Measuring the stock of residential real estate

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Standard table symbols

The following symbols are used in Statistics Canada publications:

.   not available for any reference period
..   not available for a specific reference period
... not applicable
0   true zero or a value rounded to zero
0s   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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Background

Canada's national balance sheet account (NBSA) is an important component of Canada's System of National Accounts. The NBSA (national balance sheet account) records the value of the stock of physical and financial assets and the value of financial liabilities for about 25 different sectors. The difference between a sector's assets and liabilities is its net worth.

Residential real estate is the largest non-financial asset in the household sector in the NBSA (national balance sheet account), accounting for more than 80% of non-financial assets in the household sector and over 45% of total national wealth in 2011. Given its importance and the impact that it has on measuring Canada's national net worth and the net worth in the household sector, it is critical that the value of residential real estate on the NBSA (national balance sheet account) accurately reflects current market value. The value of residential real estate plays an important role in how households perceive their wealth, and that perception impacts decisions regarding household consumption, saving and investment.

Chart 1
Residential real estate as a share of total non-financial assets – Household sector
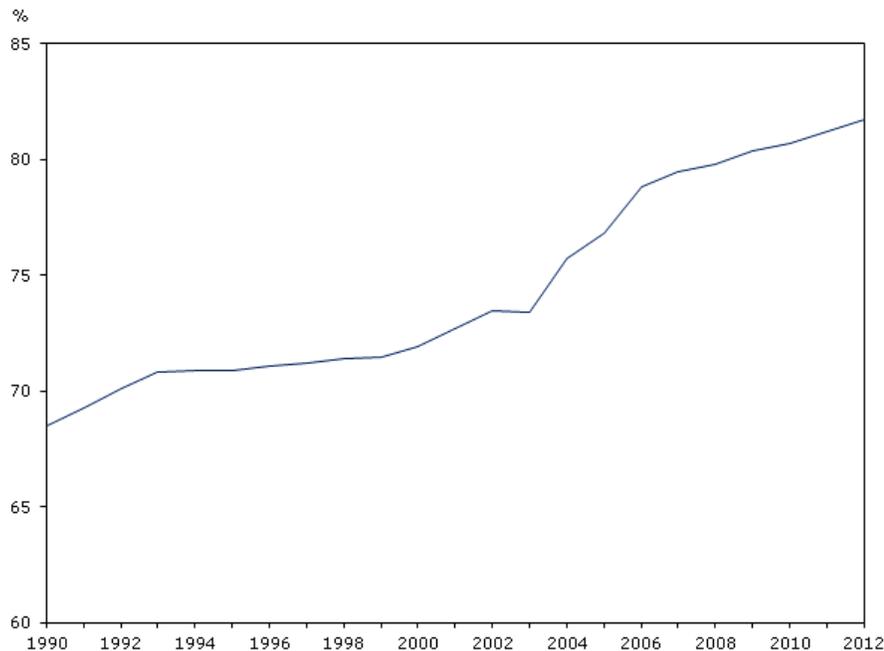
There are many different ways to measure the value of residential real estate. Values can be derived via surveys or administrative data, or developed using models. The result can be quite different, depending on the method chosen.

Over the last number of years, Statistics Canada has worked to develop a methodology to derive estimates of the value of residential real estate using property assessment files received from provincial or territorial assessment entities across Canada. These estimates differ from the current estimates contained in the NBSA (national balance sheet account). This note outlines the different ways to measure the value of the stock of residential real estate, compares the different methods and provides guidance to users as to when they should use a particular estimate.

Alternative ways of measuring the stock of residential real estate

Perpetual inventory method

Statistics Canada's current approach to estimating the value of the housing stock is based on the perpetual inventory method (PIM). The perpetual inventory method uses investment flows, asset lives, asset prices and assumptions regarding methods of depreciation to develop estimates of the market value of residential real estate.[1] This method is widely used around the world and is the recommended approach in the Organisation for Economic Cooperation and Development (OECD) handbook on measuring capital stock. The PIM (perpetual inventory method) is a method of constructing estimates of capital stock and consumption of fixed capital from a time series of investment flows. It allows an estimate to be made of the stock of fixed assets in existence and in the hands of producers, which is generally based on estimating the current market value of the fixed assets created as a result of investment undertaken in previous years that remain productive in the current period.

