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Latest Developments in the Canadian Economic Accounts

Revisions analysis - National Balance Sheet Account 2012

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.. not available for a specific reference period
... not applicable
0 true zero or a value rounded to zero
0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p} preliminary
^{r} revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E} use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)

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Revisions analysis - National Balance Sheet Account 2012

This article is the ninth of a series of articles which have been prepared to help users understand the changes introduced as a result of the historical revision of the Canadian System of National Accounts (CSNA12)—due to the implementation of the new international standards published in *System of National Accounts 2008* (SNA2008).

This article provides users with a broad summary of the conceptual, methodological and statistical revisions that have been made to Canada's National Balance Sheet Accounts (NBSA). The article first traces the revisions by asset or liability category and then examines the impact these revisions had on the net worth and other important macro-economic aggregates and ratios for the various sectors of the Canadian economy. The tables referred to within this article are the National Balance Sheet Accounts tables as they appear on CANSIM.

Throughout this paper, the term NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012) is used. This refers to the vintage of the National Balance Sheet Accounts that were released on October 15th, 2012. This includes data from the first quarter of 1990 to the second quarter of 2012. NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012) is based on the *System of National Accounts 2008* (SNA 2008) international standard. Also used is the term NBSA (National Balance Sheet Accounts)97, which refers to the vintage of NBSA (National Balance Sheet Accounts) that were last released on June 14th, 2012, which included data from 1990 to the first quarter of 2012 on a quarterly basis and 1961 to 2011 on an annual basis. NBSA (National Balance Sheet Accounts)97 is based on the *System of National Accounts 1993* international standard.

The changes incorporated with NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012) have yet to be implemented for years prior to 1990. That work is on-going and Statistics Canada intends to release, at a later date, a consistent annual market value time series for the period 1970 to 1989.

Non-financial assets

NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012) introduced five significant changes to the nation's measure of non-financial assets and thus national wealth. These include:

1. The capitalization of research and development activities.
2. The capitalization of military weapons systems.
3. Improved valuation of the corporate sector's non-financial net stock.
4. Improved valuation of the government sector's non-financial net stock.
5. Utilization of new source data in valuing the residential net stock.

The first change involved the capitalization of research and development activities. One of the provisions in SNA2008 (System of National Accounts 2008) is the expansion of the capital boundary to include research and development activities. The implementation of this change increased the stock of non-financial assets for the corporate, non-profit institutions serving households and government sectors.

Prior to NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012), business expenditures on research and development were treated as intermediate expenditures. Government expenditures on research and development were treated as current expenditures. As such, a stock of capital for these investments was not estimated. SNA2008 (System of National Accounts 2008) recognizes that research and development activities represent an investment made by businesses and government that are used in the production of goods and services for more than one year (SNA2008 (System of National Accounts 2008) 10:32).

In addition to the new stock estimates for research and development, the presentation of non-financial assets has also changed. A new non-financial asset category has been created, called intellectual property products, which includes the stock of mineral exploration, software and research and development. Mineral exploration was previously included in the stock of non-residential non-financial assets and software was previously included in the stock of machinery and equipment non-financial assets.

Similar to government research and development, military weapons systems were treated as government final consumption expenditures on goods and services under NBSA (National Balance Sheet Accounts)97. SNA2008 (System of National Accounts 2008) proposes that "expenditures on military equipment, including military weapons systems, [be] treated as fixed capital formation." (SNA2008 (System of National Accounts 2008) 6:232). The value of the stock of military weapons systems is not large, but it is an important step forward in ensuring international comparability with other countries, such as the United States.

Although NBSA (National Balance Sheet Accounts) anticipated the guidelines of SNA1993 (System of National Accounts 1993) and SNA2008 (System of National Accounts 2008) by estimating corporate non-residential, and machinery and equipment stock values at replacement cost, these assets were valued using a linear rate of depreciation. Under NBSA (National Balance Sheet Accounts)12 the stock is now valued using geometric rates of depreciation to align with the recommendations of SNA2008 and to more accurately reflect observed declines in fixed asset prices over time. This change decreased the value of the stock of the corporate sector's non-financial assets from $2.4 trillion to $2.2 trillion.

