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Guide to the Monthly Credit Aggregates

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Introduction

In the past, the Bank of Canada (the Bank) and Statistics Canada produced aggregate measures of borrowing, or credit, for sectors of the Canadian economy. The Statistics Canada measures were on a quarterly basis as part of the National Balance Sheet Accounts (NBSA) whereas the Bank of Canada published more frequent monthly statistics via their Monthly Credit Program (MCP). As part of a comprehensive credit data harmonization project, these measures were reconciled to better understand the statistical, conceptual, and methodological differences. At the same time, a joint project was underway between the Bank of Canada and Statistics Canada to develop a new collection vehicle for chartered banks initially called the joint balance sheet. This regulatory banking schedule would be administered by the Bank of Canada and designed in collaboration with Statistics Canada to serve the needs of both organizations and reconcile source data.

The outcomes of these two endeavors led to the decision for a full harmonization of credit statistics between the Bank and Statistics Canada with the agreement to move to a single set of credit statistics. Starting in December 2020, as part of the Monthly Credit Aggregates (MCA) program, Statistics Canada will be producing monthly estimates of selected liabilities that will be integrated into the overall macroeconomic accounts framework including the national balance sheet. This will provide users with a single, consistent, internationally comparable set of monthly estimates that align with officially recognized national accounting principles and classifications as detailed in the United Nations System of National Accounts Compilation Guide (SNA 2008).

This guide will serve as a brief review of the historical differences between each organization's credit aggregates, an overview of the conceptual and statistical changes that will occur as a result of the integration of monthly estimates within the NBSA, and a synopsis of the methods that will be employed to estimate the outstanding credit debt of households and non-financial private corporations by lending sector.

Reconciliation

The Bank and Statistics Canada conducted a joint reconciliation exercise to understand and identify key differences between their respective measures of household and business credit, including non-mortgage loans, residential and non-residential mortgages, debt securities, and equity. The outcome of this project included a series of articles covering the conceptual, methodological, and statistical differences for households and businesses and quarterly reconciliation tables that tracked these principal differences over time. While each organization incorporated similar data sources and portrayed the indebtedness of Canadian households and non-financial businesses in a similar light, various reconcilable differences existed due to the use of differing assumptions, classification systems, concepts, methodologies and coverage.

Box 1. A summary of outputs of the credit harmonization initiative

Previous reconciliation studies and subsequent tables have been produced in the past; however, since these articles were published, revisions to the NBSA have eliminated some of the conceptual and statistical differences that were originally identified.

Understanding household credit measures, a joint study by the Bank of Canada and Statistics Canada

Understanding business credit measures: a joint study by the Bank of Canada and Statistics Canada

Reconciliation tables

- Total household credit from the Bank of Canada and the National Balance Sheet Accounts, Table: 36-10-0441-01
- Reconciliation of estimates of main household credit aggregates between the Bank of Canada and National Balance Sheet Accounts, Table: 36-10-0441-02
- Reconciliation of estimates of mortgage liabilities of the household sector between the Bank of Canada and the National Balance Sheet Accounts, Table: 36-10-0441-03
- Reconciliation of estimates of consumer credit between the Bank of Canada and National Balance Sheet Accounts, Table: 36-10-0441-04

Bank of Canada and Statistics Canada to move to a single set of credit statistics

At the time of this exercise, the Statistics Canada measures were comprised of quarterly estimates that were published as part of the NBSA, which presents assets and liabilities between counterparties or in the case of credit, debtors and creditors, across all sectors of the economy including households and private non-financial corporations. In other words, for each instrument, all holders of financial assets must have corresponding counterparties who hold the financial liabilities.

The Bank's existing credit aggregates are presented based on the lender or creditor perspective, i.e., the holder of the financial assets where the counterparty is either a household or non-financial business. However, the Bank's aggregates are more limited in coverage on both the lending sector and instrument dimensions (i.e., the Bank does not include all assets and liabilities for all sectors).

The table below summarizes the main differences that this exercise documented.

Table 1
Principal conceptual and statistical differences between the Bank of Canada's and Statistics Canada monthly credit estimates

Item	Description
Classification	**Unincorporated businesses:** In the NBSA, unincorporated businesses are included in the household sector whereas the Bank classifies them to non-financial businesses. An extension of this is that the NBSA business credit estimates exclude unincorporated businesses and cover only private non-financial corporations. **Mortgages:** The NBSA emphasizes the debtor-creditor relationship; that is, if the debtor is a corporation, then the liability will be classified as a residential mortgage in the corporate sector. The Bank's credit statistics classify mortgages to sectors based on the intended use of property; therefore, the Bank includes all residential mortgages with household credit and all non-residential mortgages with business credit. **Consumer credit:** In the NBSA framework, the measure of household consumer credit includes only the financing related to current consumption, whereas financing for financial and capital investment expenditures is included in a separate category for non-mortgage loans other than consumer credit. In contrast, the Bank includes borrowing related to all categories of household expenditures in its measure of consumer credit.

