility for the oversight of clearing and settlement systems in Canada since 1996.[2] The PCSA gives the Bank of Canada this responsibility for the purpose of controlling systemic risk. In this context, systemic risk is defined as the risk that the default of one participant in a clearing and settlement system could lead, through the activities of the system, to the default of other institutions or systems.

A clearing and settlement system brings together various financial system participants in a common arrangement, such as a clearing house, where the participants are explicitly interlinked so that the behaviour of one participant can have implications for others. In such an arrangement, each participant could face potentially significant risks and liabilities, depending on the behaviour of other participants and on the design of the system. As a result, spillover or domino effects with broader economic consequences can occur if the system is not properly designed and operated.

Under the PCSA, the Bank identifies clearing and settlement systems in Canada that could be operated in a manner that could pose systemic risk. Provided the Minister of Finance agrees that it is in the public interest to do so, these systems are designated for oversight by the Bank of Canada, and must satisfy the Bank that they have appropriate risk controls in place to deal with concerns related to systemic risk.[3]

Three systems have been designated by the Bank: the Large Value Transfer System (LVTS), which deals with large-value Canadian payments; CDSX, which clears and settles securities transactions; and CLS Bank, a global system for foreign-currency transactions.

In the following sections, we discuss various aspects of the Bank's oversight work during the past year. In 2007, the major payment, clearing, and settlement systems continued to evolve in a way that supports the stability and efficiency of the financial system.

The Large Value Transfer System

Owned and operated by the Canadian Payments Association (CPA), the Large Value Transfer System began operation in February 1999. During 2007, it processed, on average, 21,000 transactions per day worth approximately $185 billion. In its nine years of operation, the LVTS has been a relatively stable system; that is, there have been few significant changes to its design and risk controls. In 2007, the Bank reviewed five rule changes concerning the LVTS, which were largely technical in nature, including further improvements to contingency arrangements and an adjustment to the operation of

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2. A clearing and settlement system is the set of instruments, procedures, rules, and technical infrastructure for the transfer of funds or other assets among system participants.

3. For a discussion of the Bank's approach to the oversight of designated systems, see Engert and Maclean (2006).

the so-called central queue, to improve liquidity management.[4]

The past year, 2007, was the first full year in which the Bank of Canada and the CPA were operating under a Memorandum of Understanding (MOU), signed in November 2006. The MOU sets out the roles and responsibilities of both parties under the PCSA and how they intend to work together to meet these responsibilities. The MOU added clarity and structure to the relationship between the Bank and the CPA, and improved the oversight relationship between the two organizations.

The gains from a well-functioning relationship were illustrated in late October and early November 2007. The CPA discovered a coding error, which meant that, under certain circumstances, it was possible, in principle, for a queued payment in the LVTS to be processed through the system, even though it may not have passed the LVTS risk controls. Although the available data and anecdotal evidence suggest that the likelihood of such an event was remote, the LVTS was operating without the benefit of all the risk-control features working as intended. The implications of this could have been serious.

The CPA responded to the situation and worked with the Bank of Canada and LVTS participants to implement an interim solution acceptable to LVTS participants and the Bank, until a permanent solution that corrected the system error was put into place on 11 November.

Part of the oversight arrangement with regard to the LVTS, as set out in the Bank's MOU with the CPA, are regular meetings between the Bank and senior CPA officials. This allows the Bank and the CPA to discuss general payments system developments, as well as potential changes to the LVTS, early in the process of developing those changes. During 2007, the Bank held four such meetings with senior CPA officials. The Bank also met with the Board of Directors of the CPA.

CDSX

Owned and operated by CDS (Clearing and Depository Services Inc.), CDSX clears and settles securities transactions in Canada. On average, in 2007, CDSX processed about 520,000 trades daily worth about $250 billion.

In 2007, CDS established a new cross-border clearing and settlement link with a major securities settlement system in the United Kingdom operated by Euroclear UK and Ireland Limited (formerly known as CrestCo Ltd.). Through this link, called Euroclear UK Direct, CDS participants can directly settle U.K. securities transactions, facilitating their trading in these securities.

As part of its review of this initiative, the Bank conducted a comprehensive assessment of the link with the co-operation of CDS, to satisfy itself that the creation and operation of the link would neither pose unacceptable risks to CDS nor compromise the risk controls of CDSX. This link became operational on 27 August.

