

**Canada: Financial Sector Assessment Program—Detailed Assessment of
Observance of the CPSS/IOSCO Recommendations for
Securities Settlement Systems**

This Detailed Assessment of Observance of CPSS/IOSCO Recommendations for Securities Settlement Systems for Canada was prepared by a staff team of the International Monetary Fund as background documentation to the Financial Sector Assessment Program with the member country. It is based on the information available at the time it was completed in January 2008. The views expressed in this document are those of the staff team and do not necessarily reflect the views of the government of Canada or the Executive Board of the IMF.

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FINANCIAL SECTOR ASSESSMENT PROGRAM

DETAILED ASSESSMENT OF OBSERVANCE OF THE CPSS/IOSCO RECOMMENDATIONS FOR SECURITIES SETTLEMENT SYSTEMS

CANADA

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INTERNATIONAL MONETARY FUND
MONETARY AND CAPITAL MARKETS DEPARTMENT

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GLOSSARY

ACCESS	American and Canadian Connection for Efficient Securities Settlement
ACV	Aggregate Collateral Value
AMF	Autorité des marchés financiers
ASAP	Account Services and Payments
BCP	
BOC	Bank of Canada
BNS	Batch Net Settlement
CAD	Canadian dollar
CBM	CDS/DTC Cross-Border Movement
CCP	Central Counterparty
CDS	Clearing and Depository Services Inc.
CDSX	Canadian Depository for Securities' Settlement System
CNS	Continuous Net Settlement
CPA	Canadian Payment Association
CPSIPS	Core Principles for Systemically Important Payment Systems
CPSS	Committee on Payments and Settlements Systems
CSA	Canadian Securities Administrators
CSD	Central Securities Depository
CVTS	Collateral Value and Transfer System
DBNA	Depository Bills and Notes Act
DTC	Depository Trust Company
DTCC	Depository Trust and Clearing Corporation
DVP	Delivery-versus-Payment
IDA	Investment Dealers Association
IDD	Infrastructure Development Division
IOSCO	International Organization of Securities Commissions
LVTS	Large Value Transfer System
MTM	Mark-to-Market
NSCC	National Securities Clearing Corporation
NYL	New York Link
OBS	Overnight Batch Settlement
ONB	
OSC	Ontario Securities Commission
OSFI	Office of the Superintendent of Financial Institutions
OSTA	Ontario Securities Transfer Act
PCSA	Payment Clearing and Settlement Act
PPSA	Personal Property Security Act
RAC	Risk Advisory Committee
SRO	Self Regulation Organization
STA	Securities Transfer Act
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TFT	Trade-for-Trade
TSX	Toronto Stock Exchange Inc.
UCC	Uniform Commercial Code

Table 1. Detailed Assessment of Canada’s Observance of the CPSS-IOSCO Recommendations for Securities Settlement Systems

Recommendation 1.	Securities settlement systems should have a well-founded, clear and transparent legal basis in the relevant jurisdiction.
Description	<p>Accessibility of the regulatory framework The Canadian Depository for Securities (CDS) is the operator of the securities settlement system (CDSX). All key laws, regulations, contractual arrangements, rules, and procedures governing the operations and activities of the CDSX are public and accessible to participants. In particular, participants receive comprehensive documentation covering the rules, requirements, procedures, and instructions pertaining to CDSX. This documentation is available on request and is accessible on the CDS website. The public authorities’ regulations are also available to the general public on their websites.</p> <p>Legal basis Securities clearing and settlement activities in Canada are governed and regulated by specific laws and regulations and by provisions in other financial legislation and regulations:</p> <ul style="list-style-type: none"> - The federal Payment Clearing and Settlement Act (PCSA), enacted in 1996 and amended in 2007, empowers the Bank of Canada (BOC) to designate and oversee clearing and settlement systems that could pose a systemic risk to Canadian financial markets. The BOC is authorized and responsible for regulating CDSX in a manner that will limit systemic risk. The PCSA protects settlement rules and procedures in CDSX from certain legal challenges and thus provides a high degree of legal assurance to the settlement process in CDSX. - The Ontario Securities Act and the Québec Securities Act recognize, authorize, and regulate clearing houses to provide a clearing service. - Other relevant legislation related to the issuance, immobilization, book-entry, and transfer of federal government, provincial government, and corporate securities include the federal Bills of Exchange Act, the federal Depository Notes and Bills Act, the Ontario Business Corporations Act, and equivalent statutory instruments in other provinces. - The Canadian Securities Administrators National Instrument 54-101 grants to non-registered and registered securities holders equivalent access to corporate information and voting rights. - Clearing and Depository Services Inc. (CDS) also qualifies as an eligible foreign custodian with the Securities and Exchange Commission of the United States and is, thus, subject to the Investment Companies Act (1940). <p><i>Legal Basis for Book-Entry Transfers and Pledges</i> Transfers of property rights (including ownership interests and security interests) in securities are governed generally by provincial law. Ontario (the jurisdiction where CDS’s operations are centered), Alberta, and British Columbia (two other major head-office jurisdictions) have recently enacted the uniform <i>Securities Transfer Act</i> (STA), which, in combination with amendments to those provinces’ <i>Personal Property Security Acts</i> (PPSA), provide a modernized legal basis for book-entry transfers and pledges in CDSX. Closely modeled on Article 8 of the United States Uniform Commercial Code, the STA provides that a credit entry to a securities account at a securities clearing house creates a bundle of rights in favor of the credited account holder—known as a “security entitlement.” If the account holder takes the security entitlement as a means of purchasing the securities, it renders the entitlement free and clear of any adverse claims to the security, as long as the account holder gave value for the securities and did not have any notice of an adverse claim. If the account holder</p>

takes the security entitlement as a means of perfecting its security interest in the securities, the account holder obtains a priority security interest in those securities, and this has priority even over the competing claims of another creditor who has previously registered an interest against the same property under the registration provisions of the PPSA. Québec is the other major head-office jurisdiction, the laws of which could possibly be applied to transfers and pledges of securities in CDSX (see below under conflict of laws issues).

Transfers of certain specific types of securities in CDSX (bankers' acceptances and commercial paper) will also be governed by the federal *Depository Bills and Notes Act* (DBNA). The DBNA provides that entries to the securities accounts of participants in a securities clearing agency constitute transfer of possession of those securities for the purposes of transferring ownership and of perfecting security interests. The federal government is currently considering whether the DBNA should be amended or repealed in response to the provincial STAs.

(a) Enforceability of transactions

The contractual arrangements between CDS and its participants are fully enforceable under Canadian laws. CDSX regulations can be enforced by a legal action. Furthermore, the PCSA provides protection against stays being imposed on CDS realizing on security granted by participants who have become insolvent.

(b) Protection of customer assets

Assets held in trust at a custodian are held in segregated accounts and are thus protected from seizure in the event of the insolvency of the custodian. This fiduciary relationship is governed by general commercial law. At the level of the CDS, an intermediary is obliged to keep its securities holdings separate from customers' holdings. CDS is also required to keep its own securities holdings separate from the assets of its participants.

In addition, entities acting as custodians such as banks, investment firms, and other financial intermediaries are legally obliged to have an internal accounting system that allows the identification of the holdings of their customers at any time.

(c) Immobilization and dematerialization of securities

The great majority of securities issued in Canada are either dematerialized or immobilized in CDSX. The book-entry transfers and pledges of securities are governed mainly by provincial legislation. The laws of Ontario, Québec, and British Columbia, as well as the federal laws of Canada, explicitly recognize bookentry title, transfers, and pledges of securities. For debt securities issued by the federal government, the *Financial Administration Act* provides for the possibility of fully dematerialized federal debt securities. For securities governed by the federal DBNA (commercial paper, bankers' acceptances), a single certificated security for each issue must be deposited into CDSX and immobilized.

CDS is located in Ontario and governed in this respect by Ontario securities law. The Ontario Securities Transfer Act (OSTA), which came into force on January 1, 2007, provides a legally sound basis for the electronic transfer of securities between member accounts in CDSX for the purpose of transfers of securities. Book-entry transfers of bills of exchange and promissory notes (including bankers' acceptances) are subject to the federal Depository Bills and Notes Act, which provides an explicit legal basis for the immobilization and book-entry transfers of those securities in CDSX.

The OSTA is closely modeled on Revised Article 8 of the Uniform Commercial Code (UCC) in the United States. The OSTA, together with corresponding amendments to the PPSA, replaces outmoded concepts of the transfer of possession of book-entry

securities with the UCC concept that the holder of a book-entry position in securities acquires a “security entitlement.” By controlling a security entitlement (through the securities being recorded in its account), the participant who takes a pledge of the securities in CDSX obtains a valid, first priority security interest in the securities.

(d) Netting arrangements

The PCSA ensures the validity of netting arrangements defined in accordance with the settlement rules of the system, notwithstanding any federal or provincial laws governing the insolvency of a CDSX participant. In addition, the OSTA provides that a clearing agency rule that governs rights and obligations between the clearing agency and its participants or among its participants is effective even if the rule conflicts with the OSTA or PPSA and affects another person who does not consent to the rules.

(e) Securities lending arrangements

Securities lending arrangements, including close-out netting and pledges of collateral, are explicitly protected in the event of insolvency of a counterparty by the “eligible financial contract” provisions in the federal insolvency statutes. The OSTA and PCSA ensure that the transfers and pledges of securities in CDSX to settle SLA transactions will be legally effective. See also Recommendation 5.

(f) Finality of settlement

Securities and fund transfers are settled simultaneously, irrevocably, and finally in CDSX. Finality is defined by the rules of the CDSX as the discharge of a securities settlement obligation through the transfer of securities and funds irrevocably (after transfer) and unconditionally. The finality of settlement in the CDSX rules is, as noted, protected under the PCSA.

Net cash settlement (payment exchange in CDSX terminology) between settlement members in CDSX and CDS as the central counterparty is conducted through Large Value Transfer System (LVTS) payments on the books of the BOC. The LVTS is a payment system that adheres to the Core Principles on Systemically Important Payment Systems (CPSIPS). LVTS is also a designated payment system under the PCSA. Accordingly, the PCSA legally mandates that settlement of payment obligations on the books of the BOC is final and irrevocable upon entry, and not subject to reversal, set-aside, or stay.

Intraday settlement of individual securities transactions in CDSX, as well as the end-of-day settlement of the net amounts owing, are protected from unwinds by the PCSA, which protects the enforceability of the finality provisions in the CDSX rules.

(g) Delivery-versus-payment (DVP)

Entries to securities accounts and corresponding entries to fund accounts are made simultaneously only after all risk control tests have been passed. The CDSX rules, as well as the design and functionality of the system, ensure that no transaction settles in CDSX unless securities are available and there is sufficient cash or credit to fully support the transfer of securities.

Challenges by a court

To date, there have been no court challenges to the settlement of securities transactions, end-of-day net cash settlement or to the protections provided to the rules of CDSX.