Table 1
Principal conceptual and statistical differences between the Bank of Canada's and Statistics Canada monthly credit estimates

Item	Description
Valuation	The Bank's monthly credit estimates incorporate banking data reported on a worldwide consolidated basis in Canadian currency as well as balances with Canadian residents in foreign currency as an approximation for Canadian activity, Additionally, source data is reported on, or calculated as, an average-over-the-period basis (the average value of the stock of an asset over the period). Finally, the Bank's loan data are net of expected credit losses because they measure the value of the loan the creditor anticipates will be collected. Statistics Canada uses data on a booked-in-Canada basis in domestic and foreign currency to capture activity within Canada. Additionally, source data is reported on an end-of-period basis (the value of the stock of an asset on the final day of the period). Lastly, because Statistics Canada's data are presented on a debtor-creditor basis, impaired loans are still assets and liabilities on the books of the debtor and creditor at their full outstanding value (gross of impairments).
Coverage	The Bank's credit aggregates do not cover loans from some sectors that are included in the NBSA. Examples include certain types of loans from credit unions, government business enterprises and other private financial institutions where the Bank has partial coverage. Additionally, the Bank excludes some lending sectors entirely, as they are not within the scope of its definition of credit. Finally, the Bank includes non-trade receivables in its measure of business non-mortgage loans, the NBSA classifies these to other assets/liabilities, and all leasing in business credit, while the NBSA includes a portion of automobile leasing as a liability of households.

Source: Bank of Canada, Statistics Canada.

Concepts

The section below outlines the various concepts that will be implemented as part of the MCA program. Generally, the MCA measures the outstanding credit market debt of households and non-financial corporations based on lending from all sectors of the economy.

Valuation

Because the NBSA is on a debtor-creditor principle, it is important that the instrument liability of one sector align with the related asset of the counterparty sector. The outstanding stock of loans can be recorded on a gross or net basis, with the latter reflecting expected credit losses that may occur if a percentage of borrowers default and thus requiring a lender to write-off the value of those impaired loans. However, from the debtor's perspective, no explicit assumptions are made for the likelihood of default. Thus, to ensure the debtor-creditor relationship is coherent and consistent, the gross amount of loans outstanding are recorded on both the liability side of borrowers and the asset side of lenders.

Also, like the NBSA, the MCA uses data for domestic lenders that is on a booked-in-Canada basis. This means that only lender activities from their Canadian operations are counted even though these activities may be with Canadians or non-residents. Similarly, borrowers are able to obtain funds from domestic or non-resident lenders. An implication of this treatment is that activities with non-residents are only recorded when they include a domestic counterparty and, consequently, transactions solely between non-residents are out-of-scope.

Outstanding stocks are recorded at the end of the reference period meaning the balance sheet will reflect a snapshot of all assets and liabilities at a single point in time. In this case, the NBSA captures a portrait of all assets and liabilities at the end of the calendar quarter while the MCA will record the portrait of credit debt on the last day of each month.

Lastly, outstanding debt is valued at market-value for loans liabilities and nominal-value for securities with the latter reflecting the debt from the viewpoint of the debtor that is owed to the creditor based on the terms of the contractual agreement. In the case of loans, the assumption is that market-value and nominal-value are equivalent and loans are not marked up on the asset side of the balance sheet.

Classifications and coverage

The NBSA adheres to internationally comparable taxonomies laid out by the SNA 2008 with some exceptions intended to reflect Canada-specific circumstances. To ensure coherence within the broader system of macroeconomic accounts, the MCA aligns to these same classifications.

Sector classifications

The Canadian System of Macroeconomic Accounts (CSMA) covers the entire economy and delineates economic activity across a number of domestic institutional sectors, the principal ones being households, non-profit institutions serving households, corporations, and government. The rest-of-the-world, while not a sector, but rather the same sectors identified above within other countries' economies, is referred to as non-residents.

Debtor sectors: households and non-financial corporations

The MCA focuses on two of the major domestic sectors in its coverage of debtors (borrowers); that is, households and non-financial corporations. Households represent groups of individuals who share the same living accommodation, who pool some or all of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food. An important inclusion within the household sector are unincorporated businesses that may engage in a variety of activities and incur debt. In the CSMA, unincorporated businesses are generally allocated to the household sector as these types of business cannot be reliably distinguished from their proprietors for the purpose of compiling sector statistics (i.e., frequently, the line is blurred between the assets of the household versus the business).

Corporations are classified to a variety of sub-sectors under both non-financial and financial corporations. Private non-financial corporations specifically are corporations not engaged in the production of financial services as their principal activity and which are not controlled by government (i.e., exclude government business enterprises). Additionally, the corporate sector will only include incorporated entities and some types of partnerships, but will exclude unincorporated businesses, which are classified to the household sector.

Box 2. Canadian Classification of Institutional Units and Sectors

The Canadian Classification of Institutional Units and Sectors (CCIUS) is a classification system for institutional sectors in the Canadian economy. Institutional sectors are groups within an economy that share principal functions, behaviours, and objectives.