The PIM (perpetual inventory method) has many advantages from a national economic accounting perspective. It ensures coherence among the investment flows, consumption of fixed capital, and stock of assets. If these were each estimated separately, inconsistencies could occur in the Canadian System of National Accounts. For example, if the investment flows were estimated using survey information, depreciation estimated using business tax returns, and the capital stock estimated via administrative records, there are no assurances that the investment flows and depreciation would be reflective of the estimate of net stock.

Using the investment flows and estimates of service lives and profiles of depreciation, and incorporating these into a model which generates an estimate of the net capital stock, provides a closed system which is useful from a national accounting perspective. The closed system ensures coherence among investment, depreciation and wealth—all important components of the System of National Accounts.

While the PIM (perpetual inventory method) is a useful way to develop estimates of net capital stock, the quality of the estimates depends on the inputs that enter the model. If the investment flows, profiles of depreciation, estimates of the services lives or price indexes used in the model are of a lesser quality, the result will be a poor measure of net capital stock. The inputs in the PIM (perpetual inventory method) model in Canada are assumed to be high-quality estimates. The investment flows for new housing are taken from building permits and information about housing starts obtained from the Canada Mortgage and Housing Corporation (CMHC). Work-put-in-place coefficients are then used to spread the value of housing starts over the construction period. Estimates of renovations and ownership transfer costs are added to the new housing investment flow to obtain an estimate for total residential investment. The primary price index used is the new housing price index. The use of the new housing price index does pose a problem, since the assumption is the price of existing houses move in the same direction and magnitude as new houses.

This is not to say that the PIM (perpetual inventory method) is the only way to produce a measure of a country's net residential stock, nor that it is the most appropriate. This depends on the user's needs and the context of the analysis. If the user is trying to relate the residential stock data to other macro-economic measures (such as investment flows), the PIM (perpetual inventory method) model estimates are appropriate. If, however, the user is forecasting estimates of property taxes or analyzing trends in the real estate industry, then estimates based on alternative sources may be more appropriate.

Survey approach

As noted above, there are a number of different ways to derive a value for a country's stock of residential real estate. One method is to survey households and ask them to provide an estimate of the current market value of their real estate assets. Statistics Canada currently collects this information on a periodic basis through both the National Household Survey (NHS) and the Survey of Financial Security (SFS). For example, the 2011 NHS (National Household Survey) posed the following question to Canadian households, "*If you were to sell this dwelling now, for how much would you expect to sell it?*" The 2011 SFS (Survey of Financial Security) posed a similar question to households, "*How much would this property sell for today?*"

Results for both the 2011 NHS (National Household Survey) and 2012 SFS (Survey of Financial Security) will be released in the next year. Each will provide an estimate of the market value of residential real estate (land and buildings) in Canada. These estimates could vary from the estimates contained on the NBSA (national balance sheet account) for a number of reasons. First, the results could be influenced because they are based on a household's self-assessment of the current market value of their residence. If the homeowner is unaware of the current real estate market, the estimate may be very different from the actual value that would be received if the property were actually sold. Secondly, the estimates produced by the NHS (National Household Survey) will differ from the SFS (Survey of Financial Security) because the NHS (National Household Survey) asks only for a value of the principal residence, while the SFS (Survey of Financial Security) also asks for an estimated value of the respondent's additional property. The implication is that the NHS (National Household Survey) value will be a subset of the SFS (Survey of Financial Security) value.

While coverage represented by the SFS (Survey of Financial Security) is consistent with the coverage included in the NBSA (national balance sheet account), the fact that the valuation is a homeowner's estimate and not an objective valuation provided by a real estate expert, a model or an actual transaction price means that the data are subject to a large variance.

Residential property value assessment

In 2004 Statistics Canada began receiving property value assessment files from Canadian provinces and municipalities. These files contain the current assessed value of all properties in all provinces across Canada, the year the assessment was made, the type of property, and other related variables, for both residential and non-residential properties.

