

CDSX: Canada's New Clearing and Settlement System for Securities

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A typical securities transaction occurs each time two parties enter into a contract to trade debt or equity securities for funds.¹ In theory, the completion of a securities transaction is very simple, requiring nothing more than the direct transfer of securities and funds between the buyer and seller. In reality, however, the process is more complex and involves many parties from start to finish. Securities transactions are typically completed through a central system that transmits, reconciles, and confirms the obligations of participants (clears) and transfers the securities and funds between the parties (settles). Securities are also held in a central depository and transferred electronically rather than physically. The important role played by Canada's securities clearing and settlement system is the focus of this article.

CDSX is the new clearing and settlement system for debt and equity securities in Canada. Implemented in its first stage on 31 March 2003, it replaces the Debt Clearing Service (DCS), which was used to clear and settle most Canadian-dollar debt transactions, and is also expected to replace the Securities Settlement Service (SSS), which settles equities and some debt transactions.² CDSX incorporates the robust risk-containment arrangements used in DCS and represents a significant improvement in cost-efficiency. It is also consistent with international standards for clearing and settlement of securities.³

1. Debt and equities are jointly referred to as securities and are more commonly known as bonds and stocks.
2. Implementation of CDSX began with debt being transferred from DCS, and equities are expected to follow over the course of the next few months.
3. The internationally recognized minimum standards for securities clearing and settlement are the CPSS-IOSCO "Recommendations for Securities Settlement Systems" (BIS 2001b).

CDSX is one of the most important clearing and settlement systems in Canada because it deals in very large values and facilitates a well-functioning collateral market.^{4,5} Collateral is a necessary component of many financial arrangements and is critical to the functioning of other important clearing and settlement systems, such as the Large Value Transfer System (LVTS). CDSX is thus a systemically important clearing and settlement system. Given the size and the type of transactions it processes, it could trigger or transmit serious shocks across domestic and international financial systems or markets if it were insufficiently protected against risk. The stability of the Canadian financial system requires that all systemically important clearing and settlement systems are sufficiently risk-proofed that they are able to operate in all reasonable circumstances. For this reason, systemically important clearing and settlement systems in Canada, which include CDSX, are subject to formal oversight by the Bank of Canada.

The Oversight Process

In 1996, Parliament passed the Payment Clearing and Settlement Act (PCSA), which created a formal designation and oversight process for clearing and settlement systems that could be operated in such a manner as to pose a risk to the system or its participants. In Canada, there are three systemically important clearing and settlement systems: CDSX for securities, the Large Value Transfer System (LVTS) for large-value payments, and the Continuous Linked Settlement Bank (CLS Bank), an international system for settling foreign exchange

4. Debt securities are the primary instrument used as collateral in many financial arrangements.
5. For a general description of Canadian clearing and settlement systems, refer to Box 5 on page 27.

transactions.⁶ The Act provides the means for the Bank of Canada to assess the adequacy of risk-containment arrangements in these systems and provides certainty regarding the enforceability of the legal arrangements that underlie designated systems. The Bank also requires that systems designated for oversight, such as CDSX, meet international minimum standards.

Risk Mitigation through System Design

The issues of system design and risk mitigation are intimately related; that is, the design of the system involves a combination of risk-mitigation techniques. This section provides an overview of system design, followed by a more thorough explanation of the techniques used to mitigate the specific risks inherent in securities clearing and settlement systems. Formal definitions of these risks are given in Box 1.