Similarly, while the government sector's non-financial assets were also largely valued at replacement cost within the NBSA (National Balance Sheet Accounts), the stock of non-residential, and machinery and equipment capital was derived using a linear rate of depreciation. A geometric method of depreciation is now used which better reflects the observed decline of fixed asset prices through time from usage, and aligns with international practices.

The final change that impacted the estimate of the nation's wealth is the new data sources and price information used to estimate residential stock. Over the last number of years Statistics Canada has been able to exploit commercially available residential real estate price indexes which reflect the movement in the prices of existing homes. In the past, the main price input used to determine the replacement value of the residential stock was the New Housing Price Index (NHPI). The new, more comprehensive information resulted in a revision to the residential stock.

Table 1 compares Canada's national wealth as published under NBSA (National Balance Sheet Accounts)97 and NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012). Overall, national wealth was revised down by $25 billion in 2011.

On October 1st, 2012, Canada's net foreign debt was also historically revised. This revision had an impact on Canada's national net worth. Table 1 shows the revision to national net worth and national net worth per capita, decomposed into revisions to national wealth and net foreign debt. Overall, national net worth decreased by $64 billion. On a per capita basis, national net worth decreased from $190,200 to $188,300.

Table 1: Revisions to Canada's national wealth and national net worth

	NBSA (National Balance Sheet Accounts)97 - 2011	**NBSA (National Balance Sheet Accounts)12** - 2011	Difference
National wealth, $billions	6,830	6805	-25
Canada's net foreign debt, $billions	237	277	40
National net worth, $billions	6,593	6,529	-64
National net worth per capita, $	190,200	188,300	-1,900

Financial assets or liabilities

One of the basic accounting principles within the NBSA (National Balance Sheet Accounts) is the premise that financial assets equal financial liabilities. This means that the occurrence of financial assets or liabilities in and of themselves cannot change the national wealth, but rather only transfer wealth from one sector to another. As such, when discussing revisions to financial assets and liabilities only the revision to a given category need be mentioned, since the revision is applicable to both the asset and liability side of the balance sheet.

There are four main types of changes to the financial asset or liability categories in the NBSA (National Balance Sheet Accounts). These include:

1. Improved methodology,
2. Improved classification,
3. Improved valuation of unlisted shares,
4. Statistical revisions resulting from improved data sources.

Improved methodology

A revised methodology was adopted with this revision in the construction of estimates of financial assets and financial liabilities in the national balance sheet accounts.

Prior to NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012) the stock estimates contained in the national balance sheet accounts were largely estimated by accumulating flow of financial assets and liabilities as recorded in the financial flow accounts. This was because the financial flow accounts pre-dated the balance sheet accounts and therefore were the only comprehensive source of information that could be used to derive the stock estimates. Prior to the establishment of Statistics Canada quarterly national balance program in June 2003, the financial flow accounts were linked to an annual balance sheet. This method is consistent with the method used in financial accounting and represents the linkage between the income statement and the balance sheet.

With NBSA12, (National Balance Sheet Accounts that were released on October 15th, 2012) quarterly time series of stock estimates from source data were obtained and incorporated into the national balance sheet accounts. In a number of cases the estimate derived by accumulating the financial flows differed from the stock estimate as reported in the source data. The result is a relatively large revision to certain categories of financial assets and financial liabilities including mortgages, mutual funds, cash and deposits and life insurance and pensions. In addition to the revision resulting from the change in methodology, additional revisions were as a result of new and improved data sources.

Improved classification

An updated classification of financial assets or liabilities has been implemented with NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012). The classification more closely reflects the classification proposed by the international SNA2008 (System of National Accounts 2008) standard. The main changes include:

Corporate claims: Under NBSA97 corporate claims were presented as a single category and represented an aggregation of inter-company loans and inter-company equity holdings. With NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012), corporate claims have been decomposed into inter-company loans and inter-company equity and assigned to the respective loans and equity categories.

Government claims: Similar to corporate claims, government claims are now separated into loans and equity, with each component being assigned to the appropriate loan or equity category.

Foreign investment: Foreign investment can take various forms. Under NBSA97 all types of foreign investment were aggregated and presented under a single category called foreign investment. With NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012), foreign investment is now separated into three components—short-term paper, bonds and equity and grouped in their respective categories.