Canadian Classification of Institutional Units and Sectors

Households

The household sector includes all of the households residing in Canada. A household is defined as a group of people who share a living accommodation and collectively share some income, wealth, or spending activities (common examples are shared spending on housing and food). In general, assets are owned or liabilities are incurred jointly among the household's members. Households often coincide with families, but members of the same household do not necessarily have to belong to the same family so long as there is some sharing of resources and consumption. This sector also includes unincorporated businesses as their assets and liabilities cannot be reliably separated from those assets and liabilities of individuals and households.

Private non-financial corporations

This subsector includes corporations (and quasi-corporations) whose main activity is the production of goods or non-financial services. This subsector includes only privately owned businesses, which means that all business that are owned or controlled by the government are excluded. Unincorporated businesses are similarly not grouped with this sub-sector, but are instead included in the household sector.

Creditor or lending sectors

The NBSA measures the stock of assets and liabilities across all sectors of the economy and presents these on a quarterly basis. While the MCA only foscuses on two debtor sectors, from a creditor perspective, all lenders to these sectors are included. The table below presents the lender sectors whose activities are captured in the MCA as well as the corresponding groupings within the NBSA. The MCA is less detailed given the higher frequency estimates that are provided and the lack of a fully-balanced matrix with which to produce monthly estimates at the most granular sectoral level.

Table 2
Coverage of lender sectors

Monthly Credit Aggregates (monthly) lender sectors	National Balance Sheet Accounts (quarterly) lender sectors
Banks	Chartered banks
Non-banks	Aggregation
Government	Federal general government Provincial and territorial government Local general government Social security First nations and aboriginal general government
Non-bank financial corporations	Aggregation
Credit unions and caisse populaires	Credit unions and caisse populaires
Trust companies and mortgage loan companies	Trust companies and mortgage loan companies
Financial vehicle corporations engaged in securitization	Financial vehicle corporations engaged in securitization
Other financial corporations not elsewhere included	Life insurance companies Property and casualty insurance companies Segregated funds of life insurance companies Trusteed pension plans Mutual funds Financial corporations engaged in lending Security and derivative dealers Specialized financial corporations and other financial intermediaries Financial auxiliaries Captive financial institutions and money lenders
Other lenders not elsewhere included	Private non-financial corporations Non-residents Non-profit institutions serving households Households

Source: Statistics Canada, "A guide to the Monthly Credit Aggregates", *Latest Developments in the Canadian Economic Accounts* (13-605-X), 2020.

Financial vehicle corporations engaged in securitization

Each of the credit aggregates (mortgage and non-mortgage loans) include an adjustment for the effects of "securitization." Securitization occurs when loans are removed from the balance sheets of financial institutions and sold to special-purpose vehicles (SPV) who issue bonds, commercial paper, and other notes secured by the transferred assets. This credit, which is derecognized from the balance sheets of financial institutions, is recaptured in the credit aggregates through the inclusion of loans held by the SPVs referred to as "financial vehicle corporations engaged in securitization". With the adoption of International Financial Reporting Standards (IFRS) beginning in January, 2011, financial institutions converting to IFRS now re-recognize securitized assets on their consolidated balance sheets when these are contained within an SPV that is non-arm's length as per the provisions of the recognition/de-recognition rules laid out by the accounting standard. The most significant effect relates to the inclusion of securitized loans on financial institutions' balance sheets, which were previously shown as loans held by SPVs including NHA mortgage-backed securities. These data are obtained from Statistics Canada's Quarterly Survey of Securitized Receivables and Asset-backed Securities.

Instrument classifications

The focus of the MCA is on the credit market debt of households and non-financial corporations. For this reason, a specific subset of instruments are estimated on a monthly basis with the aggregate of these estimates providing a measure of total credit market debt for each of these sectors.

Non-mortgage loans

One important difference between the MCA and the NBSA involves the definition of non-mortgage loans to households. In the NBSA framework, the measure of household consumer credit includes only the financing related to current consumption, whereas financing for financial and capital investment expenditures is included in a separate category for non-mortgage loans other than consumer credit. Both categories combined cover the total non-mortgage debt of the household sector as defined in the MCA.

Table 3
Instrument detail

Item	Description
Non-mortgage loans	Includes loans to finance current consumption as well as all other non-mortgage borrowing. In the NSBA, the former is show separately as Consumer Credit and represents the majority of the total.
Personal loans Credit cards Lines of credit Other personal loans Loans to unincorporated businesses	This detail is only available for banks given detailed information on loans by product type. This includes loans on an installment basis such as auto loans, credit card debt that is both interest and non-interest bearing, lines of credit including home equity lines of credit (HELOCs), all other loans to households for non-business purposes not elsewhere included, and loans to households for business purposes.
HELOCs	Home Equity Lines of Credit are secured lines of credit offered by banks and other financial institutions that are linked to the available equity in an individual's residential property and offer revolving credit. This excludes home equity loans that are similar in how they are secured, but offer fixed repayment terms.
Mortgage loans	Loans secured by a specified real estate property for the purpose of acquiring said property and accompanied by a predetermined schedule of payments.
Residential mortgages	Mortgages secured by single- or multi-unit dwellings.
Of which: off balance sheet National Housing Act mortgage-backed securities (NHA-MBS)	NHA-MBSs are separately identified when they are shown off balance sheet; that is, derecognized by the issuing entity.
Non-residential mortgages	Mortgages secured by commercial properties
Debt securities	This category covers marketable securities in the forms of bonds and debentures, commercial paper, asset-backed securities, and other negotiable notes.
Short-term instruments	Marketable securities with an original-term to maturity of one year or less.
Long-term instruments	Marketable securities with an original-term to maturity of more than one year.
Equity securities	This category covers the value of equity on the books of non-financial corporations that are publically listed on stock exchanges.
Listed shares and warrants	The book-value of equity corresponding to Canadian companies whose shares are publically listed (i.e., stock exchanges).
Trust units	Shares of publically-listed trusts including real estate investment trusts (REITs)
Real estate secured lending	An aggregation of mortgages and HELOCs