An Overview of System Design, Risk, and Efficiency in CDSX

CDSX is a system designed to incorporate thorough risk-proofing. At the same time, steps to reduce risk are carried out in the most cost-effective manner. The four most important risk-mitigation techniques and their consequences for cost-efficiency are the following:

- CDSX must be able to withstand the default of the participant with the largest obligation to the system. As a result, participants are subject to limits on their obligations to the central counterparty. They must also collateralize their obligations, which is expensive. Collateral costs in CDSX are decreased by netting payment obligations and by allowing participants to pool collateral within groups of participants. Furthermore, transactions are final and irrevocable intraday, so participants can use as collateral any securities they have purchased immediately upon completion of a transaction.⁷
- There must be a simultaneous transfer of securities and payment obligations in each

6. See Miller and Northcott (2002) for an overview of the CLS Bank.

7. Provided that the securities they have purchased are eligible for use as collateral in CDSX.

Box 1

The Major Risks in Securities Clearing and Settlement^a

Banker risk	The risk that a private institution acting as the settlement agent will fail.
Credit risk	The risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter.
Legal risk	The risk that a party will suffer a loss because laws or regulations do not support the rules of the securities settlement system, the performance of related settlement arrangements, or the property rights and other interests held through the settlement system.
Liquidity risk	The risk that a counterparty will not settle an obligation for full value when due, but on some unspecified date thereafter.
Operational risk	The risk that deficiencies in information systems or internal controls, human errors, or management failures will result in unexpected losses.
Principal risk	The risk that the seller of a security delivers a security but does not receive payment or that the buyer of a security makes payment but does not receive delivery.
Systemic risk	The risk that the inability of one institution to meet its obligations when due will cause other institutions to be unable to meet their obligations when due. Such a failure may cause significant liquidity or credit problems, and, as a result, might threaten the stability of or confidence in markets.
Pre-settlement risk	The risk that a counterparty to a transaction for completion at a future date will default before final settlement. The resulting exposure is the cost of replacing the original transaction at current market prices.

a. Most definitions are from the Bank for International Settlements (BIS 2001a).

transaction. This is referred to as delivery versus payment (DVP) and is facilitated by the fact that the exchange of securities does not require physical transfer between the buyer and seller. Rather, the securities are immobilized in the system, and ownership is transferred via an electronic book-entry process. Immobilization allows transactions to be completed quickly, very accurately, and at a lower cost.

- End-of-day funds exchange must be very secure and therefore takes place on the LVTS, a well-risk-proofed payments system. Since collateral can be transferred between CDSX and LVTS as needed, the demand for collateral in the two systems can be reduced.
- Finally, CDSX must be extremely reliable and must incorporate extensive contingency arrangements. The need for a highly reliable system motivated the replacement of the outmoded SSS with the new system. Combining the two systems will reduce overall operating expenses.

The owner and operator of CDSX, The Canadian Depository for Securities (CDS), plays a major role in risk mitigation.⁸ It acts as the central securities depository to facilitate delivery versus payment, takes the role of central counterparty to maximize the effectiveness of netting, monitors collateral requirements so that the system is able to withstand the default of the largest net debtor, and is responsible for the system's operational security. Finally, CDS sets caps on the total amount of funds each participant is allowed to owe to the system to limit potential risk in the event of a default.

An Efficient Use of Collateral

The most important risk-mitigation objective in CDSX is that it is designed to be able to withstand the default of the largest net debtor. Participants are subject to limits on the maximum amount they can owe to the central counterparty and must pledge collateral to cover payment obligations that arise in the system. In the event that payment obligations are not fulfilled, the collateral is used to generate the liquidity needed for the system to settle, thus eliminating

credit risk. Certain techniques seek to minimize the cost of providing collateral—payments netting is employed, and payment obligations are collateralized only up to the point that the system is able to withstand the default of the largest net debtor.

The settlement of a securities transaction consists of two parts: a securities transfer and a funds transfer.⁹ Either or both of the securities and funds can be transferred on a gross basis, or on a net basis, in which case, a number of transactions are allowed to offset each other. CDSX employs a gross intraday settlement approach for securities: the securities are transferred in real time between the two participants upon settlement of the trade. Funds positions, however, are netted on a transaction-by-transaction basis and are settled at the end of the day.