Enforceability of rules and regulations in the event of a bankruptcy

As indicated above, the PCSA explicitly validates and upholds the enforceability of CDSX rules as binding on CDSX and its participants, notwithstanding any federal or provincial insolvency laws. It also ensures that realization on collateral pledged in the

	<p>system will not be the subject of stays on execution by creditors in the event of the insolvency of the pledgor.</p> <p>Cross-border participation Securities traded through the United States cross-border services are held by the Depository Trust Company (DTC) in New York and are subject to United States law on securities transfers and pledges (Uniform Commercial Code (UCC) Articles 8 and 9). This law determines with certainty the laws of the jurisdiction that will apply to transactions in a multi-tiered indirect holding system. As New York law applies to cross-border transactions settled in DTC, CDS would look to courts in New York to uphold the validity of CDS's claims as a participant in DTC.</p> <p>Conflict of law issues The OSTA also helps eliminate any uncertainty as to whether Ontario's laws, or some other jurisdiction's laws, are applicable to the transfer and pledge of securities in CDSX. With participants' acknowledgement in the CDSX rules that CDS is governed by the laws of Ontario, the OSTA ensures that the laws of Ontario will be the governing law. Of the other provinces in Canada most relevant to CDS, Alberta has recently enacted similar STA legislation; and British Columbia and Québec have announced their intent to introduce similar legislation in the very near term.</p> <p>There is a remote risk that the courts of another jurisdiction outside of Ontario will not apply the conflict of laws provisions of the STA and could hold that their laws apply instead. This could occur, for example, where the securities being pledged are still evidenced by physical certificates held outside Ontario, or if a court outside Ontario were to hold that a security interest in book-entry securities constitutes a non-possessory security interest governed by the law of the pledging participant's principal place of business.</p> <p>To assure itself that security interests granted in CDSX will have validity and priority in other jurisdictions, CDS has obtained legal opinions on the enforceability of security interests in all relevant jurisdictions of its operations: Alberta, British Columbia, New York, Ontario, and Québec. These opinions have all given a high degree of certainty that CDS will have a valid and first-priority security interest (or hypothec) under the laws of those jurisdictions. To obtain even more certainty that security interests will be upheld, CDS registers its security interest or hypothec against all participants in Ontario and in the jurisdictions of those participants with executive offices outside Ontario.</p> <p>With respect to its cross-border arrangements with DTC (see Recommendation 19), it is New York law that applies to cross-border transactions settled in DTC that involve CDS. CDS would, therefore, need to look to courts in New York to uphold the validity of CDS's claims as a participant in DTC. Provided that United States securities are otherwise eligible as collateral security, CDSX participants may pledge them to CDS, through their respective DTC accounts as collateral for CDSX settlement purposes. As noted, based on legal opinions obtained from counsel in the United States, the courts of New York would apply the laws of Ontario to determine the validity and priority of CDS's security interest in these securities. Even if a court were to hold that CDS's security interest is subject to the laws of New York, CDS would still have a valid and perfected security interest under those laws under UCC Article 8.</p>
Assessment	Observed
Comments	

Recommendation 2.	Confirmation of trades between market participants should occur as soon as possible after trade execution, but no later than trade date (T+0). Where confirmation of trades by indirect market participants (such as institutional investors) is required, it should occur as soon as possible after trade execution, preferably on T+0, but no later than T+1.
Description	<p><i>Confirmation of trades entered into CDSX on T+0</i> CDSX has the capability for straight-through-processing (STP) of trade for trade confirmation on T+0. In practice, confirmation of trades, relative to trade date (T), depends on whether a trade is between direct market participants (“non-institutional”) or between indirect market participants (“institutional”).</p> <p><i>Direct/non-institutional</i> Transactions traded on the exchange are confirmed or “locked-in” automatically at the exchange at T+0. They are then moved to CDSX with a “confirmed” status and are ready for settlement. Direct non-exchange trades between two participants of a clearing agency are generally confirmed through the facilities of the clearing agency. Dealer to dealer trades are subject to Investment Dealers Association (IDA) Regulation 800.49, which provides that trades in non-exchange traded CDS eligible securities must be submitted to an “acceptable trade matching utility” within one hour of the execution of the trade. In trade “matching,” both parties to a trade targeted for processing in CDS’s trade matching service submit trade entry instructions, which are compared and matched, resulting in the creation of a confirmed trade. The CDS can also accept matched trades from a virtual matching utility, setting them up for settlement as confirmed trades.</p> <p><i>Indirect/institutional</i> Effective April 1, 2007, a new framework for trade confirmation for indirect participants was adopted by the various jurisdictions of the Canadian Securities Administrators (CSA). By July 1, 2008, market participants must confirm 90 percent of their trades by T+1 or, if not, are required to submit an “exception report” to regulators. The current situation is that about 70 percent of trades by volume are confirmed by T+1.</p>
Assessment	Observed
Comments	
Recommendation 3.	Rolling settlement should be adopted in all securities markets. Final settlement should occur no later than T+3. The benefits and costs of a settlement cycle shorter than T+3 should be assessed.
Description	<p><i>Settlement cycles</i> Securities transactions are settled on a continuous basis using a rolling settlement cycle. The regular schedule for rolling settlement is as follows:</p> <ul style="list-style-type: none"> ▪ Equities (T+3). ▪ Government of Canada treasury bills and money market securities (T+0). ▪ Government of Canada bonds and Government of Canada guaranteed bonds having remaining maturity of three years or less (T+2). ▪ Government of Canada bonds and Government of Canada guaranteed bonds with remaining maturity of over three years, all provincial, municipal, corporate and other bonds or debentures, equities, or other certificates of indebtedness including mortgage-backed securities (T+3). <p>(OTC) trade settlement is negotiable between the counterparties, but the majority of these transactions is settled similarly to exchange-traded securities.</p> <p><i>Failed trades</i> Failed equities trades accounted for about 0.5 percent of the total number of trades</p>

	<p>executed on the stock exchange. There is room to improve on the failure rate for fixed income trades, as approximately 5 percent are not settled by the value date. The failed trades are settled within 5 days after the settlement date and can remain within the system for 10 days.</p> <p><i>Facilities to smooth settlement process</i> The CDS does not provide an automated securities lending facility that would potentially reduce settlement failure. However, there are well-developed securities lending and repo markets allowing participants to “borrow” securities to fulfill settlement obligations.</p> <p><i>Monitoring of fails</i> The CDS actively monitors participants’ outstanding positions and collateral is required in order to cover the risks that they bring to the system. In terms of regulatory reporting, currently market participants are required to file short position reports.</p> <p><i>Incentives to settle in due time</i> The outstanding positions of the continuous net settlement (CNS) process are marked-to-market daily and participants must also pledge collateral to cover the replacement cost risk that they bring to the system. In addition, there is compensation outside of CDSX by parties who fail to deliver in due time.</p> <p><i>Closing of open positions</i> Once a trade has been novated to the CDS through the Continuous Net Settlement (CNS) process, the counterparty to a transaction can request that the CDS “buy-in” the outstanding counterparties’ position. If the CDS has not delivered all of the securities owing to a participant under a CNS obligation, then that participant may request the CDS to settle the outstanding CNS obligation on its current value date. If the CDS receives such a request to settle a partial or delayed delivery, the CDS may require any participant who has a CNS obligation to deliver securities of that issue to CDS on that value date to make such a delivery. Upon such request by the CDS, that participant shall be required to settle in full the forced-on CNS obligation by the time prescribed and shall not be permitted to make a partial delivery or to delay delivery.</p> <p>If the participant fails to settle a forced-on CNS obligation in full, then the CDS may at any time execute a buy-in of the participant’s delayed or partial delivery. When the CDS executes a buy-in, the forced-on CNS obligation is terminated. The CDS may appoint an agent to purchase the securities required for the buy-in, and the purchase shall be made on such terms as the CDS deems commercially reasonable taking into account the need of the CDS to receive prompt delivery of such securities.</p> <p><i>Analysis of shorter settlement cycle</i> The securities industry in Canada, in response to the G-30 Recommendations for Securities Clearing and Settlement, has explored the possibility of shortening the settlement cycle in Canada and has agreed that any further shortening of the settlement cycles take place at a later stage.</p>
Assessment	Observed
Recommendation 4.	The benefits and costs of a central counterparty should be assessed. Where such a mechanism is introduced, the central counterparty should rigorously control the risks it assumes.
Description	<p>CDS as central counterparty (Central Counterparty) The CDS becomes the CCP for cash payments that arise from all securities transactions settled in CDSX. The CDS also acts as a CCP for the securities leg of transactions that involve future-dated Canada bonds and treasury bills, through the</p>

	<p>DetNet clearing function, and for equities through the CNS function.</p> <p>The CDS generally acts as a CCP at the date of settlement, however, in the case of DetNet, novation of the payment and securities obligations can take place <i>before</i> the settlement date. This means that the participants are facing replacement cost risk from the time of trade execution T+0 until novation occurs, which is generally on settlement date, but in the case of DetNet this can be earlier. International best practice would require the CCP to assume its responsibility immediately after the trade is executed.</p> <p><i>Cost-benefit analysis</i> No explicit cost-benefit analysis has been done for introducing CCP for trade-for-trade (TFT) transactions. However, the pros and cons of offering the TFT service with a CCP or without a CCP were implicitly evaluated as part of the decision to offer the TFT service in CDSX without a CCP. Nonetheless, the regulators intend to raise with CDS, for its consideration, the issue of providing TFT on a CCP basis.</p> <p>Risk management This recommendation deals only with the cost-benefit analysis of introducing CCP, while the risk management procedures of the CCP, including margin requirements, financial resources, default procedures, should be assessed separately against the Committee on Payments and Settlements Systems CPSS/IOSCO Recommendations for CCP.</p> <p>Nevertheless, the CDS's credit and liquidity risk exposures in connection with the settlement are assessed in order to ensure the safety of the settlement system (see Recommendation 9).</p>
Assessment	Broadly observed
Comments	In order to fully observe this recommendation, the CDS should explicitly assess the benefits and costs of acting as a CCP for trade-for-trade (TFT) transactions.
Recommendation 5.	Securities lending and borrowing (or repurchase agreements and other economically equivalent transactions) should be encouraged as a method for expediting the settlement of securities transactions. Barriers that inhibit the practice of lending securities for this purpose should be removed.
Description	<p><i>Institutional framework</i> Canada has well-developed securities lending and repo markets that can contribute to the settlement process. The vast majority of repo and securities lending transactions involve securities issued by the Government of Canada, but can also include provincial, municipal, and corporate bonds, as well as equities and money market instruments. Typical borrowers of securities include investment dealers, banks, insurance companies, hedge funds, and individuals. Typical lenders include pension funds, investment funds, mutual funds, investment dealers, and third-party lenders (such as trustees). Custodians also play a key role in the securities lending market, mainly as agents. They provide custody account management services, securities valuation, and transfer administration services, notably investment and lending services on behalf of their clients. Since Canadian dollar securities are held in the CDS, the actual transfer of loaned and repoed securities is in the form of a book-entry in the CDSX.</p> <p>The Canadian tax regime does not differentiate between repo transactions and securities lending arrangements.</p> <p>The standardized documentation governing lending and borrowing transactions was developed by the IDA and includes Securities Loan Agreements and Repurchase</p>

	<p>Agreements. The banking supervisor, the Office of the Superintendent of Financial Institutions (OSFI), also publishes guidelines for federally regulated financial institutions involved in securities lending. Standard agreements exist and are used for cross-border securities lending arrangements.</p> <p><i>Market infrastructure</i> There is no centralized automated securities lending facility in Canada. All such transactions are carried out on a bilateral basis. In 2006, CDS investigated the business case for the creation of a new facility characterized as an “Automatic Lending Program”, where lending would automatically occur to cover short positions in CNS on settlement date. CDS also investigated the business case for a “Voluntary Lending Program”, through which CDS would provide a single information source on securities available for lending and borrowing, and functionality to match and complete loan transactions between lenders and borrowers. However, discussions with participants suggested that failed trades were not a significant problem and that the business cases did not exist for developing these facilities.</p> <p><i>Supervision and regulation of securities lending arrangements</i> There is no specific regulatory regime for securities lending and repo markets. Participants in these markets are supervised by various prudential regulatory bodies, such as the IDA, a self-regulatory organization for investment dealers, and OSFI for federally regulated financial institutions. The IDA and provincial securities regulatory authorities have in place specific and general rules that regulate domestic secondary market trading carried out by IDA member firms. In addition, the Bank of Canada, the Department of Finance, and the IDA have developed a formal code of conduct that provides further amplification and, in some cases, broader application of these rules in relation to domestic debt markets (Policy No. 5).</p>
Assessment	Observed
Comments	As there is room to improve on the failure rate for debt instruments, CDS might reconsider introducing a securities lending facility in order to reduce settlement failure.
Recommendation 6.	Securities should be immobilized or dematerialized and transferred by book entry in Central Securities Depository (CSDs) to the greatest extent possible.
Description	<p>The great majority of securities issued in Canada are either dematerialized or immobilized in the CDS. However, securities held by most active participants are immobilized (approximately 95 percent of government securities, equities, and corporate bonds, and 90 percent of corporate money market instruments). Not all securities issued in Canada are dematerialized. However, all securities deposited in the CDS—both dematerialized and immobilized—are recorded, managed, and transferred through an electronic book-entry system.</p> <p><i>Transfer of title</i> CDS operates an indirect account holding system. Securities are kept in the name of the custodians, who act as a nominee for customers. The transfer of ownership occurs when the securities are transferred among participants in the books of the CDS, which notifies by electronic message the intermediaries that the transfer has been registered in the relevant accounts held by the CDS. As soon as the intermediaries receive this notification, intermediaries shall make the necessary entries in their sub-accounts.</p> <p>The CDS does not carry out the registrar function. The listing of beneficial ownership of securities is done by private transfer agents acting on behalf of issuers. However, the transfer of ownership within the CDSX takes place on its books and does not depend on a transfer of beneficial ownership at the registrar.</p>