Source: OSFI, Statistics Canada.

Mortgage loans

Generally, financial institutions will make a distinction between their mortgage assets based on the intended use of the mortgaged property, i.e., for residential or non-residential purposes. For example, if a residential care facility requires a mortgage, a financial lender will record this as a residential mortgage. The NBSA emphasizes the debtor-creditor relationship; that is, if the debtor is a corporation, then the liability will be classified as a residential mortgage in the non-financial corporations sector. Thus, residential mortgage liabilities may appear in various sectors of the economy. Similarly, non-residential mortgage liabilities are allocated to the various borrowing sectors with some non-residential mortgage borrowers classified to the household sector (i.e., unincorporated businesses).

Securities

The securities statistics cover issuances and holdings of financial negotiable instruments. Securities include debt instruments designed to be traded in financial markets, such as treasury bills, commercial paper and bonds, as well as equity instruments, such as listed shares. The statistics relate to outstanding amounts (stocks) and net transactions (new issues net of redemptions). Definitions and concepts are consistent with the recommendations of the Handbook on Securities Statistics, an internationally agreed upon framework for classifying securities instruments.

Data sources

The MCA incorporates a wide variety of data sources from administrative and regulatory sources, surveys, third-party data providers, and publically available information. These are available with differing frequencies and timeliness such that some portions of the estimates are more directly estimable on a monthly basis while others require additional assumptions. Moreover, the data sources for both the NBSA and MCA generally align given the high degree of overlap; however, the MCA may incorporate additional information to produce monthly trends that decompose the NBSA benchmarks.

Regulatory data on banks

Data on federally-regulated deposit taking institutions collected by the Bank of Canada, OSFI, and Statistics Canada are incorporated into both the MCA and NBSA programs. The balance sheets of chartered banks and the counterparties to whom they lend are compiled from this information.

The historical time series estimates are derived in part using information from the L4 schedule; this is one of the primary sources on which the Bank of Canada's original monthly credit program is based.

A key banking schedule is the Z4—Balance Sheet by Booking Location, which provides monthly estimates of the balance sheets of chartered banks including selected counterparty information. This schedule was developed as a joint effort between the Bank of Canada and Statistics Canada as part of the credit harmonization initiative. It is administered by the Bank of Canada and collected through the Regulatory Reporting System.

In addition to the Z4, Statistics Canada also administers the AS – Non-Mortgage Loans Report, which elaborates on the balance sheet information provided by banks through the delineation of additional details on lending. The AS schedule is filed quarterly and, as such, is used as the basis for the quarterly NBSA estimates of loan assets for banks to which the MCA is reconciled. Finally, the MCP was based on information from the now discontinued L4 - Monthly average return of assets and liabilities.

Detailed cross-return rules exist between the Z4 and numerous other schedules to ensure consistent reporting and concepts. However, due to variation in definitions and objectives of the different returns some inconsistencies do exist. Firstly, the concept of **loans to individuals for non-business purposes** aligns across the Z4, AS, and L4. As such, the monthly Z4 and the quarterly AS should yield the same estimates and thus be used interchangeably; this identity is verified each applicable reporting period. Consequently, the monthly Z4 can be used to simultaneously construct both the monthly and quarterly estimates, which simplifies the methodology. However, there are differences between how the Z4 and AS capture **loans to unincorporated business**, which as mentioned earlier are classified to the household sector. While the AS has a clearly defined line item for reporting loans to unincorporated businesses, the Z4 is less precise. As a result, the AS is used as the quarterly benchmark, while the Z4 is a reliable proxy for deriving monthly trends. Lastly, banks provide information on **loans to individuals for business purposes**, a category that encompasses loans to corporations, non-profit institutions, government business enterprises, etc. The AS provides the most granular detail distinguishing loans to private non-financial corporations from all other counterparties whereas the Z4 is less clear-cut in this respect. As a result, the AS is used to establish the quarterly benchmark with the Z4 data used as a highly correlated monthly allocator.

It should be noted that, while some differences exist in definitions and specific instructions across the banking schedules, there is ongoing work to reconcile and align content where applicable. Additionally, banks produce their counterparty information using a variety of methods. Industry classifications recorded by the banks based on their clients' business activities are one approach to classifying borrowers, but other approaches may be taken and the exercise is frequently dependent on the type of information collected at the branch-level, which varies between banks in level of detail and availability.