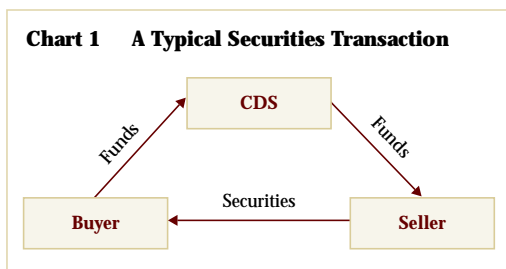
CDS substitutes itself as the central counterparty for the funds portion of each transaction to minimize the end-of-day payment obligations of participants. Chart 1 illustrates a typical securities transaction: securities are transferred directly from the seller to the buyer, and CDS becomes the counterparty for the funds portion of the trade. This way, participants can conduct transactions with many other participants throughout the day and end up with only one netted funds obligation with CDS—either to pay CDS funds owed or to be paid funds owed by CDS.¹⁰

Netting significantly reduces collateral needs so that, for any given value of security trades, the amount of funds needed for settlement is significantly less than otherwise. Specifically, netting allows “buys” (negative funds positions) and “sells” (positive funds positions) to offset each other. Although netting systems are more efficient in their use of liquidity, they have the potential to be riskier if netting arrangements do not have a sound legal basis. In Canada, the PCSA reinforces the legal validity of netting to

8. CDS is a private, not-for-profit institution owned by its participants—Canada's major banks, the stock exchanges, and private investment brokers/dealers.

9. An example of a securities transaction is a pension fund buying 100 shares of Equity X from an investor for \$5 per share. The trade creates an obligation for the investor to deliver 100 shares to the pension fund in exchange for payment of \$500 by the pension fund.

10. CDS acts as the central counterparty for both the funds and the securities portions of future-dated debt transactions, as well as for some equities and cross-border transactions. Caps and collateral are used to minimize risks (such as pre-settlement risk) to which CDS may be exposed.



assure participants that these arrangements will stand up in the event of the default of a participant. The use of netting thus adds efficiency without adding risk.

A second method for minimizing collateral requirements is the use of collateral pools. In a collateral pool, members of the pool combine their collateral for common use and share risk by guaranteeing the obligations of the other members that arise from use of the pool. Each member of a collateral pool is allowed to be in a net debtor position (owe funds to CDS) equal to a proportion of the usable value of all the collateral in their pool.¹¹

In the event of a default by one member of the collateral pool, the securities in the pool are liquidated so that the system can settle. If the defaulter's funds obligation is larger than the liquidation value of the securities it has pledged to the pool, the other collateral pool members are required to cover the defaulter's remaining commitment arising from the defaulter's use of the pool. A collateral-pool arrangement is thus referred to as survivors-pay, because the surviving institutions in that pool share some liability in the event of a default.

CDSX is not structured solely as a survivors-pay arrangement. Indeed, it also operates importantly on a defaulter-pays basis where a participant individually pledges collateral to cover its own payment obligation.

Acceptable Collateral Instruments

The value given to securities as collateral is adjusted to cover the risk that, following a participant's default, the assets pledged to the system cannot be sold for cash (liquidated) at prices close to market value at the time of the pledge. If the only acceptable collateral were cash, this would not be a problem. But since cash is a very expensive form of collateral, acceptable collateral in CDSX also includes securities, the market value of which can fluctuate. Thus, CDSX must be designed to provide a very high probability that all collateral can be liquidated on a timely basis for a value equal to or greater than that assigned to the securities in the system.

11. The usable value of collateral is the market value of each security less a certain amount (a "haircut") to account for day-to-day variability in the market price.

Various types of securities are acceptable as collateral in CDSX. They include Government of Canada bonds and treasury bills, provincial bonds, federal and provincial guaranteed bonds, and certain corporate bonds. In the event of a default, collateral would be used to obtain funds to cover a defaulting participant's negative funds balance in order for the system to settle, and would be sold later. The system operator must therefore be reasonably sure that the value given to securities being used as collateral is not larger than the minimum expected saleable value of the assets. This value, however, is impossible to determine with certainty, since the market value of securities varies daily. The value of securities that can be used as collateral must, therefore, be the current market value *minus* a factor that takes into account expected market variability based on historical performance. This factor is known as a "haircut." Haircuts vary across securities and must take account of (i) the reliability of the market price estimate, (ii) the possibility that market prices decline on the day that the securities are liquidated, and (iii) the estimated number of days required to liquidate the security.