Assessment	Observed
Comments	
Recommendation 7.	Securities settlement systems should eliminate principal risk by linking securities transfers to funds transfers in a way that achieves delivery versus payment.
Description	<p><i>Technical framework</i></p> <p>The CDSX has three distinct trade settlement processes: (i) real-time gross settlement Trade-for-Trade (TFT), (ii) overnight batch settlement (OBS); and (iii) intra-day continuous net settlement (CNS) and DetNet. The TFT settlement is offered for debt and equity transactions. The CNS nets eligible exchange-traded equity transactions. DetNet nets eligible future-dated trades in Government of Canada bonds and treasury bills (T-bills). In the net settlement, the CDS acts as a CCP.</p> <p>The real-time TFT process runs continuously throughout the day. All securities transactions (both debt and equity) that are eligible to settle TFT are submitted to the real-time TFT routines and are continually evaluated against the real-time TFT settlement criteria. For transactions that settle in the real-time TFT settlement process, DVP is achieved by moving securities on a gross basis with a simultaneous final debit or credit to participants' accounts.</p> <p>The OBS batch process occurs once per day at around 4:00 a.m. EST and takes approximately 2 hours to complete. This process increases settlement efficiency by combining the settlement of CNS trades with TFT trades, reducing a participant's securities positions, funds and collateral while still satisfying the appropriate risk controls. This is accomplished by excluding trades from the OBS process until one final "notional" position is achieved for each participant, for each account and for each security. DVP is achieved because the system settles all transactions that have not been excluded from the OBS process with exactly the same timestamp.</p> <p>The detailed steps involved in the OBS processing cycle are as follows:</p> <ol style="list-style-type: none"> 1. The system extracts all of the trades available for settlement that are eligible to settle CNS, as well as all of the trades that are not eligible to settle CNS (that is, TFT). 2. For each participant, for each account, and for each security, the system calculates a provisional net securities position by adding together new CNS trades, previous CNS outstanding, new TFT trades, and the participant's ledger position in the securities. 3. The system also nets the funds amounts from the CNS activities and the TFT trades to arrive at a provisional net funds position. 4. Based on the net obligations, provisional changes to the securities, funds and Aggregate Collateral Value (ACV) positions are carried out. At the end of the changes, the securities, funds and ACV positions reflect the balances that would be there if the entire obligations were settled. Shortages of securities, funds, and ACV would result in negative positions. 5. For settlement to occur, the participants must have sufficient securities, funds, and ACV. Therefore, all the negative positions must be eliminated. CNS positions and TFT trades are removed from the settlement by an exclusion process. Partial exclusions of CNS positions are possible. However, for TFT trades, the entire trade must be removed. The settlement priority plays an important role in deciding which positions are excluded. CNS positions and TFT trades that have the higher priority are removed

	<p>last.</p> <ol style="list-style-type: none"> 6. Once all the negative positions are excluded, the inclusion process is performed to include as many TFT trades and CNS positions as possible without causing any negative positions in the securities, funds, and ACV. When the exclusion and inclusion processes are complete, the outstanding CNS positions are created and the ledgers are updated to reflect the settled CNS and TFT trades. If necessary, the system excludes TFT transactions until the provisional negative position is eliminated. 7. The system executes all of the non-excluded CNS trades as settled, executes the non-excluded TFT trades as settled and updates the excluded TFT trades as pending. 8. All of the pending TFT trades are re-considered for settlement in the real time TFT settlement process. All of the CNS outstanding positions are re-considered for settlement in the intra-day CNS settlement process. <p>Finally, for CNS transactions that do not settle in the OBS settlement process (“CNS outstanding”), settlement is re-attempted on a full or partial basis during one of four settlement windows over the processing day, referred to as the intra-day CNS processes.</p> <p><i>Delivery versus payment</i> In CDSX, DVP is achieved through the simultaneous transfer of funds and securities at the time of settlement of transactions. The funds and securities transfers are final between the participants and CDS. At the end of the day, the obligations among the CDS and settlement banks, acting as cash clearers, are settled through the LVTS payments for Canadian Dollar (CAD) and FedWire funds for U.S. dollar.</p> <p><i>Legal framework</i> The PCSA supports the legal framework of DVP; it makes the systems’ settlement rules binding by removing potential legal challenges to the rules. Both securities deliveries and funds payments are irrevocable and unconditional. The systems are set up so that securities and funds transfers in the accounts of participants are final once settlement has been completed. Furthermore, end-of-day payments are made through the large value transfer system (LVTS), a system that provides irrevocable and unconditional funds on an intraday basis.</p> <p><i>DVP and cross-border links</i> See Recommendation 19 for description of the cross-border links.</p>
Assessment	Observed
Comments	
Recommendation 8.	Final settlement on a DVP basis should occur no later than the end of the settlement day. Intra-day or real-time finality should be provided where necessary to reduce risks.
Description	<p><i>Intraday finality</i> CDS provides real time finality and intraday finality. In fact, the TFT settlement process allows real time finality after the execution of DVP settlement. For transactions that settle in the overnight CNS/BNS settlement process, finality is achieved after the execution of each batch. The (ONB) processes the CNS trades and the batch net settlement (BNS) component processes the TFT and DetNet trades. The goal of the combined process is to allow CNS and TFT activities to net against each other and to reduce a participant’s requirements for securities positions, funds, credit and collateral while still satisfying the appropriate risk controls. The CNS/BNS process occurs once per day after the overnight period around 4:00 am. EST.</p>

	<p>Finally, for CNS transactions that do not settle in the ONB, settlement is re-attempted on a net basis during one of four settlement windows over the processing day. These are referred to as the intra-day CNS processes.</p> <p>The settlement of a trade results in a final and irrevocable delivery of securities and funds on the books of the two trading parties. They can then reuse securities and funds that have been transferred to them intraday or in real time.</p> <p><i>Need for intraday real time finality</i> As a settlement participant in the CDSX, the BOC settles its securities transactions that are related to monetary policy transactions and collateralized credit operations. Except for some client account securities transactions, the majority of the BOC securities transactions are for same-day DVP settlement in the TFT service. Similarly, all its collateral transfers involve real-time transfers on a “free delivery” basis or through DetNet.</p> <p><i>Links to foreign CSDs</i> The CDS has links to CSDs in other countries to facilitate cross-border trading by its members. As a rule, the CDS credits participants’ securities accounts and makes securities available only after confirmation of settlement finality on the local market by the depository. However, DTC (the CSD in the United States) allows provisional transfers. The CDS participants can move these securities from their DTC (sponsored) account to their CDSX account, using the CDS’s cross-border movement service. This issue is discussed further in Recommendation 19 on links.</p>
Assessment	Observed
Comments	
Recommendation 9.	CSDs that extend intraday credit to participants, including CSDs that operate net settlement systems, should institute risk controls that, at a minimum, ensure timely settlement in the event that the participant with the largest payment obligation is unable to settle. The most reliable set of controls is a combination of collateral requirements and limits.
Description	<p>Risk management procedures</p> <p>The CDS facilitates securities settlement by providing intra-day funds accounts to participants, with positive net funds positions representing an end-of-day claim on the CDS and negative net amounts representing a claim by the CDS on the participant. The balances of the banks, acting as cash clearer, are settled at the end-of-day payment exchange process. The credit risk associated with these balances is managed through limits and collateralization. The CDS also acts as a CCP for the net settlement procedures. Thus, the CDS is exposed to credit and liquidity risks. In addition, implicit risk exposure occurs within the net settlement process in the event a participant is unable to meet its obligations on time or at a later stage.</p> <p>In order to handle these risks, the CDS’s enterprise risk management program provides a structured approach to the identification and management of those events that can negatively impact the CDS’s activities. Each division assesses and measures risks according to their probability of occurrence and potential impact. These risk assessments are reviewed at the enterprise level by a dedicated risk committee. For each risk committee meeting, the key risk report for the applicable reporting period documents changes to the enterprise-wide risk profile and provides the information detailed above. In addition to ongoing identification and management of risk through a self-assessment process, the CDS also conducts a thorough annual risk review that comprehensively identifies the key risks faced by divisions and the strategies for</p>

managing these risks. The report's findings are reviewed and approved by CDS senior management before they are reported to the audit/risk committee of the board of directors.

A complete risk review is also performed for every new service and significant enhancement to existing services to help ensure that appropriate controls are in place before implementation. This review process is integrated into the system and business development life cycle methodologies at the CDS.

In regard to the risk containment of the CDS's clearing and settlement services, risk management:

- designs, tests and implements suitable risk controls that together make up the risk model and any enhancements to the risk model;
- monitors participant settlement activity to help ensure that the risks being brought to the system are adequately mitigated;
- applies suitable additional measures to participants determined to be contributing excessive risks to the system;
- presents for review and approval by the risk committee and the board of directors proposed tolerances and limits and any changes to the risk model;
- regularly reports on results and any actions taken in applying the risk controls (highlighting exceptions) to senior management, the Risk Advisory Committee and the Audit/Risk committee;
- in coordination with the operations division, maintains and applies appropriate procedures to resolve participant defaults; and
- liaises with other CDS divisions to help apply appropriate risk controls.

Risk Advisory Committee (RAC) and Risk Monitoring

The RAC acts as an advisory group to the CDS on issues regarding the CDSX risk model and reports to the audit committee of the CDS's board of directors. The RAC, which meets at least once per month, has representatives from each participant category, the BOC, the IDA, the Ontario Securities Commission (OSC), the Autorités Marchés financiers (AMF), and members of the CDS management. This monthly report, circulated to the RAC members and the risk board committee, provides a summary of the results of the CDS's assessment of the financial risk measurements and controls applied in the CDSX. To monitor payment risk, the report provides metrics on the CDSX collateral pools and resulting credit facilities. To assess replacement cost risk, the report provides metrics on the largest aggregate risk and single participant exposure in each of the CCP services. It also covers the risk created by the largest outstanding position of any single participant in all the CCP services of which they are a member, and back-tests results for CCP participant funds, DetNet losses, and CNS losses. Finally, to assess liquidity risk, the report covers the CDS liquidity risk exposure in both currencies.

The CDS staff also monitors the system and related risk metrics in real time, with standard escalation procedures. For example, upon determination that a CDS receiver or credit participant has satisfied one or more of the conditions for suspension, an internal crisis management team at CDS becomes involved in making a decision. There is also a Problem Management Group that includes both CDS management and other CDS stakeholders.