A comparison of the principal bank schedules used in the compilation of estimates is outlined in Table 4 below.

Table 4
Principal regulatory data sources used in building the monthly credit aggregate (MCA) bank estimates

	L4	Z4	AS
Name	Monthly average return of assets and liabilities	Balance sheet by booking location	Non-mortgage loans report
Purpose	Used by the Bank of Canada to derive estimates for their monthly credit program. Discontinued with the introduction of the Z4.	Used by Statistics Canada to derive MCA monthly estimates and movements and National Balance Sheet Accounts (NBSA) quarterly estimates	Used by Statistics Canada to derive NBSA quarterly estimates and MCA benchmarks
Booking location	Booked worldwide	Booked in Canada, outside Canada, and worldwide	Booked in Canada
Effective period	November 1993 to September 2020	January 2020 to ongoing	January 1998 to ongoing
Resident/non-resident	Partial	Yes	Yes
Valuation	Average over the period	End of period	End of period
Frequency	Monthly	Monthly	Quarterly
Loan classification (households)	Loans by type	Loans by type	Loans by purpose
Coverage (households)	Consistent definition for "To individuals for non-business purposes"		
Coverage (private non-financial corporations)	Inconsistent or incomplete definitions for "To individuals and others for business purposes"		
	At most granular includes loans to private non-financial corporations, government business enterprises (GBEs), some government institutions such as hospitals and universities/colleges, non-profit institutions, unincorporated, businesses, and unregulated financial institutions	At most granular includes loans to private non-financial corporations, GBEs, some government institutions such as hospitals and universities/colleges, and non-profit institutions	At most granular includes loans to private non-financial corporation (as "Total Industrial corporations")
Coverage (unincorporated businesses)	Inconsistent or incomplete definitions		
	Not available as a separate item.	Captured as loans to individuals for business purposes other than those to financial and non-financial corporations, but this may be too broad.	Captured directly as loans to unincorporated business (business purposes).

Source: OSFI, Bank of Canada, Statistics Canada.

Non-bank data

Data for all other lending sectors except that of banks are outlined in Table 5. The data sources are varied as all other lending sectors are covered including non-bank financial and non-financial corporations, government, and non-residents. Moreover, there tends to be less detailed counter-party information among the non-bank lenders and full balance sheet information is generally available on only a quarterly basis. For this reason, various monthly indicators have been identified to be used in allocating the quarterly NSBA benchmarks to the monthly space.

Table 5
Principal data sources used in building the monthly credit aggregate (MCA) non-bank estimates

Area	Monthly	Quarterly
Credit unions	The Survey of Monthly Credit Aggregates (SMCA) provides selected information on the monthly balance sheets of a subset of the credit union sector.	The Quarterly Survey of Financial Statements (QSFS) provides a full income statement and balance sheet for all credit unions operating within Canada.
Trust and mortgage loan companies	Information from the Office of the Superintendent of Financial Institutions (OSFI) and the Bank of Canada that cover these entities including the M4 (Balance Sheet) and A4 (Report on New and Existing Lending) returns.	OSFI and Bank of Canada information is used to supplement full financial statement information provided by the QSFS.
Financial vehicle corporations engaged in securitization	Monthly information from third-party data providers and publically available information on securitization activities.	Full financial statement information provided by the QSFS for a sample of entities supplemented with information from third-party data providers and publically available information on securitization activities.
Other sectors	Non-residents – monthly information on loans	Various data sources such as the QSFS.
Government	Seasonal trends involving student loans programs	Government Finance Statistics cover the accounts of federal, provincial, and territorial governments based on detailed administrative accounting information submitted quarterly and annually.
Securities	The Securities statistics program covers issuances and holdings of financial negotiable instruments. This is accomplished by tracking information on a security by security basis for all sectors of the economy each month.	

Source: Statistics Canada, “A guide to the Monthly Credit Aggregates”, *Latest Developments in the Canadian Economic Accounts* (13-605-X), 2020.

Methodology

The overall methodology of the Monthly Credit Aggregates can be summarized as a decomposition of selected portions of the quarterly NBSA into monthly estimates. To accomplish this task, the MCA incorporates all available monthly data and ensures that this aligns as closely as possible with NBSA concepts. For example, with respect to chartered banks, the available banking information provides conceptually accurate information that is used to produce both quarterly and monthly estimates. The sections below detail the approaches taken across three domains: generating historical estimates, benchmarking, and forecasting when necessary.

Table 6
A summary of methodologies used for backcasting, benchmarking, and forecasting

	Benchmarking and forecasting			Backcasting	
	Method	Benchmark	Allocator	Method	Allocator
Households					
Loans from banks	Direct use of monthly data (Z4)	National Balance Sheet Accounts (NBSA)	None	Quadmin[1]	Monthly Credit Program (MCP)
Loans from non-banks	Various	NBSA	Various	Quadmin[1]	MCP
Non-financial corporations					
Loans from banks	Direct use of monthly data (Z4)	NBSA	Z4	Quadmin[1]	MCP
Loans from non-banks	Various	NBSA	Various	Quadmin[1]	MCP
Debt securities	Direct use of monthly data (securities statistics)	NBSA	None	NBSA	MCP
Equity	Direct use of monthly data (securities statistics)	NBSA	None	NBSA	MCP

1. Quadratic minimization (optimization) process

Source: Statistics Canada, “A guide to the Monthly Credit Aggregates”, *Latest Developments in the Canadian Economic Accounts* (13-605-X), 2020.