Equity: Previously, equity was presented as a single category on the national balance sheet under the category "shares". NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012) presents a substantial improvement, in that equity is now broken into five categories:

- Listed shares
- Unlisted shares
  - Of which: corporate claims: equity
- Mutual fund shares (units)

- Government claims: equity
- Foreign investments: equity

Improved valuation of unlisted shares

The SNA2008 (System of National Accounts 2008) standard proposes that financial "assets and liabilities [be] recorded at current values at the time to which the balance sheet relates, not at their original valuation." (SNA2008 (System of National Accounts 2008) 2:60). In other words, the value of assets and liabilities on the national balance sheet must reflect the current market value for these assets and liabilities. Statistics Canada has been producing a market value balance sheet since 2003, and while the majority of the marketable assets and liabilities were at market value, unlisted shares and foreign equity direct investment were still at book value. With the implementation of NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012), both the unlisted shares and foreign equity direct investment for large firms are now valued at current market value. The valuation is consistent with the valuation of unlisted shares included in the direct investment estimates of the International Investment Position which was released on October 1st, 2012.

Given that these unlisted shares are not traded on the market, and therefore a directly observable market prices does not exist, the market price must be estimated. The most widely-accepted methodology in the international standards will be used to make this change—the recent transaction price and the market capitalization approach. This approach is only used to value the equity of large unlisted firms as their equity is most similar to that of firms which trade on the market and it can be argued that they could easily go to the market for equity funding.

The market capitalization approach amounts to using capitalization ratios (market value over book value) derived from listed companies, and applying these to the book value equity estimates of unlisted companies, with exceptions for specific cases (e.g. (for example), small companies, specific sectors). The steps, in brief, are as follows:

1. If a subsidiary is a listed company, the market value to book value ratio of the listed subsidiary will be used to derive the market value.
2. If a company is not listed then it will first be determined if the investment level is above a certain threshold; if it is not, then the market value will be set equal to the book value. If the level of investment is significant, research will be undertaken to determine if there has been any recent merger or acquisition activity and this information will be used to determine the market value. If there is no recent merger or acquisition activity, or if there is no other information available, then an industry average book-to-market value ratio will be applied to the equity to derive the market value.

Moving all equity to a market value will provide a more accurate picture of the value of assets and liabilities across all sectors of the economy as well as for the International Investment Position. It will have a tendency to increase the net worth of the household sector since a significant portion of this equity is ultimately held by this sector.

The move to market valuation of foreign direct investment equity and unlisted equity investment has a significant impact on the value of equity within the national balance sheet program.

Statistical revisions

There were a number of statistical revisions made to various financial asset or liability categories in the national balance sheet. The majority of these revisions were due to the use of new source data. In the past, a large amount of the back-period stock information was constructed using financial flow information. With NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012), a different approach was taken, in which the stocks were constructed first using available source data—resulting in revisions not only to the stocks but also to the financial flows and Other Changes in Assets Account.

The following outlines some new sources of information that were used in constructing the National Balance Sheet Accounts and the categories these impacted:

1. A new methodology was used to allocate residential mortgages among the household and corporate sectors. Currently, Statistics Canada receives high quality information on the total value of residential mortgage assets held by financial institutions. A previous allocation method of these mortgages as liabilities resulted in approximately 12% of these being allocated as corporate liabilities, such as mortgages on corporately owned apartment buildings. The remainder was allocated to household as liabilities for residences. A closer examination of the methodology and improved source data indicate this split should be closer to 8% to corporate liabilities and 92% household liabilities. This significantly increased the level of mortgage debt held by households.
2. Updated estimates of mutual funds were developed using commercial data sources. This impacted not only the mutual fund sector but the assets in the household sector.