CDSX risk management

Membership standards

The minimum requirements for participation vary depending upon the type of participant. In general, the CDS requires every participant to be subject to regulation and, if applicable, to be a member of a self-regulatory organization (SRO). The CDS

also requires that participants be able to demonstrate that they meet basic financial and operational requirements, related to a participant's financial ability to meet its obligations to the CDS, and to its operational capabilities, including staffing needs.

Credit risk controls

The credit risk associated with participants' net cash settlement obligations to the CDS, as the CCP, is managed by limits on the maximum payment obligations that a participant can create in the system and collateralization of those payment obligations. These risk controls are ultimately supported by a structure in which each participant belongs to at least one of the "category" credit rings.

A category credit ring is a grouping of the CDSX participants that share similar characteristics. For example, the six largest banks in Canada are classified as Extenders of Credit and provide credit to other participants that are classified as Receivers of Credit. Each class of member is eligible to participate in a specific credit ring.

Limits on payment obligations ("Funds Edit")

All participants' funds accounts have a limit on the size of negative funds balances (essentially a limit on the maximum negative balance that the participant can have in its funds account at any point in time). The size of this limit is based on two factors:

- Caps: A cap is an amount that is assigned to a participant pursuant to a formula in the rules and procedures. Some participants are assigned a cap of zero. Only participants who are members of a collateralized category credit ring receive a cap.
- Lines of Credit: In CDSX, credit granters can provide lines of credit to other participants. Participants may receive multiple lines of credit from multiple credit granters. The Extender that grants a line of credit is ultimately responsible for covering the payment obligations that arose from use of that line.

Collateralization of payment obligation ("ACV Edit")

The CDS also performs a risk check to ensure that a participant's negative funds balance is fully collateralized—the Aggregate Collateral Value (ACV). No payment obligation is permitted unless it satisfies the ACV. The ACV is the estimated ("haircut-adjusted") value of the collateral that could be realized if the participant failed to meet its payment obligation. ACV is composed of securities maintained by a participant in certain of its accounts, and of a pool of securities contributed by members of the participant's category credit ring(s). This pool of securities is known as a category credit ring's collateral pool.

Collateral pools

The collateral pool associated with each credit ring provides some ACV to the members of that ring. The collateral pools work on the premise that obligations of multiple participants are covered by the same collateral, so the system is guaranteed to survive the default of at least the largest net debtor. If two or more participants from the same collateral pool were to fail while in a net intraday debtor position, the remaining (surviving) members of that collateral pool would ultimately be required to cover the portion of the defaulters' obligations that arose from use of the pooled collateral. For one of the pools, the CAD Receiver's of Credit Pool, the CDS monitors the members of the pool through its memorandum of understanding with the IDA. Members of the CAD credit Pool, who are on "Early Warning Level One" are subject to a special collateral charge equal to their normal collateral requirement, or may elect a cap equal to 50% of their calculated cap. Members who are on Early Warning Level Two must collateralize their calculated cap on a dollar-for-dollar basis. If defaults of

participants (in this pool) were somewhat anticipated by regulatory authorities, then this mechanism would mitigate the losses to surviving members that result from the default of one or more of these participants.

Replacement cost risk

As a CCP, the CDS faces replacement cost risk should one of the participants in the CCP service default, leaving the CDS's obligation to complete the transaction with the surviving counterparty. Under this scenario, the CDS would be required to replace the defaulter's position in the market, which may have appreciated or depreciated in value since the trade date. The CDS protects itself against replacement cost risk by using daily mark-to-market and collateral requirements.

Mark-to-market payments

All trades, once novated in a CCP service, are subject to daily mark-to-market (MTM) at the most recent closing price. At the time of novation, and daily until the trade has settled, the party that has lost relative to the trade price must pay an MTM payment equal to the difference between the trade price and the current market price. This payment will be transferred to the gaining party.

Participant funds

In addition to daily MTM payments, CCP participants pledge participant fund collateral to the CDS to mitigate the risks that CDS faces as a CCP. These risks are: (i), the potential for a defaulting participant to fail to pay an MTM payment owed to the CDS on default, and (ii) the replacement-cost risk on the outstanding positions in the CCP service. The MTM component of the participant fund (which is required in addition to the daily MTM payments) is designed to cover the possibility that a participant who owes a mark-to-market payment to CDS will default and not pay that amount. The outstanding position component of the participant fund is designed to cover the risk that CDS would face if a participant defaulted with outstanding transactions in a CCP service.

Two additional measures have been developed to minimize the replacement cost risk and limit losses to survivors in the CCP services resulting from another participant's default where the defaulter's own collateral was insufficient: a CCP service exposure cap and a survivor withdrawal option.

Exposure cap

The CCP exposure cap sets a predefined limit on the risk created by the outstanding positions of any single participant in all of the CCP services of which they are a member. The value against which the limit is measured is the potential replacement cost risk created by each participant in the CCP services. The replacement cost risk is measured by the collateral requirement that covers the failed trades in CNS and the unsettled future-dated and failed trades in DefNet. Each participant's risk is measured against the predetermined limit on a daily basis.

Withdrawal option

The participant withdrawal option allows participants in a CCP service to limit the loss allocation they would have been responsible for due to the future default of one or more other members of the service, by withdrawing from the service. If the participant chooses to withdraw from the service, it must first provide an additional 500 percent of its collateral requirement in that CCP service before the withdrawal is effective. The participant withdrawal option cannot be exercised to avoid an immediately available loss. However, it does limit a participant's losses in the event that another member were to default after the option had been exercised by the participant.

Liquidity risk management

Immediacy of collateral liquidation

In the CDSX, liquidity risk is created by the need to settle payment obligations on the same day that they are incurred and by the need to sell securities pledged as collateral as well as buying positions to offset a defaulter's obligations in the CCP services. The CDSX controls liquidity risk by applying haircuts to securities used as collateral, restricting the amount of ACV that can be created by certain types of securities (sector limits), restricting the eligibility of collateral in category credit ring collateral pools and participant funds, having back-up lines of credit with commercial banks, and performing stress-tests regularly.

Stress-testing

The CDS is continuing to develop its stress-testing capabilities in order to refine its estimates of the losses associated with various financial shocks, including the default of one or more participants. The results of these stress tests are used internally for risk management purposes and are also selectively disclosed to participants to help inform participants' own risk management decisions.

Default process

The CDS Participant Rules outline the grounds for suspension and the process for default management. During the processing of a suspension, the CDS allocates the suspended participant's current payment obligation to the appropriate mechanism, which in turn is responsible for paying CDS the default amount allocated to them.

The CDS initiates suspension and default procedures against a participant if they fail to fulfill any of the obligations. The same suspension and default procedures are applied regardless of the cause of the suspension.

The payment obligation in the CDSX of any suspended participant (i.e., extender of credit, settlement agent, federated participant or receiver of credit) must be replaced on the day of suspension. Settled transactions cannot be unwound during the processing of a suspension, nor can the suspended participant's payment obligation be delayed beyond the date of suspension. On the day of suspension, an alternative source of funds must be available to replace the amount that was owed to CDS by the suspended participant. The process of determining the payment obligation amount is conducted separately for each currency in which the suspended participant has an obligation owing to CDS.

If a suspended participant has outstanding CCP obligations (that is, outstanding to-deliver or to receive positions in CNS or DetNet), the CDS executes close-out transactions to clear these outstanding positions. For example, if the suspended participant left a CNS outstanding to deliver position, the CDS buys or sells the securities in the market to clear the outstanding position. Any loss or gain that is generated by the execution of these close-out transactions becomes an obligation of the CCP participant fund for the service in which the outstanding position originated.

Risk management—New York Link (NYL)

The CDS and National Securities Clearing Corporation (NSCC) hold collateral that serves to cover both CDS's exposure to participants using the NYL Service and NSCC's exposure to the CDS in the event that the CDS cannot complete settlement on behalf of the NYL participants. The arrangement in place is that collateral requirements are calculated based on the risk methodology of NSCC, and knowing these requirements, the CDS collects the collateral that its participants are required to pledge to support settlement of their transactions in NSCC. The collateral pledged is held partly by the CDS and partly by NSCC.

Within NSCC, any net market loss on the close-out of guaranteed transactions of a

	<p>defaulting member is first to be covered by the defaulter's contribution to the NSCC clearing fund plus any other collateral of the defaulter available to NSCC. Any part of the loss not covered by the defaulter's collateral is borne by NSCC's surviving members.</p> <p>The CDS manages its risk to a loss allocation by NSCC by having participants using the NYL Service agree to indemnify and hold harmless the CDS from and against any loss, damage, cost, expense, assessment, penalty, charge, liability, or claim. In particular, Rule 4.1.3 describes the indemnity provided by participants to the CDS regarding services generally. It states that each participant shall indemnify and hold harmless the CDS, nominees, and all other participants and relevant parties from and against any loss.</p> <p>Multiple failures CDSX is designed to fully collateralize at least the largest intraday net debit position, and it also has in place risk control mechanisms to avert multiple failures before they happen and to deal with them if they do. These include stringent membership standards, guarantees provided by surviving members of collateral pools and participant funds, as well as monitoring and early intervention by CDS, regulatory authorities, and the participants themselves.</p>
Assessment	Observed
Comments	<p>In order to further protect the CDSX from the credit and liquidity risks arising from the CCP services and, as international best practice, the CCP functions should be separated from the settlement and custody functions, with the CCP services being provided by a distinct legal entity.</p>
Recommendation 10.	<p>Assets used to settle the cash leg of securities transactions between CSD members should carry little or no credit risk. If central bank money is not used, steps must be taken to protect CSD members from potential losses and liquidity pressures arising from the failure of a settlement bank.</p>
Description	<p><i>Multi-tiered structure for cash settlement</i> Throughout the day, transactions are settled in commercial bank money provided by the CDS and commercial banks. At the end of the day, the net balances between the CDS and the banks are settled through the LVTS on the books of BOC.</p> <p>The system uses a tiered structure whereby only certain designated participants can participate in the Payment Exchange process with CDS. These "Designated Bankers" are settlement banks eligible to act for their own account as well as on behalf of others. Only Extenders of Credit or Active Federated Participants are qualified to act as Designated Bankers. A participant who is not a Designated Banker must appoint one. All Designated Bankers are regulated financial institutions. For the settlement of the CAD, settlement banks must be members of the Canadian Payment Associations (CPA's) LVTS. For the settlement of the US dollar, settlement banks must be members of FedWire Funds.</p> <p>The net settlement positions are aggregated at the settlement bank level. These aggregated net settlement positions are settled with the CDS during the day. Once a participant makes a payment to the CDS, that participant's settlement obligation is extinguished. Similarly, once the CDS makes payment to a participant, the CDS's settlement obligation vis-à-vis that participant is extinguished. The CDS must receive all funds owed to it before making payments to participants.</p> <p><i>CAD cash settlement</i></p>