Benchmarking and forecasting estimates

Given the important integration between the monthly program and balance sheet, the third month of each quarter is benchmarked to each quarterly release of the NBSA. Additionally, there will be a maximum of two months of estimates available as part of the MCA before the official release of the applicable NBSA quarter. Given this lag, these months will be forecasted using various methods (i.e., regression modelling) until the benchmarking process can take place, at which point all overlapping estimates will be harmonized and the subsequent months will again be forecasted.

Box 3. Benchmarking using a quadratic minimization (optimization) process

The quadratic minimization procedure is used to preserve the previous monthly trends while respecting the quarterly NBSA totals. The procedure uses the formula as follows:

General form:

$$\min f(x) = \frac{1}{2} x^T A x + x^T b$$

Proportional model:

$$\min f(x) = \sum_{t=2}^{T} \left(\frac{x_t}{z_t} - \frac{x_{t-1}}{z_{t-1}} \right)^2$$

This process fits the monthly MCA data trends to the levels of the quarterly NBSA data, maintaining the quarterly values, while fitting the data between the quarters (i.e. month 1 and 2) based on the growth rates of the monthly data source. While the fit is close, there are some adjustments to the monthly growth rates arising from the change in level for the overall quarter once benchmarked. This process ensures quarterly estimates are consistent across the NBSA and MCA, maintaining the NBSA levels while incorporating the trends of the monthly data.

Banks

For chartered banks lending, the monthly Z4 data provides information on loans to individuals for non-business purposes that is consistent with data received from the quarterly AS schedule. As such, the Z4 is used as a direct source when estimating household debt and is compared to the AS results each quarter to ensure cross-return coherence. Information on loans to unincorporated business are only available on the AS, but the Z4 provides a reliable indicator for this amount and is consequently used to allocate and project the quarterly series.

The Z4 also provides information on lending to individuals and others for business purposes; however, this does not align as directly with what is collected quarterly from the AS. The Z4 uses a broader definition of non-financial corporations than the AS, the latter being more consistent with the NSBA. As such, the Z4 monthly data is used as a close proxy to allocate the quarterly NBSA benchmark and forecast the months where the benchmark is unavailable. The differences between the Z4 and AS for non-financial corporations will continue to be investigated and the overall discrepancies are not expected to have a material impact on the monthly trends.

Non-banks

All non-bank lending sectors will be estimated monthly using all available indicators that serve as reliable proxies for monthly trends. These will be used in conjunction with ARIMA modelling to forecast months lacking a quarterly benchmark. If no reliable indicators exist, then linear interpolation will be applied to the quarterly benchmarks and forecasted values will be based on various methods, such as ARIMA models and year-over-year trends.

Timing of forecasting, benchmarking and revisions

The MCA will follow the same revision period as the NBSA and other accounts within the Canadian System of Macroeconomic Accounts. As a result, only certain months of the MCA will be open for revision at the time of each quarterly NBSA release. For example, at the time of the March release of the MCA, the first quarter NSBA estimates will not be available (see Table 7). Consequently, the three months of the first quarter will not be benchmarked to the NBSA. At the time of the first quarter release of the NBSA, current quarter estimates will be available for the first time as well as revised estimates for the prior four quarters. The following MCA release for April will then incorporate the first quarter benchmarks as well as any revisions from the preceding four quarters; however, the April and subsequent reference months will not yet be benchmarked and will remain so until the second quarter release of the NBSA. However, there are two exceptions, the first being the two-months of the quarters that are not directly tied to the quarterly benchmarks and the seasonally adjusted estimates. Each of these may be revised without affecting the benchmarked values and such changes will be noted for data users.

Table 7
Revision period and benchmarking/forecasting timelines

Quarter	Month	Before National Balance Sheet Accounts (NBSA) first quarter release	After NBSA first quarter release
First quarter	January	Forecasted	Benchmarked
First quarter	February	Forecasted	Benchmarked
First quarter	March[1]	Forecasted	Benchmarked
Second quarter	April	Not yet released	Forecasted

1. Month end equivalent to first quarter end.
Source: Statistics Canada, "A guide to the Monthly Credit Aggregates", *Latest Developments in the Canadian Economic Accounts* (13-605-X), 2020.

Historical estimates

Selected monthly credit estimates from the Bank of Canada are available back as far as 1969 on a monthly basis whereas the NBSA quarterly estimates begin in the first quarter of 1990.

To produce a historical time series beginning in the first quarter of 1990, the Bank's monthly estimates are benchmarked to the NBSA estimates using either a quadratic minimization (optimization) procedure when monthly data is available, or a linear interpolation process in the absence of monthly data.