3. A non-mortgage bank loan liability report supplied by the chartered banks was used to better allocate non-mortgage bank loans by sector. A deposit return is similarly used to allocate deposits.
4. The trade payables liability in the household sector and the private non-financial corporations' sector were aligned with the trade receivable estimates in the quarterly financial statistics program.
5. The majority of deposit (Canadian currency and foreign currency) information is obtained from chartered bank returns submitted to Statistics Canada. Deposits within the SNA classification includes cash deposits, bearer deposit notes and covered bonds. Under NBSA97 all bearer deposit notes were allocated to the private non-financial corporations sector. With NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012), this allocation method has been updated, as some of the bearer deposit notes are now being allocated to other sectors of the economy, mostly institutional investors in the financial sector.
6. The holdings of treasury bills in the household sector were revised down from 1990 to 1996. Estimates of Treasury bill holdings as reported on the 1999 and 2005 Survey of Financial Security indicated that the previous estimate of household holdings of Treasury bills was too high and the estimates were revised downward to bring the data more in line with the household survey estimates.
7. Statistics Canada obtains issuer-by-issuer commercial paper information on a monthly basis. This information is used to establish benchmark estimates on commercial paper liabilities for certain sectors of the economy such as the private non-financial corporation sector.

Revisions to financial indicators

There are a number of financial indicators that emanate from the National Balance Sheet Accounts. "Financial indicators can be used to monitor the soundness, stability and performance of the economy. Their usefulness lies in their ability to highlight the relationships among such things as debt, assets, liabilities, net worth, incomes and output. While each of these series provides insight into aspects of the economy, together they provide a broader and different perspective." (from *Financial indicators from the National Balance Sheet Accounts*).

Two key household financial indicators underwent substantial revision with the implementation of both CSNA12 and NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012)—the household credit market debt to income ratio and the credit market debt to net worth ratio. These indicators were also revised due to improved sectoring in the NBSA, with non-profit institutions serving households being removed from the household sector and published as a distinct sector. In addition, the implementation of SNA 2008 (System of National Accounts 2008) in the Current and Capital Accounts resulted in a redefinition of household disposable income—further affecting household financial indicators constructed using household disposable income.

Household credit market debt for 2011 was revised up $13 billion, while the new measure of household disposable income was $53.1 billion below the previous measure. This resulted in an upward revision to the credit market debt to income ratio in 2011 from 150.6 to 161.7.

Similarly, the household debt service ratio was revised as a result of a change to household disposable income. The previous household debt service ratio was 7.31 for 2011, with CSNA12 the ratio now sits at 7.62.

While the credit market debt to income ratio was revised up, the credit market debt to net worth ratio was revised downward. The move to market valuation of unlisted equity helped increase overall household net worth by approximately $108 billion. This more than offset the increase in credit market debt, resulting in a downward revision to the credit market debt to net worth ratio.

A key indicator for the government sector is the ratio of net debt to gross domestic product. CSNA12 resulted in a level shift upward in gross domestic product, mainly as a result of the capitalization of research and development and new valuation methods related to the consumption of fixed capital in the government sector. The NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012) revision resulted in an upward revision to government net debt. The upward revision in government net debt was larger than the upward revision in GDP (Gross domestic product) resulting in an overall upward revision in the ratio of government net debt to gross domestic product.

Similarly, NBSA12 (National Balance Sheet Accounts that were released on October 15th, 2012) resulted in a revision to corporate credit market debt and equity (both expressed at book value). Credit market debt increased from $845.6 billion to $912.5 billion, while the value of their equity increased from 1.56 trillion to 1.69 trillion. As a result, the credit market debt to equity ratio was revised to 53.9% whereas it stood at 54.1% prior to the revision.

Chart 1
Credit market debt to household disposable income

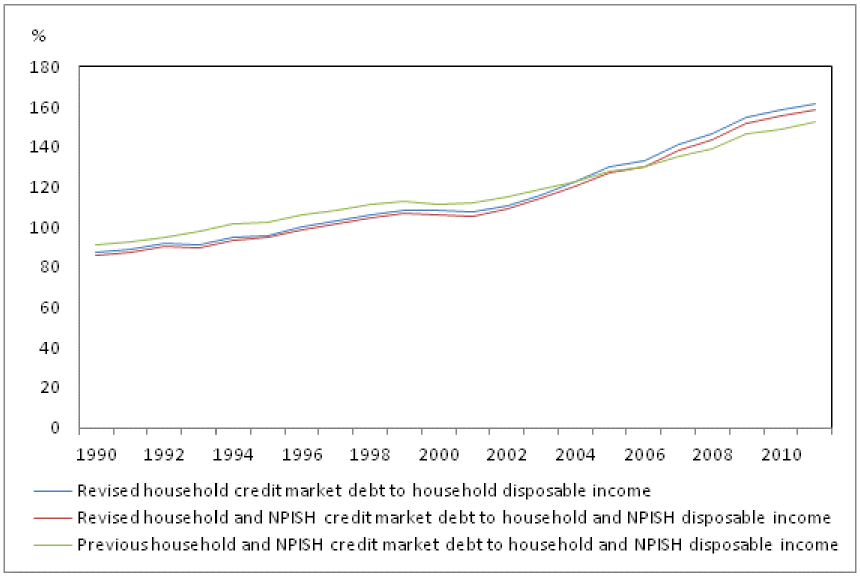

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Chart 2
Household debt service ratio