An important development in 2007 was the Bank of Canada's participation in the Financial Sector Assessment Program (FSAP) of the International Monetary Fund (IMF) and World Bank.[5] The FSAP included a formal review of the compliance of CDSX with internationally accepted standards for the design, operation, and regulatory oversight of securities settlement systems.

Accordingly, the IMF conducted an extensive assessment of CDSX in collaboration with the Bank, provincial regulators, and CDS. The assessment concluded that CDSX is

> sound, efficient and reliable. The legal basis for the system's operation is solid, its functionality is well developed, its risk management procedures to mitigate credit, liquidity, and operational risks are appropriate, and its governance structure is effective and transparent.

The IMF also made several recommendations to further enhance CDSX. Most important were those related to two standards that the IMF assessed CDSX as not observing.[6] More specifically, the IMF advised that CDS diversify the settlement of U.S.-dollar positions arising from

4. The central queue is an algorithm that offsets batches of queued (delayed) payments against each other (on a multilateral basis) at specified intervals throughout the day.

5. For more on this FSAP review, see the IMF website at <http://www.imf.org/external/pubs/ft/scr/2008/cr0859.pdf>.

6. These were the only standards that CDSX was assessed by the IMF as not observing. The complete IMF assessment of CDSX is available at <http://www.imf.org/external/pubs/cat/longres.cfm?sk=21712.0>.

one of its services, currently concentrated on the books of a single, private bank. The Bank of Canada has accommodated this particular settlement arrangement because of the relatively small size of potential losses, and the complexity, operational risk, and significant cost of apparent solutions. The Bank will continue to monitor the situation, however, and will seek solutions with CDS if warranted.

The IMF also advised that CDS should not permit the transfer into Canada of securities obtained through its link with the Depository Trust Corporation (DTC) in the United States until after settlement finality is obtained in that system. DTC is a major securities settlement system in the United States and, under some circumstances, DTC has the ability to reverse a security transaction until the end of the day of the original transaction. This can raise risks for participants who have already disposed of the securities they are asked to return.

Rather than delay securities transfers from DTC to the day after the original transaction, thus importing inefficiencies into the Canadian marketplace, CDS has established means to mitigate the associated risks.[7] The Bank's view is that even if such transaction reversals were to occur, any resulting risk is sufficiently mitigated by the risk controls that CDS has in place. Moreover, once a security is transferred into CDSX, the transaction is unlikely to be subject to such reversals.

The IMF assessment of CDSX provided a rigorous and useful complement to the Bank of Canada's oversight.[8]

7. This mechanism assigns the obligation to the CDS participant that had received the recalled security. If that participant does not comply, CDS has in place collateralized credit arrangements that would provide CDS with the funding needed to pay out the obligation or replace the security. Ultimately, any associated loss would be assigned to participants in a predetermined manner, protecting CDS.
8. In 2007, CDS was also assessed by a private custody and risk-management-rating firm, Thomas Murray, and received a rating of AA, which is deemed "very low risk overall." No depository clearing organization has received a higher rating from Thomas Murray. (Thomas Murray has rated over 140 securities depositories worldwide, including DTC, the U.S. Federal Reserve, and all of the Euroclear group.) The outlook for this rating is stable, suggesting that there are no forthcoming developments that would be expected to alter the assessment.

A valuable component of the Bank's oversight of CDSX is the bilateral meetings between the Bank and CDS that examine a range of topics related to the operation of CDSX. These meetings provide the Bank and CDS with an opportunity to explore any concerns or questions related to proposed changes to CDSX on a timely and efficient basis. In this way, the Bank is alerted to possible significant changes early in the process, and can raise any concerns that it may have, so that they can be dealt with efficiently by CDS in the process of developing system changes. During 2007, the Bank held two such meetings with senior CDS officials. Among the issues discussed, in addition to planned CDSX development, was the IMF assessment of CDSX.

The Bank of Canada approved 48 changes to rules and procedures concerning CDSX in 2007.

CLS Bank

CLS Bank clears and settles foreign exchange (FX) transactions in 15 currencies, including the Canadian dollar. In 2007, CLS Bank settled an average daily value of US$3.6 trillion, which included Canadian-dollar transactions with an average daily value of US$79 billion. Five of the six major Canadian banks now use CLS Bank as one means of settling their FX transactions.

CLS Bank is overseen collaboratively by the central banks whose currencies are included in the system, with the Federal Reserve Bank of New York acting as lead overseer. (CLS Bank is incorporated under U.S. laws, and the vast majority of FX trades involve the U.S. dollar.)