	<p>Cash settlement of CAD positions towards banks in the CDSX is effected through transfers on the books of the BOC at the end of the day using the LVTS. Once all pay-ins are received in the CDS's settlement account at the BOC, the CDS instructs the BOC to make the pay-outs to participants.</p> <p><i>US dollar cash settlement</i></p> <p>The cash settlement of US dollar positions in the CDSX is effected through transfers on the books of a private bank (BMO Harris). In selecting its US dollar banker, the CDS requires a minimum credit rating threshold of 'A' (S&P rating) or 'A2' (Moody's rating). Payment exchange involves FedWire Funds payments between CDS settlement banks and CDS's US dollar banker acting as settlement agent for US dollar-denominated transactions in CDSX. The gross value of US dollar transactions in the CDS is about USD 1.3 billion, which results in daily net payment obligations of about US dollar \$520 million.</p> <p><i>Concentration of settlement bank risk</i></p> <p>The CDS uses a single private bank as a settlement agent for the settlement of the US dollar-denominated securities in CDSX. If this private bank were to fail during the period in which pay-ins are received but have not yet been paid out, the CDS would still be responsible for making the pay-outs. The CDS would generally pass these losses on to its members. The potential credit losses may represent a systemic risk for CDS, although the relative size of US dollar-denominated securities remains relatively small for the time being. Furthermore, there may be some US dollar liquidity pressures associated with the failure of the US dollar settlement agent.</p> <p><i>Same day funds</i></p> <p>The proceeds of securities settlements can be used as soon as they are credited to the participants' cash/securities accounts. Participants are also required to transfer the cash and securities to their clients on the same day.</p>
Assessment	<p>Observed for Canadian dollar settlement. Non-observed for US dollar settlement.</p>
Comments	<p>For the full observance of this recommendation, the CDS needs to reduce the current concentration of settlement cash for US dollar dominated securities on a single settlement bank. The CDS might explore the possibility of becoming a direct member of Fedwire or having access to US dollar central bank money through the Bank of Canada.</p> <p>The CDS practice of taking on credit exposure as a CCP should be more transparent.</p>
Recommendation 11.	<p>Sources of operational risk arising in the clearing and settlement process should be identified and minimized through the development of appropriate systems, controls and procedures. Systems should be reliable and secure, and have adequate, scalable capacity. Contingency plans and back-up facilities should be established to allow for timely recovery of operations and completion of the settlement process.</p>
Description	<p><i>Identification and management of operational risk</i></p> <p>The CDS has developed an operational risk control model that employs service level standards, which cover the depository, clearing, settlement, and ancillary services, and which are based on input from its participants. The standards are intended to serve as targets for the system and focus not only on the reliability of CDSX but also on the targeted level and quality of the customer services supported within the CDSX platform. These standards are consistently met through regular monitoring and testing. The CDS, through its internal audit function, performs more than 20 disaster recovery tests throughout each year. In 2006, no significant problems were encountered through testing. The CDS reports on these tests and on its compliance with these standards in</p>

	<p>its quarterly newsletter.</p> <p>The internal risk management department at CDS, along with internal risk and operations committees, an external risk advisory committee (composed of CDS members and regulators) and the board's audit/risk committee develop, monitor, and update the standards and oversee their compliance.</p> <p><i>Contingency plans and back up facilities</i></p> <p>The CDS completed a business continuity planning review in 2005 and began implementing some changes to its contingency procedures that would decentralize some of their core services. To avoid serious disruptions, it distributed key service operations between Toronto, Montreal, and Vancouver, with at least two locations capable of providing all its core services system-wide. This was completed by June 2006.</p> <p>As for CDSX, the operating facilities involve two independent central operating sites, with back-up facilities in each, and tertiary contingency arrangements (such as secure facsimile procedures and book-based transfers) in the unlikely event of simultaneous outages of both primary and back-up sites. Independence of the operating sites refers to remote physical locations, close enough to allow personnel transfer on short notice with negligible failover time but distant enough to ensure security from localized physical infrastructure disasters (such as electrical grid failures, floods, fires, or terrorist events). Planned failover times from primary to secondary sites are well within the two-to-four hour standards used internationally.</p> <p>The CDS has business resumption plans (BRPs) for key systems. The plans, which are updated semi-annually, provide for crisis management, communication, and recovery teams. The latest disaster recovery test to date was in mid-November 2005, with full success against target objectives. All failover and failback two-and-four hour recovery objectives between primary and back-up sites were easily met in an actual processing environment in which markets were open (although banks were closed). There was neither loss of data nor any meaningful disruption in services. A second overnight exercise in May 2006 involving all CDSX clearing and settlement applications was equally successful. All recovery requirements were achieved in just under the 2-hour target recovery time and all 4-hour requirements were achieved in less than 3 hours. The simulated overnight batch processing execution was fully completed on time.</p> <p><i>BCP coordination with related systems</i></p> <p>CDSX is linked to other settlement systems for payment exchange, notably the LVTS and the BOC's Collateral Value and Transfer System (CVTS) and its Account Services and Payments (ASAP) system. Accordingly, the CDS, the CPA, and the BOC established a Joint Business Continuity Planning Group in 2003 to identify operational risks in the core systems of these organizations that could prevent same-day cash settlement and their next-day readiness to operate. The Joint BCP Group is required to assess the extent of the threat of these operational risks, develop risk prevention and operational recovery strategies, and propose forward-looking initiatives to mitigate the future threat of these risks.</p> <p><i>Protection of data communication</i></p> <p>To protect against data loss, the CDS has backups of all computer files, has secure off-site data storage, and uses data mirroring in the back-up systems. The CDS monitors system stress in key systems for early warning of potential operational problems that may arise.</p> <p><i>Availability and scalability</i></p> <p>CDSX service level standards include targets for network availability (99.8 percent</p>
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	<p>annual average), operational reliability (99.4 percent annual average) and payment exchange (99.6 percent annual average). In 2006, each of these target levels was surpassed. Actual network availability was 99.9 percent of required time, operational reliability at 99.8 percent ,and payment exchange at 100 percent of required time.</p> <p>In terms of scalability, the CDS targets its actual capacity utilization at about 50 percent of fully available operating capacity as defined by a rolling 20-day average of volume. It aims to produce processing improvements and design enhancements to alleviate potential bottlenecks for the operating capacity of the core systems, including CDSX, without substantial hardware upgrades. Indeed, tests on a number of such changes made in 2006 indicated that they almost doubled the peak intra-day capacity of the existing technology platform.</p> <p><i>Development and procurement</i> Some of the processing operations for CDSX are out-sourced or co-sourced to third-party service providers. The CDS service agreements with third-party service providers require compliance with the relevant operational risk controls, service level standards, and contingency arrangements in CDS’s risk model for CDSX and its service agreements with the CDS members and CDSX participants. The CDS manages these outsourcing agreements actively.</p> <p><i>External audits</i> An annual independent audit of operational risk controls (a 5970 audit) is performed by KPMG LLP to assess CDS’s risk-control procedures. The most recent annual audit for the year ending July 31, 2006 found that controls were appropriately designed and effective.</p>
Assessment	Observed
Comments	
Recommendation 12.	Entities holding securities in custody should employ accounting practices and safekeeping procedures that fully protect customers' securities. It is essential that customers' securities be protected against the claims of a custodian's creditors.
Description	<p>The CDS operates an “indirect holding” system, where securities are registered in the name of the broker/dealer or custodian, through nominee accounts, rather than in the name of the end beneficiary. The broker/dealer or custodian is responsible for the management of securities holdings in their individual client accounts, again through book-entry systems.</p> <p><i>Account segregation</i> Asset holdings are protected through account segregation: CDS participants need to separate between their own holdings and customers’ holdings. In addition, there are separate electronic ledger accounts for securities pledged to the CDS and assets of participants held by the CDS in the depository. As indicated in Recommendation 1, the PCSA and the PPSA protect assets held by CDS for participants against liens by creditors of CDS.</p> <p><i>Securities custody and transfer safety arrangements</i> To protect participant’s securities against loss and inappropriate disposition, the CDS has established on-site security standards and guidelines for each depository site. These involve physical security personnel and devices, electronic security and monitoring, and personnel access and identification requirements. Access to inventory sites is restricted and closely monitored. Inventory handling procedures are updated and closely inspected for immediate problem resolution. Site security is subject to periodic checks and regular maintenance (for example, periodic lock changes).</p>

	<p>Securities certificates are housed in vaults in the CDS. Registered securities are held in the CDS's nominee name in non-negotiable form. The market value for immobilized single security certificates is capped at \$50 million Canadian to limit the value of certificate losses.</p> <p>Physical transfer of security certificates across regional offices for safekeeping or delivery involves extensive documentation and controls. Transfer is through armored courier services with strict transfer procedures and controls.</p> <p><i>Inventory control and reconciliation</i> Verification of the inventory of physical certificates and reconciliation with securities book-entry ledger accounts is performed on an on-going basis. Custodians, holding both physical securities and dematerialized securities, provide the CDS with inventory listings monthly, which are checked against the CDS internal reports. CDSX participants' electronic securities ledger accounts are also reconciled with the CDS reports of internal inventory holdings and external custodian holdings. Custodians transfer an electronic inventory file to the CDS through CDSX on a daily basis for CDSX automated reconciliation. Exceptions are documented and resolved using standard procedures and guidelines. Reports on participant ledger holdings against CDS (internal and external) inventory holdings are produced each night, with discrepancies noted and resolved. If resolution is not timely, follow-up procedures to escalate the process are triggered through the automated reports.</p> <p><i>Audits of inventory management procedures</i> In addition to internal audits of performance and procedures, the inventory management process is subject to an annual external audit. The CDS is also subject to audits by the OSC and the autorité des marchés financiers (AMF) for depository services.</p> <p><i>CDS protection against liability loss</i> In addition to controls to manage custody risk, the CDS also has acquired specialized insurance against financial liability in the performance of its custody services. As part of its operational risk insurance, the CDS purchases protection against the risk of loss or damage to securities from fraud, theft, destruction, or disappearance. In addition, the CDS purchases insurance for loss from errors and omissions, general liability, and direct damage to real property and computer equipment. In the event that depository assets are lost or damaged as the result of an insured peril, the CDS limits its liability to the net amount recovered from insurers, plus any amount agreed to by the Board of Directors, which may be available through the corporation's reserves.</p> <p>If the CDS uses a third-party custodian to hold participants' assets (as for cross-border functions), the CDS adequately transfers responsibility for losses to the agent being used and verifies that the CDS board-approved standards for security and insurance are maintained. The CDS selects as domestic and foreign custodians: (i) the BOC or another central bank of a country recognized by Canada; (ii) a regulated securities depository or clearing agency; or, (iii) a regulated trust or banking firm (or wholly-owned subsidiary) in good regulatory standing, subject to minimum capital and credit rating requirements.</p> <p><i>Supervision and regulation</i> As noted in Recommendations 1 and 6, the CDS is subject to regulation of its depository and transfer functions by the OSC and the AMF.</p>
Assessment	Observed

Comments	In order to reduce the custody risk, the CDS should eliminate the circulation of physical securities through its regional offices by immobilizing or, preferably, dematerializing them.
Recommendation 13.	Governance arrangements for CSDs and central counterparties should be designed to fulfill public interest requirements and to promote the objectives of owners and users.
Description	<p><i>CDS Board</i></p> <p>The CDS is owned by the major Canadian banks, members of the IDA, and Toronto stock exchange (TSX). The CDS Board of Directors consists of shareholder representatives, independent directors, and a representative from CDS management. The present composition of the CDS's Board of Directors is as follows: six seats for the chartered banks, three seats for TSX, one seat for investment dealers, one CDS executive, and four independent directors. The CDS has proposed certain changes to its corporate governance structure including a reduction in the number of seats for TSX to two from three, and an increase in the number of independent directors to five from four. The proposed change to the governance structure of the CDS, including the composition of its board, was determined through a consultative process with CDS stakeholders.</p> <p>The CDS regularly reviews its governance structure; and details are outlined in its annual report. Individual directors have membership on one of three committees:</p> <ul style="list-style-type: none"> ▪ Executive (to be renamed Governance/Human Resources) ▪ Audit/Risk ▪ Finance <p>Each of the three committees has a formally documented mandate with specific accountabilities.</p> <p><i>Public interest objectives</i></p> <p>The CDS submits all significant rule changes pertaining to CDSX to the BOC for the purposes of controlling systemic risk. In addition, the OSC's Recognition and Designation Order of CDS and the AMF Authorization Order require that CDS submit for each rule change, along with other documentation, a statement indicating that the change is not contrary to the public interest. In this regard, a key element of the CDS by-laws is that directors carry out their duties to the corporation in a manner that recognizes the need for a "safe, fair and efficient central securities depository, clearance and settlement system in Canada."</p> <p><i>Publication of relevant information</i></p> <p>The CDS's rules, procedures, fees, and major decisions are all published on its external website. Other publications that are available on the external website include annual reports and the most recent financial risk model.</p> <p><i>User participation</i></p> <p>The CDS's internal processes rely on recommendations by committees with broad user representation. There are formal committees that deal with business (Strategic Development Review Committee) and risk (Risk Advisory Committee), as well as ad-hoc working-level committees that deal with special issues as they arise.</p> <p>However, some market participants noted that the workings of the various committees and the selection of candidates were not entirely transparent, with a dominant role for the largest banks. Based on the assessor's discussions with market participants, non-bank participants were not seen as adequately represented in the work of the committees.</p>