Seasonal Adjustment

Generally, time series can be categorized into two different types: stock and flow. A stock series is a measure of the magnitude of attributes at a specific point in time, while a flow series refers to the accumulated value over a period of time. The MCA records the stock or value of assets and liabilities at the end of the quarter. The most practical approach to seasonally adjusting the monthly stocks is direct seasonal adjustment of the unadjusted MCA stocks. This approach was adopted for each component of the credit market debt. The resulting seasonally adjusted series were then reconciled to produce specific aggregate estimates including total credit market debt.

Box 4. A brief overview of seasonal adjustment

Seasonal adjustment is a technique that aims to identify, estimate and remove seasonal variations in a time series. These variations result from the effects of institutional and climatic factors and are expected to reoccur at the same time of the year with similar intensities. Seasonally adjusted time series contains the trend cycle and irregular components. This provides an approximate idea of the underlying changes in trends and facilitates the analysis of short-term dynamics.

For more information on seasonal adjustment: Seasonally adjusted data – Frequently asked questions

Box 5. An Overview of the Financial and Wealth Accounts

The Financial and Wealth Accounts comprises the National Balance Sheet Accounts (NBSA), the Financial Flow Accounts (FFA), and the other changes in assets account (OCAA). These accounts cover the entire economy and directly align with the internationally recognized national accounting principles detailed in the United Nations System of National Accounts compilation manual (SNA 2008).

The NBSA are composed of the balance sheets of all sectors and subsectors of the economy. The main sectors are households, non-profit institutions serving households, financial corporations, non-financial corporations, government and non-residents. The NBSA cover all national non-financial assets and all financial asset-liability claims outstanding in all sectors. To improve the interpretability of data on debt, selected household borrowing series are available on a seasonally adjusted basis. All other data are unadjusted for seasonal variation. For information on seasonal adjustment, see Seasonally adjusted data – Frequently asked questions.

The FFA articulate net lending or borrowing activity by sector by measuring financial transactions in the economy. The FFA arrives at a measure of net financial investment, which is the difference between transactions in financial assets and liabilities (for example, net purchases of securities less net issuances of securities). The FFA also provide the link between financial and non-financial activity in the economy, which ties estimates of saving and non-financial capital acquisition (for example, investment in new housing) to the underlying financial transactions.

While the FFA record changes in financial assets and liabilities between opening and closing balance sheets that are associated with transactions during the accounting period, the value of assets and liabilities held by an institution can also change for other reasons. These other types of changes, referred to as other economic flows, are recorded in the other changes in assets account.

There are two main components to this account. One is the other changes in the volume of assets account. This account includes changes in non-financial and financial assets and liabilities relating to the economic appearance and disappearance of assets, the effects of external events such as wars or catastrophes on the value of assets, and changes in the classification and structure of assets. The other main component is the revaluation account, showing holding gains or losses accruing to the owners of non-financial and financial assets and liabilities during the accounting period as a result of changes in market price valuations.

Additional information

Definitions concerning financial indicators can be found in Financial indicators from the National Balance Sheet Accounts and in the Canadian System of Macroeconomic Accounts glossary.

The *User Guide: Canadian System of Macroeconomic Accounts* (13-606-G) is available.

The *Methodological Guide: Canadian System of Macroeconomic Accounts* (13-607-X) is available.

The data visualization product “Financial accounts on a from-whom-to-whom basis, selected financial instruments,” part of *Statistics Canada—Data Visualization Products* (71-607-X), is now available.

The *Latest Developments in the Canadian Economic Accounts* (13-605-X) is available.

The Economic accounts statistics portal, accessible from the *Subjects* module of our website, features an up-to-date portrait of national and provincial economies and their structure.

Appendix A
Concordance between the Bank of Canada's and Statistics Canada's monthly credit programs

Table A1
A concordance between the Bank of Canada's and Statistics Canada's monthly credit programs