It is therefore possible to use these files to derive a market value for the stock of residential real estate in Canada. The coverage of the file is mostly consistent with the coverage as defined in the NBSA (national balance sheet account) because it includes not only single and multi-family properties, but also farm residences, cottages and vacation homes, mobile homes, institutional and communal residences and vacant lands designated for residential purposes.

Generally, there are three methods that can be used when assessing the market value of a property.

1. **Cost approach.** The cost approach is based on the idea that the value of an existing property is the value of the land plus the replacement cost of the structure.

2. **Sales comparison approach.** The sales comparison approach uses sales prices as evidence of the value of similar properties. The sales comparison approach is most suitable when there are sufficient sales of similar properties.

3. **The income approach.** The income approach is used to estimate the rental income from a property and capitalize it into an estimate of present value.

The sales comparison approach is used by assessment authorities in Canada for residential properties where the re-sale market is active. This is done using a hedonic regression model, where the sales price is the dependent variable and a series of physical characteristics are the explanatory variables.

The traditional cost approach is used for other types of properties, where re-sale or leasing markets rarely exist, or rental income data are difficult to collect.

The main challenge associated with developing estimates of the stock of residential real estate from property value assessment files is to ensure the assessments reference the same point in time. The timing of the assessments varies from province to province. Since a point in time estimate is required, most assessments must be brought forward or backwards using various modeling and estimation techniques. These modeling techniques are subject to variance and, depending on the length of time between the assessment date and the reference date, the level of price and volume adjustment can be significant. For a detailed description of these modeling techniques see "National Database of Residential Property Value Assessment." (Statistics Canada, December 2010).

The following tables compare various estimates of the value of the stock of residential real estate. The first table compares the NBSA (national balance sheet account) with the latest vintages of the SFS (Survey of Financial Security). The second table compares the NBSA (national balance sheet account) with the values derived from the property assessment files. It should be noted that when comparing the NBSA (national balance sheet account) values to the SFS (Survey of Financial Security) and NHS (National Household Survey), only the stock held by the household sector is included.

Table 1
Comparison of NBSA (national balance sheet account) with latest vintages of SFS (Survey of Financial Security)

Year	Survey of Financial Security[1]	National Balance Sheet Account
	billions of dollars	
1999	1,514	1,169
2005	2,360	2,009

1. The SFS (Survey of Financial Security) estimates include some components that are not included in the NBSA (national balance sheet account) estimates such as foreign real estate holdings, vacant lots, domestic timeshare holdings and commercial properties held by households.

Table 2
Comparison of NBSA (national balance sheet account) with property assessment files

Year	Property assessment files	National Balance Sheet Account
	billions of dollars	
2006	2,328	2,317
2007	2,654	2,521
2008	3,082	2,620
2009	3,236	2,774
2010	3,324	2,918
2011	3,631	3,116

Conclusion

The new estimates of the value of residential real estate derived from property assessment files should not be seen as competing with the NBSA (national balance sheet account) estimates. They represent an alternative source and, depending on the analytical needs, may prove a very useful estimate. In addition to providing a national estimate, the property assessment-based estimates of the stock of residential real estate are also available by province and CMA (census metropolitan area). This is an additional analytical dimension not found within the NBSA (national balance sheet account).

The basic rule of thumb that should be used when determining which value of residential stock to use is as follows: if the analysis is in the context of other macro-economic variables, such as a comparison between residential and non-residential stocks, or between the stocks, investment flows and economic depreciation, it is more appropriate to use the data contained in the NBSA (national balance sheet account). The reason is that the estimates are constructed in a consistent and coherent manner.

If the analysis is of a more stand-alone nature, then either the survey based estimates or the estimates from the property assessment files may be more appropriate.

It should also be noted that the results of the work on the property assessment data will be used to refine the PIM (perpetual inventory method) based estimates in the National Balance Sheet Accounts. Currently, the NBSA (national balance sheet account) does not provide separate estimates of residential and non-residential land. Instead the NBSA (national balance sheet account) provides a total estimate of land (residential and non-residential grouped together). Similarly, the methodology for estimating land is dated and needs revision. The property assessment file provides an excellent source of information, which will help address these two issues.

Note

1. Note that the PIM (perpetual inventory method) model is only used to measure the value of the residential structures. A land to structure ratio is used to measure the value of residential land.