Assessment	Observed
Comments	The workings of the committees set up by the CDS could be made more transparent by taking greater account of the interests of non-bank participants.
Recommendation 14.	CSDs and central counterparties should have objective and publicly disclosed criteria for participation that permit fair and open access.
Description	<p><i>Access criteria and participation requirements</i></p> <p>The criteria for participation in the CDS services are clearly stated in the rules and available to the general public on CDS's website.</p> <p>CDS accepts as participants:</p> <ul style="list-style-type: none"> • regulated financial institutions such as banks, loan, or insurance companies, brokers-dealers, securities clearing organizations and central banks; • federal, provincial, or municipal government agencies. <p>In addition to the above, foreign participants must demonstrate: (i) ownership, custody, management, or control of a minimum portfolio value of CAD-denominated securities, as specified by the Board of CDS, eligible for deposit in CDS; (ii) minimum capital equivalent to Canadian \$1 million or other evidence of its financial soundness that is acceptable to the CDS; (iii) acceptable legal opinions regarding the enforceability of the CDS's rules, novation and netting agreements, and security interests under the laws of its home jurisdiction; and (iv) otherwise, at the discretion of the Board, its ability to protect the CDS and its participants from loss and liability.</p> <p>Participation by foreign institutions in the CDS also requires additional regulatory approvals from the relevant federal or provincial regulatory bodies. For example, to participate in CDSX, a foreign institution requires the approval of the Governor of the BOC. The Governor can prohibit a foreign institution from participating in CDSX, or place conditions upon its participation, if the institution, or its actions, could pose systemic risk, or risk to the BOC.</p> <p>Following initial approval of entry as a participant in CDS, requirements for continued participation include: (i) ongoing ability to meet financial obligations to CDS; (ii) adequacy of qualified personnel, data processing and communications capabilities and capital facilities, and security controls and capabilities; (iii) sufficient insurance specified by the Board; and (iv) any other participation requirements or standards set by the Board.</p> <p><i>Participation classes and functions</i></p> <p>Each participant is categorized by its type of institution, capital adequacy, and whether it is an LVTS participant. Functionality of a participant in CDSX is based on its participant category. The main participant categories for CDSX are: (i) extender of credit, federated participant, settlement agent (all of whom can be participants in the CPA's LVTS); and, (ii) receivers of credit, principally investment dealers. There are other participant categories for transfer agents and for other services of CDS. The Bank of Canada is a participant in its own category.</p> <p><i>Exit criteria</i></p> <p>Exit procedures are clearly stated in the participant rules. As stated in the rules, the CDS may suspend a participant, or the Board of Directors may terminate a participant, if adequate cause exists. A temporary suspension or restriction of access may be issued for less serious matters, such as a loss of system functionality caused by operational or technical problems. Termination results only from serious breaches, for example payment failure, legal infringement, or risk to the system or other participants.</p>

	For participants who are IDA members, the CDS has signed a Memorandum of Understanding with the IDA under which the IDA is required to inform the CDS when a member is in early warning.
Assessment	Observed
Comments	
Recommendation 15.	While maintaining safe and secure operations, securities settlement systems should be cost-effective in meeting the requirements of users.
Description	<p><i>Benchmarking and cost control</i></p> <p>The CDS has in place procedures aimed at routinely reviewing its pricing levels against its costs of operation. When appropriate, it re-prices, provides discounts, or issues rebates. From time to time, the CDS contracts with external consultants to survey users and to benchmark its costs and charges against other systems. These ad-hoc surveys are also used to assess user satisfaction with the system and the service levels it provides.</p> <p><i>Adequacy of capacity</i></p> <p>The CDS conducts capacity planning to help ensure that sufficient resources are available to process current and anticipated transaction needs. The CDS business units provide projected transaction volumes to the IT division for planning of contingency capability and hardware upgrades. The IT division plans for adequate resources to process the projected business volumes plus a sufficient contingency. Additional processor upgrades can be implemented within several days if required.</p> <p><i>Liquidity management</i></p> <p>Participants can access information about their funds positions at any time during the processing day using the CDS terminal. A participant can also monitor the amount of credit that it has extended or received during the processing day. In addition, the CDS is in the process of implementing a stress-testing model that will provide participants with a more precise measure of their exposure following the default of another participant.</p> <p><i>Strategic planning and development</i></p> <p>CDS has internal committees that are responsible for new business plans and project approvals. New project proposals are also reviewed by the external Strategic Development Review Committee, which is a 10-member body representing the various participant groups, with the regulators for the CDS and CDSX participating as observers only.</p> <p>CDS has standardized methods and procedures in place for efficient and prompt handling of all changes. The process confirms that all changes have been authorized, tested, and assessed for potential impact and risk to CDS's business processes. System changes are generally implemented during one of four annual change windows ("Releases" in CDS terminology) so that users can plan to coordinate any changes needed on their end. Every system change is presented at the Strategic Development Review Committee. All changes are also published on CDS's external website a minimum of 15 days prior to implementation and are always submitted for regulatory approval.</p>
Assessment	Observed
Comments	
Recommendation 16.	Securities settlement systems should use or accommodate the relevant international communication procedures and standards in order to facilitate efficient settlement of

	cross-border transactions.
Description	<p>The CDS uses a proprietary communication system. For cross-border transactions, the CDS uses internationally recognized standards based on Society for Worldwide Interbank Financial Telecommunication (SWIFT's) new messaging formats that contain reusable blocks of information and minimize rekeying of information. The international securities identification numbering process (ISIN) ISO 6166 is also used. Other means of communication (telex, fax, and mail) are only accepted in exceptional situations (contingency, recognized market practice).</p> <p>For domestic transactions, the CDS is still using an old-fashioned message format, based on outdated software, which does not provide flexibility to participants to process the information and data.</p>
Assessment	Observed
Comments	The CDS may wish to adopt a modern messages interface that is more user-friendly and meets the needs of participants.
Recommendation 17.	CSDs and central counterparties should provide market participants with sufficient information for them to accurately identify the risks and costs associated with using the CSD or central counterparty services.
Description	<p><i>Availability of rules, regulations etc.</i> Laws, regulations, system rules, and fees are part of the contractual agreements that are signed by participants. In particular, participants' rights, obligations, and costs are defined in these documents, which are available on the CDS website.</p> <p><i>CPSS/IOSCO disclosure framework</i> The CDS has completed and disclosed its responses to the CPSS-IOSCO Disclosure Framework (CPSS-IOSCO 1997). The responses are posted on the Website of the CPSS. The CDS also publishes on its website: (i) its full risk model; and (ii) an annual update to its report on internal controls.</p> <p><i>Financial risk monitoring and surveillance report</i> On a monthly basis, the CDS distributes a report to its participants, Risk/Audit Committee and Risk Advisory Committee, which provides statistics on the performance of the various risk controls in CDSX and various risk measures. This report includes back-testing results for collateralization and disclosure of the size of uncollateralized losses from default simulations. This report is revised regularly based on feedback from participants.</p> <p><i>Frequency of updates</i> The CDS actively updates its website for material changes to rules, procedures, and practices. Through the year, it also updates its documentation on a regular schedule with updated information posted promptly to its website.</p>
Assessment	Observed
Comments	
Recommendation 18.	Securities settlement systems should be subject to regulation and oversight. The responsibilities and objectives of the securities regulator and the central bank with respect to SSSs should be clearly defined, and their roles and major policies should be publicly disclosed. They should have the ability and resources to perform their responsibilities, including assessing and promoting implementation of these recommendations. They should cooperate with each other and with other relevant

	authorities.
Description	<p>The BOC has the oversight responsibilities for CDSX at the federal level. At the provincial level, regulatory responsibility for CDS, as a clearing house, rests with the OSC and the AMF. The role of each authority is relatively clearly defined. While the oversight role of the BOC is to focus on systemic risk, the responsibilities of the securities regulators are to ensure the orderly functioning of the capital market and investor protection.</p> <p><i>Regulatory roles and responsibilities</i></p> <p>The BOC's oversight role is derived from the designation of CDSX under the Payment Clearing and Settlement Act (PSCA), and its oversight responsibility is to monitor the design and operations of CDSX, including clearing and settlement rules, and risk management procedures. The BOC's powers under the PSCA allow it to:</p> <ul style="list-style-type: none"> - require the CDS to disclose any information or documentation required to monitor and assess the threat of systemic risk in CDSX on an on-going basis; - enter into an agreement with the CDS relating to oversight procedures and processes; - issue directives to the CDS to control systemic risk; and - disapprove any new initiative or change that may, in its opinion, introduce systemic risk into the system. <p>The BOC entered into a regulatory oversight agreement with the CDS in 2004, which details how the BOC will conduct its oversight functions vis-à-vis the CDS.</p> <p>The BOC has also published on its website a set of oversight guidelines pertaining to its general operating principles and approaches to oversight. It publishes reports annually on its oversight activities, originally in its annual report but currently, in more detail, in its June Financial System Report. The BOC also publishes occasional articles in its various publication series, or on its website, on oversight issues and policies pertaining to CDS and other clearing and settlement systems that it oversees.</p> <p>The regulatory powers of the OSC stem from the Ontario Securities Act, which provides that the Commission may recognize a clearing agency if it is in the public interest. It will be mandatory for a person or company carrying on the business of a clearing agency to become recognized, once legislation making such recognition mandatory, which has already been passed, is proclaimed into force. The focus of the Commission's regulation of CDS is set out in the terms and conditions of the Recognition and Designation Order and includes such areas as governance, access, due process, rules, operational reliability, fees, and capacity and integrity of systems.</p> <p>The regulatory powers of the AMF stem from a section in the Québec Securities Act that requires the AMF to authorize the CDS to carry on clearing activities in Québec. The focus of the AMF is mainly on investor protection and market operations. Rule and procedure changes are provided to the AMF for comment and approval. The AMF also supervises the CDS governance structure, its financial viability, the capacity and integrity of its systems, and its operational reliability.</p> <p><i>Resources for regulation and oversight</i></p> <p>Oversight of CDSX by the BOC is carried out under the Bank's Financial System Function, which is the responsibility of a Deputy Governor, who chairs the Bank's Financial System Review Committee and participates in the Bank's Executive Committee. Oversight tasks and activities are performed by staff of the Infrastructure Development Division (IDD) of the Bank's Monetary and Financial Analysis Department. The IDD is responsible for ongoing oversight, and policy research and analysis in financial system infrastructure, with a particular focus on payment,</p>