In 2007, CLS Bank proposed a number of new services and products that required regulatory approval. One of them is the provision of settlement services for over-the-counter (OTC) credit derivatives housed in the Depository Trust and Clearing Corporation (DTCC) Deriv/SERV trade information warehouse for which CLS won a tender offer in December 2006.[9] This warehouse is a centralized database of records relating to OTC credit-derivative transactions in nine CLS-eligible currencies.

9. DTCC is a U.S. holding company that provides a range of clearing and settlement services through its six subsidiaries, including clearing and settlement of U.S. securities.

To this point, the focus of CLS Bank had been on virtually eliminating FX settlement risk by settling FX payments on a payment-versus-payment basis.[10] The proposal to settle these OTC credit derivatives meant that CLS Bank would be settling non-FX-related payments. Since these are one-way payments from one participant to another (as opposed to two-way payments characteristic of FX transactions), they cannot be settled on a payment-versus-payment basis.

In assessing this proposal, the overseeing central banks considered whether this would compromise the ability of CLS to comply with the CPSS (Committee on Payment and Settlement Systems) core principles for systemically important payments systems, which underpin the oversight of CLS Bank.[11] As well, the central banks also considered broader risk issues associated with the future direction of CLS, and possible conflicts with the policies of some central banks if CLS were to evolve beyond its focus on reducing FX-settlement risk. For example, there was concern that CLS Bank could become a general-purpose payments system and reduce the role of major domestic systems, which could compromise the ability of some central banks to oversee systemically important payments systems involving their currencies.

The Bank of Canada continues to believe that the fundamental principle guiding the oversight group in considering such proposals should be the continued compliance with the CPSS core principles and, in particular, that any new service or product offered should not impair the controls put in place to manage FX-settlement risk. If these conditions are met, undue barriers should not be placed on the evolution of CLS Bank. It must also be recognized that, given the large fixed costs associated with CLS Bank's core FX-settlement business, complementary products may be useful to amortize these costs and may provide efficiencies.

10. FX transactions involve the sale of one currency for another. In a payment-versus-payment arrangement, the currency payable is paid at the same time as funds due are received. In this way, risk arising from asynchronous exchange of payments (settlement risk) is eliminated.

11. These core principles are available at <http://www.bis.org/publ/cpss43.pdf?noframes=1>.

With regard to the proposal to settle these specific OTC credit derivatives, approval was provided by the oversight group. Accordingly, CLS Bank began operation for transactions in five of the nine currencies in November 2007. Transactions in the other four currencies, including the Canadian dollar, will be phased in over time.

Approval was also given to CLS Bank to offer two other products: the settlement of payments related to non-deliverable forward contracts; and the settlement of FX option premiums.[12] Payments resulting from these instruments involve a single currency payment instead of a two-way currency payment as in a standard FX transaction.

The central bank oversight group also approved changes to the eligibility criteria for new currencies and settlement membership. The new criteria for currency eligibility will allow a currency whose sovereign credit rating is below investment grade to be settled in CLS Bank. However, such currencies cannot be used as collateral to support net debit positions within the system.

The minimum credit rating required for settlement membership was also lowered to below investment grade. Settlement members rated below investment grade cannot owe money within the system, however, but are required to fund settlement of their payment instructions on a cash basis.

These latter two changes have the potential to reduce settlement risk among a broader range of currencies and trading institutions than those previously eligible, without adversely affecting the safe and efficient functioning of the CLS settlement service.

Finally, an important outcome of the work among the overseeing central banks regarding CLS Bank's evolving business strategy has been

12. Non-deliverable forward contracts differ from normal forward FX contracts in that there are no transfers of the principal currency sums between counterparties. Rather, on the contracted settlement date, profit/loss is calculated based on the difference between the contracted exchange rate and the prevailing spot exchange rate, and a net cash payment is made by the party suffering the loss to its counterparty, often in U.S. dollars. Such contracts are commonly used to hedge against currency risks in emerging markets. An FX option premium is the price the buyer of an option contract pays for the right to buy or sell a certain currency for a specified price in the future.

a strengthening of the co-operative oversight arrangement that provides enhanced focus and resources with regard to CLS Bank developments.