Delivery versus Payment

The system is designed to eliminate principal risk—the risk that one party to a transaction will complete its obligations from a trade but will not receive payment for the asset sold or will not receive the asset it had purchased. To eliminate this risk, CDSX operates using a real-time, delivery-versus-payment (DVP) system, whereby a link between securities transfers and funds transfers ensures that delivery occurs if, and only if, payment occurs (BIS 2001b). Participants are thus assured that, if a transaction is completed, it is completed as contracted.

Tiering

Another risk-control mechanism in CDSX is its use of tiering, whereby some participants—extenders of credit—act as bankers and guarantors for other participants—receivers of credit. The institutions permitted to extend credit include the major banks and, to a limited extent, the Caisse centrale Desjardins du Québec. The receivers of credit include investment dealers and smaller financial institutions.

The main reason for tiering is that it allows the end-of-day funds exchange to go through the LVTS, a well-risk-proofed payments system. To participate in end-of-day funds exchange, participants must have LVTS accounts at the Bank of Canada. Since it is not cost-effective for some smaller participants to hold these accounts, tiering allows the use of the LVTS at a lower cost. The Bank of Canada also acts as settlement agent for CDSX, which means that banker risk is eliminated.

Receivers of credit are required to have their obligations guaranteed by an extender of credit, which means that only a small group of participants have direct obligations to CDS.¹²

Operational Contingency Arrangements

The Canadian financial system depends on the functioning of CDSX. It is therefore important that CDSX be able to operate in all reasonable circumstances and that it be able to recover quickly in the event of any disruption.¹³ That is, it must be adequately protected from operational risk. CDS has designed the functioning of all critical systems to be extremely reliable and able to handle periods of high volume. Operational-risk controls also incorporate contingency planning for key systems, including business-recovery planning and an off-site data centre, which should allow CDSX operations to resume within two hours if operational functionality is lost at its primary site. The process is overseen by both internal and external auditors who examine whether operational-risk controls are sufficiently comprehensive and consistently met.

The Transition Period

The significant benefits of moving to a secure and, in the long run, more cost-effective unified securities clearing and settlement system come with some fairly substantial transition costs. The application of risk controls similar to those in DCS presents a number of challenges for some participants, especially for participants that previously used only the SSS, which

12. Receivers of credit are required to have a line of credit from an extender to cover their payment obligations.
13. For more information on business-continuity planning in Canadian clearing and settlement systems, see Allenby in this issue (p. 55).

employed less-stringent risk-mitigation techniques than CDSX.

To help participants that are not familiar with the risk controls in DCS to adjust to the new requirements, CDSX is being implemented with a transition phase, which will last for 12 months. The system has been designated under the PCSA and will be subject to thorough risk controls. In some cases, the risk-proofing in the transition phase is different from, but equivalent in effectiveness to, what will be required when CDSX is implemented permanently. At the end of the transition period, any changes to the original structure of CDSX that are deemed necessary and are consistent with acceptable risk-containment mechanisms will be made.

Future Developments

The introduction of CDSX is a major change in the Canadian securities market. CDSX is a safe and efficient system and, with its introduction, almost all securities clearing and settlement comes under the formal oversight of the Bank of Canada under the auspices of the PCSA.

The implementation of CDSX by no means signifies the end of the evolution of clearing and settlement arrangements for Canadian securities. Although it has achieved a high degree of risk mitigation, further efficiency gains are possible. Internationally, there are two major mechanisms for improving efficiency in securities clearing and settlement. The first is achieving full automation of trade information so that securities transactions can be completed rapidly and without manual intervention (straight-through processing). The second is standardization of information and processes so that securities clearing and settlement can take place seamlessly on an international basis. The next major changes in securities trading and clearing and settlement arrangements are thus likely to improve efficiency and to facilitate trading in an increasingly global marketplace.

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