	<p>clearing, and settlement systems. At present, the IDD has an approved staff of 9 persons including the Assistant Chief, who heads the Division, and a Research Adviser. Oversight is further supported by a dedicated legal resource, the Bank's Assistant General Counsel.</p> <p>The Ontario Securities Commission (OSC) and the Autorité des marchés financiers (AMF) each has 3 dedicated staff dealing with securities markets infrastructure. Almost all these staff have legal training, while their knowledge of securities clearing and settlement activities, including risk assessments, may not be comprehensive. In addition, external consultants are hired for specific studies of clearing and settlement activities.</p> <p><i>Cooperation between relevant authorities</i></p> <p>Although there are no formal mechanisms for cooperation between the individual provincial securities commissions and the BOC, specifically on the regulation of CDS and oversight of its systems, these agencies do maintain regular contact directly and through broader multilateral policy forums on financial policy. However, the BOC, OSC, and AMF coordinate their regulatory activities on an ad-hoc and informal basis.</p> <p>At the federal level, the BOC coordinates its oversight policy with other federal financial sector regulators through the Financial Institutions Supervisory Committee, which is chaired by the Superintendent of Financial Institutions (OSFI) and includes the heads of all federal financial regulatory agencies including the Deputy Minister of Finance. In addition, the BOC and the Department of Finance manage their shared oversight responsibilities of CDSX through a coordinating body known as the Payments Advisory Committee, co-chaired by a Deputy Governor of the BOC and an Assistant Deputy Minister of Finance. The involvement of the Department of Finance in the regulation and oversight of the CDS could be clarified.</p> <p><i>Cross-border cooperation</i></p> <p>The BOC participates in the G-10 Governors' Committee for Payment and Settlement Systems and its sub-committees, which is an international policy forum and standard-setting body for, among other things, securities clearing and settlement systems. The BOC also participates in the OECD's Capital Markets Committee.</p> <p>The OSC and AMF, in representation of the CSA, also participate in the International Organization of Securities Commissions (IOSCO), which is a policy forum and standard-setting organization for securities system regulation.</p> <p>When the links were established five years ago, there was quite extensive cooperation between the Canadian authorities, including the BOC and securities regulators, and the relevant United States' authorities for the oversight and supervision of cross-border links. However, there is no formal agreement or other structured mechanism to exchange information, data, and knowledge on cross-border activities between Canadian and United States markets, and currently cooperation is relatively limited.</p>
Assessment	Observed

Comments	<p>Cooperation between the BOC and the provincial securities regulators should be strengthened and formalized.</p> <p>The same comment applies to cooperation between the Canadian authorities and the relevant United States authorities for the cross-border activities through the links between Canada and the United States. A key objective is to make the regulation and oversight of clearing and settlement activities more effective and transparent for both service providers and market participants. In this regard, the BOC has been preparing a review of the oversight of cross-border clearing and settlement links more generally. This work, while still in draft form, among other things recommends regular consultation with relevant foreign regulators.</p>
Recommendation 19.	CSDs that establish links to settle cross-border trades should design and operate such links to reduce effectively the risks associated with cross-border settlement.
Description	<p>The CDS has established links with securities clearing and settlement systems in the United States, Japan, France, United Kingdom and Sweden as part of their cross-border services. By far the most important links are those with the Depository Trust & Clearing Corporation (DTCC), which is the parent company of Depository Trust Company (DTC) and the National Securities Clearing Corporation (NSCC).</p> <p><i>Types of links</i></p> <p>(i) North-South links</p> <p>The CDS offers two links to facilitate the clearing and settlement of Canada-United States cross-border transactions: NYL and DTC Direct Link.</p> <ul style="list-style-type: none"> - NYL Service: NYL allows CDSX participants to become sponsored members of DTC and NSCC. Sponsored members have the same privileges as full members in the two organizations. NYL provides trade clearing services through NSCC and access to custodial and securities settlement services offered by DTC. - DTC Direct Link: through DTC Direct, the CDS sponsors its members in DTC; and DTC provides custodial and settlement services for these CDSX members. DTC Direct Link differs from NYL in that DTC Direct customers conduct trading activity only on a trade-for-trade basis, whereas NYL trading activity is predominantly processed using a CCP model. <p>Another component of the North-South Service Link is the CDS/DTC Cross-Border Movement Service (CBM). This service allows a subscribing CDSX participant to transfer securities to its own (sponsored) account at DTC. Participants who also subscribe to either NYL or DTC Direct Link can use the transferred securities to settle their securities transaction on a DVP basis within DTC. The CDS's participants can use this facility to deliver securities to participants' accounts at DTC. But since this service is entirely free-of-payment, any associated payment for this transfer would have to be made through correspondent banking channels (and thus not on a DVP basis).</p> <p>(ii) East-West links</p> <p>The CDS has East-West custody links with Euroclear France. This free-of-payment link allows movements of eligible securities between the CDS and Euroclear France. However, the transaction volume through this custody link is very small. For example, in fiscal 2005, there were less than 40 securities movements across this link.</p> <p>CDS also has a link with the CREST securities settlement system in the United Kingdom, in which eligible participants are sponsored into CREST so they can clear and settle trades with their U.K. counterparts. Securities transfers via this link may</p>

occur either free-of-payment or DVP against funds denominated in GBP, EUR, or U.S. dollar.

The CDS has an indirect link with the Swedish central securities depository (VPC). The CDS settlement agent is the Skandinaviska Enskilda Banken AB. This free-of-payment link facilitates the movement of eligible securities. Participants may move securities eastbound (i.e., from Canada to Sweden) and westbound (i.e., from Sweden to Canada). Currently, only one equity issue (Boliden), cross listed on the Toronto Stock Exchange and on the Swedish Stock Exchange, is eligible for this link.

(iii) Foreign settlement systems linked to CDSX

The DTC CAD settlement link allows DTC participants to settle CAD transactions directly with DTC. To implement the link, DTC processes Canadian dollar transactions through its omnibus account at CDS on behalf of its participants. An end-of-day settlement process is used to settle the CAD obligations associated with this link via a CAD settlement bank, that participates in the end-of-day CDSX payment exchange.

The Japanese CSD also has established a CDSX account to facilitate a cross-border free-of-payment link for its participants.

Risk analysis and risk management of links

Current and potential cross-border links are examined to determine whether the link represents unacceptable financial risks to CDS that operates CDSX, or would cause CDSX to no longer meet minimum standards.

As a result of the analysis of its cross-border links with DTCC, CDS terminated a link that had been previously used. The American and Canadian Connection for Efficient Securities Settlement (ACCESS) was closed effective January 31, 2006 as a result of a 2005 assessment of CDS's cross-border services. Sponsored participant models (such as NYL), not an omnibus account model (such as ACCESS), are more consistent with participant requirements and CDS's risk and operational strategies. In a sponsored account arrangement, CDSX participants are identified individually in DTC's member directory and have individual accounts. In an omnibus account arrangement, such as the now terminated arrangement for ACCESS, CDS would hold a single account in DTC on behalf of CDSX members, thus leaving CDS potentially liable to CDSX participant obligations to DTC and vice versa.

As noted, the East-West links involving CDS are essentially cross-border custody arrangements, which follow the same custody risk controls outlined in Recommendation 12.

Delivery versus payment

The DVP nature of cross-border links relates to the settlement process in each of the linked systems. CDSX, as noted, operates on a DVP basis with intraday finality of settlement (see Recommendation 8). DTC operates on a DVP basis as well but without full certainty of intra-day finality. This means that securities can be delivered to CDS and booked on the accounts of its customers without achieving settlement finality in DTC. However, even if such deliveries were permitted, any resulting risk to CDS is sufficiently mitigated, because of the general risk controls that CDS has in place. In the event that DTC required the replacement of securities imported into CDS, the costs associated with replacing the securities in DTC would be borne by the defaulting participant sponsored into DTC by CDS, and by surviving CDS-sponsored participants, in accordance with established CDS rules.

Settlement agent risk

	<p>For the settlement of the cash leg in DTC, the CDS uses a single private bank as a settlement agent. It is also the same bank used for settling the US dollar-denominated securities within CDS. If the private bank were to fail, the CDS would still be responsible for making the payment to its customers. This means that CDS is exposed to potential credit losses.</p> <p><i>CDS participation in NSCC</i></p> <p>The CDS, as a participant in NSCC, shares the loss allocations in NSCC in the event of default members within NSCC. Within NSCC, any net market loss on the close-out of guaranteed transactions of a defaulting member is first to be covered by the defaulter's contribution to the NSCC clearing fund plus any other collateral of the defaulter available to NSCC. Any part of the loss not covered by the defaulter's collateral is borne by NSCC's surviving members. The CDS manages its risk to a loss allocation by NSCC through having participants using the NYL Service agree to indemnify and hold harmless the CDS from and against any losses. This is in line with its general indemnification policy, which covers all its activities.</p> <p>Furthermore, the CDS and NSCC hold collateral that serves to cover both CDS's exposure to participants using the NYL Service and NSCC's exposure to the CDS in the event that CDS cannot complete settlement on behalf of the NYL participants. The collateral requirements are calculated based on the risk methodology of NSCC, and knowing these requirements, the CDS collects the collateral that CDS participants are required to pledge to support settlement of their transactions in NSCC. The collateral pledged is held partly by the CDS and partly by NSCC.</p> <p>Although the links are established by CDS and not CDSX, any disruption that financial distress may cause CDS due to the links with DTC and NSCC will directly affect the functioning of the CDSX.</p>
Assessment	<p>Observed for the links to United Kingdom, France, Japan and Sweden Non-observed for the links to DTC</p>
Comments	<p>For the observance of this recommendation, the CDS should not allow the transfer of securities, delivered through the DTC links, to its participants until these securities reach settlement finality in the DTC system. Furthermore, the CDS needs to reduce the concentration on a single bank for the settlement of the cash leg in DTC.</p>

Table 2. Summary Observance of CDSX of the CPSS-IOSCO Recommendations for Securities Settlement Systems

Responsibility	Grading	Comments
Legal risk		
1. Securities settlement systems should have a well-founded, clear and transparent legal basis in the relevant jurisdiction.	O	The design and operations of the CDS are covered by a solid legal basis; and the contractual arrangements between the CDS and its participants are fully enforceable. The regulatory framework is clear and transparent to market participants.
Pre-settlement risk		
2. Confirmation of trades between market participants should occur as soon as possible after trade execution, but no later than the trade date (T+0). Where confirmation of trades by indirect market participants (such as institutional investors) is required, it should occur as soon as possible after trade execution, preferably on T+0, but no later than T+1.	O	Trade confirmation for regulated markets occurs the same day between direct participants, and the next day for indirect participants. For OTC transactions, the market convention is to confirm the trade on the same day.
3. Rolling settlement should be adopted in all securities markets. Final settlement should occur no later than T+3. The benefits and costs of a settlement cycle shorter than T+3 should be assessed.	O	Trade transactions are settled on a rolling basis for transaction on the exchanges. The settlement cycle is T+3 for equities and T+0, T+2 or T+3 for debt instruments. The settlement date for OTC transactions is negotiable, but the current convention is to follow the settlement cycles of traded instruments.
4. The benefits and costs of a central counterparty should be assessed. Where such a mechanism is introduced, the central counterparty should rigorously control the risks it assumes.	BO	<p>CDS acts as CCP for the cash leg of all securities transactions and also on the securities leg of transactions settled in the net settlement procedures.</p> <p>However, the CDS acts as CCP at the date of settlement for the majority of the transactions (measured by number of transactions). This means that the participants are facing counterparty risk from the time of trade execution until novation occurs, which can be as long as T+3. According to international best practice, the CCP assumes its responsibility immediately after the trade is executed.</p> <p>No explicit cost-benefit analysis has been done for introducing a CCP for trade-for-trade (TFT) transactions.</p> <p>The risk management procedures of the CDS as a CCP have not yet been assessed against the CPSS/IOSCO Recommendations for CCP. However, CDS did complete a self-assessment against these recommendations.</p>