August Financial Turbulence

The turbulence in financial markets that began in August 2007 led to increased volumes and activity for each of the designated systems. Although there were notable volume increases in the LVTS on some days in mid-August, there were no capacity problems, and the system functioned smoothly. Some system participants temporarily increased their collateral pledged in the system to support the higher value of LVTS transactions associated with intensified trading in markets and increased transactions in other clearing and settlement systems.[13]

The drying up of liquidity in the market for asset-backed commercial paper (ABCP) resulted in a number of defaults and extensions of entitlement payments related to securities held in CDSX.[14] On 13 August 2007, approximately $2 billion in maturities of ABCP held at CDS was not paid. Issuers of this ABCP had either to extend the maturities of this paper, where this right existed, or to leave the maturities unpaid.

In the event, about $1.6 billion of ABCP was left unpaid, and another $500 million was extended. CDS was not exposed to any financial risks arising from the unpaid maturities, because CDS does not execute an entitlement payment in CDSX unless it is prefunded by the issuers' paying agent. On 14 August, CDS took steps to assist issuers and participants holding the defaulted paper, including facilitating direct interaction between issuers and participants, to reach mutually agreeable solutions. It also enabled procedures to process partial payments on maturing ABCP. As well, CDS issued daily bulletins to system participants to provide information on unpaid and extended maturities, and on the evolving value of unpaid ABCP held at CDS.

Increased trading volumes in FX markets caused many market participants, including CLS Bank, to face internal capacity pressure. CLS Bank required two settlement extensions on 17 August, in the Australian dollar and Korean won. Peak-input volumes received on 16 and 17 August gave rise to peak-settlement days on 20 and 21 August, which were both record volume days for CLS Bank. Nevertheless, settlement and funding occurred within specified timelines on both of those days. CLS Bank had other peak-volume days after August, notably on 13 November, with over 1.4 million currency sides processed. Settlement proceeded smoothly on all of these peak-volume days.

In sum, the core payment, clearing, and settlement infrastructure functioned well during the period of market turbulence in 2007.

Other Oversight-Related Activities

CPA and other payments-system themes

In 2007, the CPA launched a strategic review of the LVTS and, more generally, is working to develop a long-term strategy for the evolution of the payments system in Canada, taking account of evolving needs and prospective developments. Such planning can provide helpful leadership in addressing important issues affecting the stability and efficiency of the Canadian financial system. Through the CPA's consultation with the Bank on these matters, the Bank undertook to enhance the ongoing exchange of research and analysis between the two organizations.

As part of the regulatory framework governing the Automated Clearing Settlement System (ACSS), the federal Department of Finance regularly consults the Bank with regard to proposed rule changes and other developments affecting the ACSS.[15] In this regard, the Bank reviewed nine ACSS bylaw and rule changes during the year.

13. Collateral is pledged by LVTS participants to the Bank of Canada to help manage risk in the system.
14. Entitlements include dividends, interest, payment upon redemption or maturity, and other payments or distributions to holders of securities. Entitlements may be distributed in the form of a money payment or as a distribution of securities or other property.
15. The ACSS, which is owned and operated by the CPA, is used for payments not handled by the LVTS: generally, small-value items, such as paper cheques, automated bill payments, and debit card transactions. The ACSS is subject to oversight by the federal Department of Finance.

More generally, to facilitate the Bank's interaction with the Department of Finance on payments issues, including broader policy developments affecting payment, clearing, and settlement systems, senior and working-level officials meet on a quarterly basis to exchange information and analysis. Among the issues considered in 2007 were the CPA's medium-term strategic plan, effects of the financial market turbulence on core payments infrastructure, and work related to the IMF FSAP.

Central bank committees and working groups

The Bank is an active member of the Committee on Payment and Settlement Systems. The CPSS is a committee of central bankers that collaboratively sets standards that guide oversight policies around the world. The CPSS also conducts analysis and research on a range of issues relevant to clearing and settlement systems. (For more on the CPSS, see <http://www.bis.org/cpss/index.htm>.)

In 2007, Bank staff were also actively involved in two working groups established by the CPSS. One working group published a consultative report in July on a global survey conducted in 2006 on the management of FX-settlement risk at major international banks. The results show that CLS Bank was used to settle 55 per cent of the value of the settlement obligations in the survey, contributing significantly to a reduction in FX-settlement risk.[16] The analysis also suggests that further reductions in FX-settlement risk can be made by making greater use of payment-versus-payment settlement methods (as provided by CLS Bank), increased reliance on bilateral netting arrangements, and, in some cases, simply through better measurement and control of settlement risk exposures. The CPSS is expected to publish the final report in mid-2008.