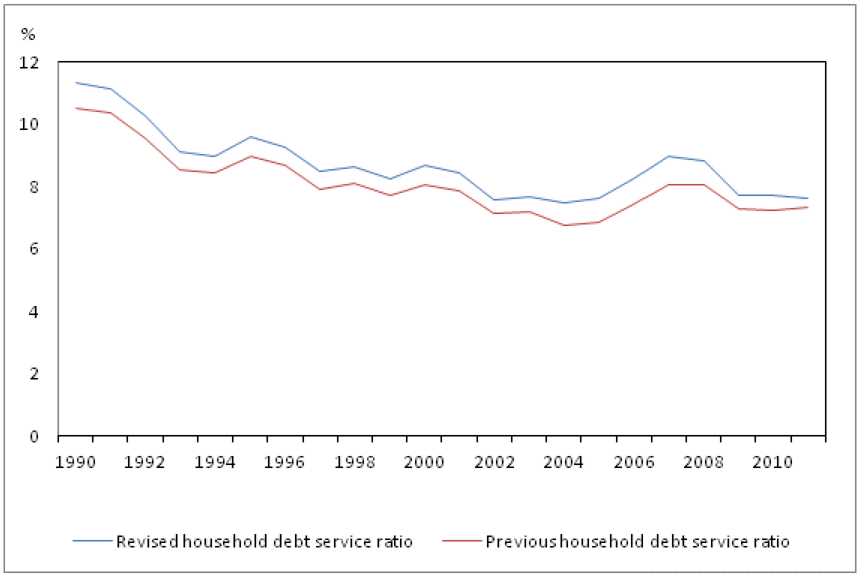

Chart 3
Credit market debt to net worth

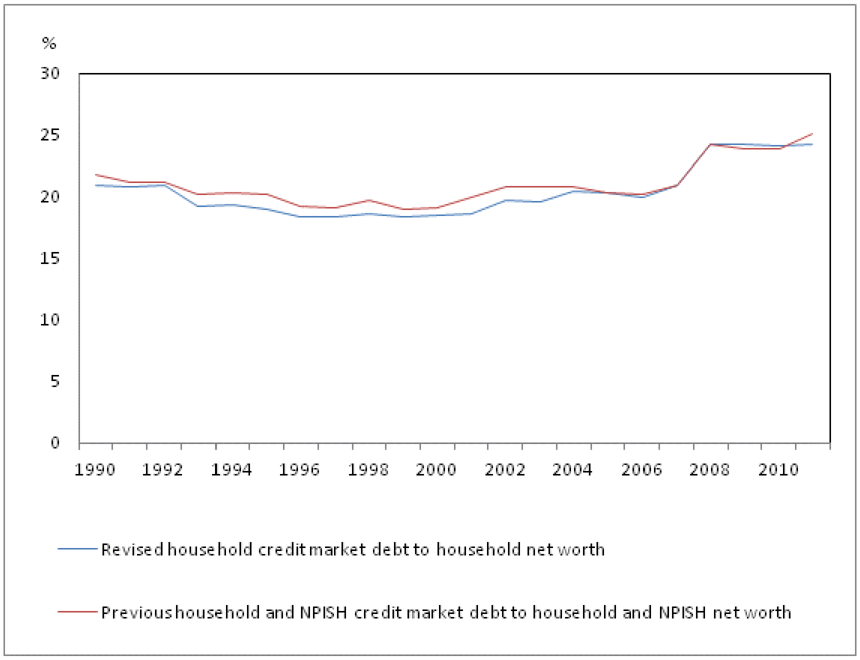

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Chart 4
Government net debt to gross domestic product