	Monthly Credit Aggregates (MCA) vector		Monthly Credit Program (MCP) vector	
	Not seasonally adjusted	Seasonally adjusted	Not seasonally adjusted	Seasonally adjusted
Credit liabilities of households				
Non-mortgage loans	V1231415568	V1231415611	V122698	V122707
Chartered banks	V1231415569	V1231415612	V122700	V122709
Personal loans	V1231415570	V1231415613	...	...
Credit cards	V1231415571	V1231415614	V36868	...
Lines of credit	V1231415572	V1231415615	V36869	...
Of which: lines of credit excluding HELOCs	V1231415573	V1231415616	...	...
Other personal loans	V1231415574	V1231415617	V36870	
Unincorporated business	V1231415575	V1231415618	...	...
Non-banks	V1231415576	V1231415619	V122611009	V122611010
Government	V1231415604	V1231415647	...	...
Non-bank financial corporations	V1231415605	V1231415648	...	...
Credit unions and caisse populaires	V1231415606	V1231415649	...	...
Trust companies and mortgage loan companies	V1231415607	V1231415650	...	...
Financial vehicle corporations engaged in securitization	V1231415608	V1231415651	V122706	V122715
Other financial corporations not elsewhere included	V1231415609	V1231415652	...	...
Other lenders not elsewhere included	V1231415610	V1231415653	...	...
Mortgage Loans	V1231415577	V1231415620	...	...
Residential Mortgages[1]	V1231415578	V1231415621	V122736	V122746
Chartered banks[1]	V1231415579	V1231415622	V122738	V122748
Non-banks[1]	V1231415580	V1231415623	V122611011	V122611013
Government	V1231415599	V1231415642	...	...
Non-bank financial corporations	V1231415600	V1231415643	...	...
Of which: financial vehicle corporations engaged in securitization[1]	V1231415601	V1231415644	V122611012	V122611014
Of which: off balance-sheet NHA-MBs[1]	V1231415603	V1231415646	V122744	V122754
Other lenders not elsewhere included	V1231415602	V1231415645	...	...
Non-residential mortgages[1]	V1231415581	V1231415624	V105926374	...
Chartered banks[1]	V1231415593	V1231415636	V122656	...
Non-banks[1]	V1231415594	V1231415637	V122611006	V122611007
Government	V1231415595	V1231415638	...	...
Non-bank financial corporations	V1231415596	V1231415639	...	...
Of which: financial vehicle corporations engaged in securitization[1]	V1231415597	V1231415640	V122655	...
Other lenders not elsewhere included	V1231415598	V1231415641	...	...
Total credit liabilities of households	V1231415582	V1231415625	V36408	V36415
of which: real estate secured lending	V1231415583	V1231415626	...	...
Residential mortgages	V1231415584	V1231415627	...	...
Chartered banks	V1231415585	V1231415628	...	...
Non-banks	V1231415586	V1231415629	...	...
Non-residential mortgages	V1231415587	V1231415630	...	...
Chartered banks	V1231415588	V1231415631	...	...
Non-banks	V1231415589	V1231415632	...	...
Home equity lines of credit	V1231415590	V1231415633	...	...
Chartered banks	V1231415591	V1231415634	...	...
Non-banks	V1231415592	V1231415635	...	...

Table A1
A concordance between the Bank of Canada's and Statistics Canada's monthly credit programs

	Monthly Credit Aggregates (MCA) vector		Monthly Credit Program (MCP) vector	
	Not seasonally adjusted	Seasonally adjusted	Not seasonally adjusted	Seasonally adjusted
Credit liabilities of private non-financial corporations				
Non-mortgage loans	V1231415654	V1231415688	V105926373	...
Chartered banks	V1231415655	V1231415689	V122631	V122645
Of which: bankers acceptances	V1231415656	V1231415690	...	...
Non-banks	V1231415657	V1231415691	V122611004	V122611005
Government	V1231415681	V1231415715	...	...
Non-bank financial corporations	V1231415682	V1231415716	...	...
Credit unions and caisse populaires	V1231415683	V1231415717	...	...
Trust companies and mortgage loan companies	V1231415684	V1231415718	...	...
Financial vehicle corporations engaged in securitization[1]	V1231415685	V1231415719	V122653	...
Other financial corporations not elsewhere included	V1231415686	V1231415720	...	...
Other lenders not elsewhere included	V1231415687	V1231415721	...	...
Mortgage loans	V1231415658	V1231415692	...	...
Residential[1]	V1231415659	V1231415693	V122736	V122746
Chartered banks[1]	V1231415660	V1231415694	V122738	V122748
Non-banks[1]	V1231415661	V1231415695	V122611011	V122611013
Government	V1231415676	V1231415710	...	...
Non-bank financial corporations	V1231415677	V1231415711	...	...
Of which: financial vehicle corporations engaged in securitization[1]	V1231415678	V1231415712	V122611012	V122611014
Of which: off balance-sheet NHA-MBS[1]	V1231415680	V1231415714	V122744	V122754
Other lenders not elsewhere included	V1231415679	V1231415713	...	...
Non-residential[1]	V1231415662	V1231415696	V105926374	...
Chartered banks[1]	V1231415670	V1231415704	V122656	...
Non-banks[1]	V1231415671	V1231415705	V122611006	V122611007
Government	V1231415672	V1231415706	...	...
Non-bank financial corporations	V1231415673	V1231415707	...	...
Of which: financial vehicle corporations engaged in securitization[1]	V1231415674	V1231415708	V122655	...
Other lenders not elsewhere included	V1231415675	V1231415709	...	...
Debt Securities	V1231415663	V1231415697	...	...
Short-term instruments	V1231415664	V1231415698	V122652	V4427861
Long-term instruments	V1231415665	V1231415699	V122640	...
Equity Securities	V1231415666	V1231415700	...	...
Listed shares and warrants	V1231415667	V1231415701	V122642	...
Trust units	V1231415668	V1231415702	V20638380	...
Total credit liabilities of private non-financial corporations	V1231415669	V1231415703	V122643	V122647

... not applicable

1. Split across household and business

Source: Statistics Canada, "A guide to the Monthly Credit Aggregates", *Latest Developments in the Canadian Economic Accounts* (13-605-X), 2020.