A second CPSS working group has been analyzing interdependencies that exist between payment and securities settlement systems in CPSS countries, as well as the potential role of these interdependencies in the transmission of risk across systems and across countries. The group's work highlights the fact that global payment and settlement infrastructure is becoming more interdependent. Tighter direct relationships between systems, and more indirect relationships arising from the activities of large financial institutions and the use of common third-party service providers, have contributed to this trend.

These relationships have strengthened the global infrastructure by reducing costs and diversifying risks, yet they also pose challenges by increasing the potential for disruptions to spread widely and quickly. Therefore, the increasing interdependence of payment and settlement systems calls for broad risk-management perspectives and coordination among stakeholders. As well, risk-management controls should be commensurate with the roles of the system, institution, or service provider in the global infrastructure. The working group will be considering more specific policy implications in 2008.

SWIFT

The Bank also continues to participate in the co-operative oversight of the Society for Worldwide Interbank Financial Telecommunication (SWIFT). SWIFT is the principal payment-messaging service provider for financial institutions around the world and for critical systems, such as the LVTS and CLS Bank. This co-operative oversight group monitors and assesses the extent to which SWIFT maintains appropriate governance arrangements, operational processes, risk management, and controls to effectively address potential concerns that may arise for financial stability.

Business-continuity planning (BCP)

The Bank of Canada works with the operators and participants of systemically important Canadian clearing and settlement systems to enhance arrangements for continuity of operations. These systems are at the centre of Canada's financial system, and serious economy-wide repercussions could arise if their operations were not extremely reliable.

One of the key conclusions from the Joint BCP Working Group in 2006 was the importance of achieving a priority-recognition status for major clearing and settlement systems from federal and provincial organizations that have responsibilities for emergency management (Goodlet 2007). Recognition of priority access to essential inputs such as electricity, diesel fuel, or municipal

16. The results for the Canadian banks included in the survey are summarized in Arjani (2007).

services during a seriously disruptive event is an important component of these systems and of the Bank's BCP work.

In 2007, the Bank of Canada and other agencies continued to follow up on these recommendations. In particular, the Bank, Finance Canada, and the system operators have been working with the Province of Ontario to achieve priority status for critical clearing and settlement infrastructure.

The Bank was also active during the year to improve its own business-continuity arrangements. The Bank conducted two integrated IT disaster-recovery exercises under conditions that simulated a serious operational disruption at the Bank. The test results were satisfactory, with the Bank able to meet its recovery-time targets. In addition, a large-scale integrated business-recovery exercise was conducted at the Bank's recovery site, which provided useful lessons for the Bank's BCP planning.

High-availability banking system

As noted in last year's oversight review (Goodlet 2007), the Bank of Canada is committed to improving its ability to deliver its unique banking services to critical clearing and settlement systems and financial institutions on a high-availability basis.

In 2007, significant progress was made in the multi-year redevelopment of a high-availability delivery system for these banking services. Final preparation and testing are expected to continue in 2008, with implementation of the new system targeted for autumn 2008.

Publications in 2007

During 2007, the Bank published the following staff work related to clearing and settlement systems:

- Arjani, N. and W. Engert. 2007. "The Large-Value Payments System: Insights from Selected Bank of Canada Research." *Bank of Canada Review* (Spring): 31–40.
- Ball, D. and W. Engert. 2007. "Unanticipated Defaults and Losses in Canada's Large-Value Payments System, Revisited." Bank of Canada Discussion Paper No. 2007-5.
- Chapman, J. T. E. and A. Martin. 2007. "Rediscounting under Aggregate Risk with Moral Hazard." Bank of Canada Working Paper No. 2007-51. This work was summarized in the Bank of Canada *Financial System Review*, December 2007, under the title, "The Provision of Central Bank Liquidity under Asymmetric Information."
- Chiu, J. and A. Lai. 2007. "Modelling Payments Systems: A Review of the Literature." Bank of Canada Working Paper No. 2007-28. This work is summarized in the Bank of Canada *Financial System Review*, June 2007.

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Engert, W. and D. Maclean. 2006. "The Bank of Canada's Role in the Oversight of Clearing and Settlement Systems." Bank of Canada *Financial System Review* (June): 57–63.

Goodlet, C. 2007. "Bank of Canada Oversight Activities during 2006 under the Payment Clearing and Settlement Act." Bank of Canada *Financial System Review* (June): 33–37.