Responsibility	Grading	Comments
5. Securities lending and borrowing (or repurchase agreements and other economically equivalent transactions) should be encouraged as a method for expediting the settlement of securities transactions. Barriers that inhibit the practice of lending securities for this purpose should be removed.	O	The CDS does not provide a securities lending facility to its participants. However, analysis by CDS suggests that no business case exists to support the development of such a facility. There are no specific barriers that inhibit the practice of lending securities.
Settlement risk		
6. Securities should be immobilized or dematerialized and transferred by book entry in CSD to the greatest extent possible.	O	The great majority of securities issued in Canada are either dematerialized or immobilized in CDS. Increasing the share of dematerialized securities would significantly reduce costs and increase the efficiency of settlement and custody.
7. Securities settlement systems should eliminate principal risk by linking securities transfers to funds transfers in a way that achieves delivery versus payment.	O	The CDS provides a DVP facility for the execution of settlement.
8. Final settlement on a DVP basis should occur no later than the end of the settlement day. Intra-day or real-time finality should be provided where necessary to reduce risks.	O	The CDS provides both intraday and end-of-day settlement finality.
9. CSDs that extend intraday credit to participants, including CSDs that operate net settlement systems, should institute risk controls that, at a minimum, ensure timely settlement in the event that the participant with the largest payment obligation is unable to settle. The most reliable set of controls is a combination of collateral requirements and limits.	O	The CDS's settlement and custody functions are integrated with its CCP function. This means that the settlement and custody functions are exposed to the credit and liquidity risks arising from CCP activities, although these risks are mitigated by the CCP's current risk management procedures.
10. Assets used to settle the cash leg of securities transactions between CSD members should carry little or no credit risk. If Central Bank money is not used, steps must be taken to protect CSD members from potential losses and liquidity pressures arising from the failure of a settlement bank.	O for CAD NO for USD	The settlement of the cash leg takes place in commercial bank money during the day, while the banks' end-of-day balances are ultimately settled through the BOC accounts. However, the settlement risk for securities denominated in U.S. dollar is concentrated on a single bank.
Operational risk		
11. Sources of operational risk arising in the clearing and settlement process should be identified and minimized through the development of appropriate systems, controls, and procedures. Systems should be reliable and secure, and have adequate, scalable capacity. Contingency plans and back-up facilities should be established to allow for timely recovery of operations and completion of the settlement process.	O	The CDS has adequate measures in place to identify and monitor operational risk. It also has developed a contingency plan that ensures that the system can resume at short notice and the information can be retrieved. The procedures are tested on a regular basis and market participants are involved in the testing.
Custody risk		

Responsibility	Grading	Comments
12. Entities holding securities in custody should employ accounting practices and safekeeping procedures that fully protect customers' securities. It is essential that customers' securities be protected against the claims of a custodian's creditors.	O	Adequate measures and arrangements are in place to ensure the protection of the customers' securities. In particular, participants are obliged to segregate their assets from those of the customers and reconciliation is done on a regular basis.
Other issues		
13. Governance arrangements for CSDs and central counterparties should be designed to fulfill public interest requirements and to promote the objectives of owners and users.	O	The CDS is owned by its major users; and its Board of directors reflects the interest of shareholders, users, and the public interest. The rules, procedures, fees, and major decisions are all published on its external website. Other publications that are available on the external website include annual reports and the most recent financial risk model.
14. CSDs and central counterparties should have objectives and publicly disclosed criteria for participation that permit fair and open access.	O	The access and exit criteria are clearly defined and publicly disclosed. Foreign participants are subjected to a specific regulatory regime based on limiting systemic risk.
15. While maintaining safe and secure operations, securities settlement systems should be cost-effective in meeting the requirements of users.	O	The CDS has in place procedures aimed at reviewing its pricing levels against its costs of operation. Using external consultants, the CDS benchmarks its costs and charges against foreign systems and assesses user satisfaction with the system and the service levels it provides.
16. Securities settlement systems should use or accommodate the relevant international communication procedures and standards in order to facilitate efficient settlement of cross-border transactions.	O	For domestic transactions, the CDS uses a proprietary system with an old fashioned messages interface. Internationally, it uses recognized standards for cross-border transactions, such as SWIFT's new messaging formats.
17. CSDs and central counterparties should provide market participants with sufficient information for them to accurately identify the risks and costs associated with using the CSD or central counterparty services.	O	Laws, regulations, system rules, and fees are part of the contractual agreements signed by participants. In particular, participants' rights, obligations and costs are defined in these agreements, which are also available on the CDS website. The CDS has publicly disclosed the questionnaire set out in the CPSS/IOSCO disclosure framework.
18. Securities settlement systems should be subject to regulation and oversight. The responsibilities and objectives of the securities regulator and the central bank with respect to SSSs should be clearly defined, and their roles and major policies should be publicly disclosed. They should have the ability and resources to perform their responsibilities, including assessing and promoting implementation of these recommendations. They should cooperate with each other and with other relevant authorities.	O	The CDS is subject to adequate regulation and supervision. The BOC oversees the CDS from a systemic risk perspective, while securities regulators supervise the CDS to ensure the orderly functioning of the market and investor protection. Cooperation between the securities regulators and BOC is informal and on an ad-hoc basis.

Responsibility	Grading	Comments
<p>19. CSDs that establish links to settle cross-border trades should design and operate such links to reduce effectively the risks associated with cross-border settlement.</p>	<p>NO for DTC links</p>	<p>The CDS has established links with securities clearing and settlement systems in the United States, United Kingdom, Japan, France, and Sweden as part of their cross-border services. The links to the United States markets are the most important ones in terms of features and activities. The CDS and its participants are exposed to potential credit and financial risks when using the United States links.</p> <p>The CDS permits the delivery of cross-border securities, delivered through the DTC links, before settlement finality is achieved in DTC system.</p>

Table 3. Recommended Action Plan to Improve Observance of CDSX of the CPSS-IOSCO Recommendations for Securities Settlement Systems

<i>Reference Recommendation</i>	<i>Recommended Action</i>
Pre-settlement risk	
<i>Recommendation 4: CCP</i>	In order to fully observe this recommendation, the CDS should explicitly assess the benefits and costs of acting as a CCP for trade-for-trade (TFT) transactions.
<i>Recommendation 5: Securities lending</i>	The CDS might re-consider introducing a securities lending facility in order to reduce settlement failure.
Settlement risk	
<i>Recommendation 9: CSD risk controls</i>	In order to further protect the CDSX from the credit and liquidity risks arising from CCP services and, as international best practice, the CCP functions should be separated from the settlement and custody functions, with the CCP services being provided by a distinct legal entity.
<i>Recommendation 10: Cash settlement</i>	For the full observance of this recommendation, the CDS needs to reduce the current concentration of settlement cash for US dollar dominated securities on a single settlement bank. The CDS might explore the possibility of becoming a direct member of Fedwire or having access to US dollar central bank money through the BOC.
Custody risk	
	In order to reduce custody risk, the CDS should eliminate the circulation of physical securities through its regional offices by immobilizing or, preferably, dematerializing them.
Other issues	
<i>Recommendation 13: Governance</i>	The workings of the committees set up by the CDS could be made more transparent, taking into account the interests of non-bank participants.
<i>Recommendation 16: Communication procedures</i>	The CDS may wish to adopt a modern messages interface that is more user-friendly.
<i>Recommendation 18 : Regulation and oversight</i>	Cooperation between the BOC and the provincial securities regulators should be strengthened and formalized. The same recommendation applies to the cooperation between the Canadian authorities and the relevant United States authorities for the cross-border activities through the links between Canada and the United States. A key objective is to make the regulation and oversight of clearing and settlement activities more effective and transparent for both service providers and market participants.

<i>Reference Recommendation</i>	<i>Recommended Action</i>
<i>Further Recommendation 19 : Cross-border links</i>	For the observance of this recommendation, the CDS should not allow the transfer of securities, delivered through the DTC links, to its participants until these securities reach settlement finality in the DTC system. Furthermore, the CDS needs to reduce the concentration on a single bank for the settlement of the cash leg in DTC.

Authorities' response to the assessment

1. The recommended action on CCP states that CDS should assess the benefits and costs of acting as a CCP for TFT transactions. Although no explicit cost-benefit analysis was undertaken, the pros and cons of offering CCP for trade-for-trade transactions were implicitly evaluated, as part of the decision to offer the TFT service without a CCP. Nonetheless, the regulators intend to raise with CDS, for its consideration, the issue of providing TFT on a CCP basis.

2. The recommended action on settlement risk states that the CCP functions should be legally separated from the custody and settlement functions, in order to protect CDSX from the liquidity and credit risks faced by the CCP. In the context of the recent corporate restructuring, the regulators raised with CDS the issue of having its CCP function in a separate legal entity. However, in light of the controls in place to mitigate the risks faced by CDS as a CCP, regulators were comfortable approving a corporate structure for CDS, which did not legally separate the CCP activities from the depository and settlement activities.

3. The recommended action on cash settlement states that CDS needs to reduce the current concentration of settlement cash for USD-denominated securities on a single settlement bank. The BOC has discussed this issue and potential solutions on several occasions with CDS, including those solutions noted in the FSAP. As a partial response to the concerns that have been raised, CDS is considering contracting a second bank to provide USD settlement services as a contingency, in the event that the bank currently being used is unable to perform this service. From the BOC's perspective, given the relatively small size of the potential financial losses, the potential efficiency loss and operational risk involved in some of the solutions, the BOC has accommodated this situation – although the intention is to continue to raise this issue with CDS, seeking possible solutions when warranted.

4. The recommended action on regulation and oversight states that cooperation between the BOC and the provincial securities regulators, as well as the cooperation between the Canadian and US authorities for cross-border links, should be strengthened and formalized. Currently, the BOC and the provincial regulators (the OSC and AMF) coordinate on an ad-hoc basis, as needed, depending on the issues at hand. These interactions occur at both a working level and more senior levels. There have been working-level links among the staffs of the BOC, the OSC and the AMF that have been growing, which has been beneficial.

Furthermore, our discussions in the context of the FSAP mission have led us to the view that a more regular, formal meeting (for example, annually or semi-annually) of the three regulators would be worthwhile, to review CDSX issues from our various perspectives. If these discussions proved to be useful, we could build on this initiative with more frequent, more in-depth interactions, as needed.

5. As regards foreign oversight agencies, particularly U.S. authorities, BOC staff has been preparing a review of the oversight of cross-border clearing and settlement links more generally. This work, while still in draft form, among other things recommends regular consultation with relevant foreign regulators; for example, an annual visit with foreign regulators of most importance to the operation of CDSX. In sum, our view is to move in the direction recommended in the FSAP.

6. The recommended action on cross-border links states that CDS should not allow the transfer of securities, delivered through the DTC links, until these securities reach settlement finality in the DTC system. In DTC, credit entries to a receiver's securities account are not final until the receiver has paid for them at the end-of-day. If the receiver does not meet its end-of-day settlement obligations to DTC, then DTC can take back the securities credited provisionally to the receiver earlier that day. However, finality of settlement can occur during the business day if the receiving party instructs DTC to effect a delivery, pledge, or withdrawal of securities. Thus, the question of whether CDS allows the transfer of securities, delivered through the DTC links, before those securities reach settlement finality in DTC, depends on whether instruction by the receiver to deliver the provisionally credited securities to another participant is sufficient for its own received delivery to become final. If the answer is yes, then finality is achieved by a retransfer of the received securities (including a northbound transfer through the CDS link with DTC), and thus CDS would not be permitting a transfer of securities through its DTC link, prior to those securities reaching settlement finality in DTC. However, to answer this question definitively would require verification of how DTC rules and U.S. law work on this detail. From an oversight perspective it is not necessary to answer this question definitively, because even if the answer is no, CDS is protected through the general risk controls it has in place. In the event that the answer is no, then DTC could potentially require the replacement of securities imported into CDS, if, for example, the CDS-sponsored participant in DTC failed to meet its end-of-day payment obligations in DTC. However, in such a case, the costs associated with replacing the securities in DTC would be borne by the defaulting participant sponsored into DTC by CDS, and by surviving CDS-sponsored participants, in accordance with established CDS rules. To summarize, it may or may not be the case that CDS permits the transfer of securities via the DTC links prior to settlement finality in DTC, depending on the answer to the specific question formulated above, which deals with particular DTC rules and US legal protocol. However, even if CDS does permit such transfers, any resulting risk to CDS is sufficiently mitigated.