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Working Party on National Accounts

ESTIMATING HOUSEHOLDS' NON-FINANCIAL ASSETS

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Note by Canada

Background and scope

1. Canada produces a set of quarterly balance sheet accounts – ***National Balance Sheet Accounts*** (NBSA) – including non-financial asset estimates for all relevant sectors of the economy, with times series beginning in 1961. Balance sheet estimates are typically available about 75 days after the end of the reference period. For example, fourth quarter 2006 estimates were released on March 16th, 2007. The balance sheet accounts are integrated with, and released one day after, ***Canada's International Investment position***.

2. National wealth (non-financial assets) in the NBSA covers both produced and non-produced assets. Produced assets include non-residential structures (building construction and engineering construction), residential structures, machinery and equipment (software estimates are currently included here), inventories (both farm and non-farm) and consumer durables. Non-produced assets currently include developed land (including agricultural land, and land surrounding residential and non-residential structures) and selected natural resources (timber and sub-soil assets). National wealth is broken into non-financial assets down by institutional sector, for each component[1].

3. This sector and asset category breakdown encompasses the two key non-financial assets for households. However, the NBSA does not produce a household sector per se but rather an institutional sector called *Persons and Unincorporated Business*, which covers households, unincorporated business (including farms) and non-profit institutions serving households. It is relatively straightforward to identify the non-financial assets that are related to specifically to households within this broader sector ─ residential real estate and consumer durable stocks ─ though only the broader sector totals for each asset is currently published. Residential real estate will be broken down into structures and land in this short note.

Residential structures

Aggregate estimates

4. As with many countries, estimates of the total residential housing stock are constructed using the perpetual inventory method (PIM). PIM requires information about the value of investments, price indexes, average services lives of the capital, and the choice of a depreciation method. This method, which is a way of developing stock time-series, cumulates deflated capital expenditures and factors in depreciation to obtain real estimates of net residential stock for a given year[2]. Current dollar estimates are

[1] This is the case, with the exception of natural resources for which a national total exists.

[2] NBSA only currently only publishes national totals, but input data and regional housing stock estimates are available.

derived by applying a current price index[3]. The value of demolitions and destruction are also estimated and deducted from the housing stock estimates[4]. In Canada, the starting point is a stock estimate using the market value data provided by the 1941 Census. Any measurement issues with this benchmark estimate diminish over time, as the base period is left further behind. Service life assumptions are also based on Census data.

5. Investment flow data includes new construction, renovations (excluding repairs) and other fees associated with new residential building transactions. By definition, this includes the construction of new detached, single, semi-detached or double, row and apartment units as well as mobiles, cottages, conversions (creation of additional dwellings from non-residential or other types of residential buildings). This also covers renovations as well as the fees associated with all of these projects[5]. The value of investment is modelled using assumptions about starts and completions.

6. In Canada, a geometric rate is used to depreciate the residential stock. This single rate is set at 2% and does not change with the category of dwelling. The calculation of the depreciation and, later, of the value of residential stock in current and constant dollars requires the use of an implicit price index for housing. This implicit price index is calculated by dividing the gross fixed capital formation in current dollars by the gross fixed capital formation in constant dollars. Investment is deflated is deflated through a series of indices[6]. Renovations to existing dwellings are deflated through a special tailor-made index based on a series of costs[7].

Household residential housing stock

7. Once the total housing stock is established, the second measurement issue entails constructing sector estimates for this asset for use in the NBSA. Direct estimates of the marginal amounts of housing in government (military housing, native housing, post-secondary residences) housing in government are available. This leaves that task of allocating the housing stock held as assets in the private sector ─ that is, to business and households.

8. Housing stock data, by type and tenure (rented-owned, occupied, non-occupied), are used as the primary method to allocate housing between the corporate and persons and unincorporated business sector. The corporate sector ─ which holds the bulk of apartment buildings, significant proportions of row

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3 PIM yields current values, real estimates as well as estimates based on original costs (roughly equivalent to book value estimates).

4 The value of demolished dwellings comes from the Building Permit Survey. The number of permits issued for the demolition of residential units is collected from the municipalities. A value is established for demolished dwellings based on a portion of the average value that had been derived for the start-up units in the calculation of Gross Fixed Capital Formation. Dwellings destroyed by fire are also included in the calculation of this variable, based on the Annual Report of the Council of Canadian Fire Marshals and Commissioners.

5 This includes sales taxes, other closing fees, land developers and service fees, the fees for reviewing files for mortgage insurance purposes and the premium). The inclusion of these latter fees is designed to reflect the value of the investment to the final buyer.

6 New construction is deflated through the New Housing Price Index for single, semi-detached and row houses. The Apartment Building Construction Price Index is used for apartment construction.

7 This includes labour force costs and the prices of materials, weighted according to information obtained through surveys such as the Homeowner Repair and Renovation Expenditure Survey. Industry Price Indexes and Construction Union Wage Rate Index are also used. With the release of 2000 figures, the Investment and Capital Stock Division revised historical data using different price indexes for each province to deflate the annual residential stock.

housing, and minimal proportions of singles-doubles ─ is constructed first. Original cost estimates of corporate sector allocations are cross-checked against book value estimates for the real estate industries from the enterprise survey statistics[8].

9. The residual, by housing type, then becomes the estimate for published housing stock of the *Persons and unincorporated business sector*[9]. This is in line with the approach for sectoring of housing investment.

Land surrounding residential structures

Methodology

10. Land surrounding residential structures (increasing proportionally with a housing boom over most of the last 5 years, currently at about 70% of total land) – This comprises land surrounding various types of residential structures owned in the sectors of the economy, including: single family dwellings and multiple dwellings, including doubles, row houses and apartments.

11. Estimates are derived by applying land-to-structure ratios (LSR). LSR are calculated by looking at new building activity by type (singles or multiples) across the country. This includes regional estimates further broken down into census metropolitan areas (CMAs). The new activity consists of selecting three key details of all units sold in a year, of which the first two are: Building permit values (BPV) and absorption price value (APV). APV is the sale value of the total residential real estate unit. Building permit values are adjusted for under-reporting in the national accounts and this same adjustment factor is applied to the BPV for this exercise.

LSR = (APV-BPV)/BPV.

12. The third key detail is the physical address of the unit completed and sold. This allows for identification of whether a unit is in a suburban area of a major city (the vast majority of new units) or in the urban centres (very limited amount of infill). LSR are always higher in urban core areas, and a further adjustment is made to the L/S to account for the higher depreciation of older buildings in urban core areas. Census weights are then used to aggregate the LSR over CMAs and by region, such that an economy-wide LSR for singles and multiples are derived to apply to the estimates of residential housing stock.

13. This methodology provides estimates of land that vary by type of structure, by urban and suburban areas and by regions of the country.

Current projectors

14. The above-described approach is labour-intensive and APV come in with a delay, such that this detailed methodology is typically 3-4 years behind the current data, such that LSR are projected using a set of current indicators of real estate activity and prices. Nevertheless, reliability has not proven to be a problematic issue. These same current indicators, supplemented by quarterly real estate transfer costs, are used to develop quarterly LSR.

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8 Other methods, including actual data, are used to allocate the corporate sector estimate across the financial and non-financial corporations' sub-sectors. These methods are beyond the scope of this note.

9 Rental units, by type, are assumed to be unincorporated business housing stock.

Sectoring

15. Sector estimates are based on the sector composition of singles and multiples using the LSR. The higher proportion of single dwellings in the household sector makes for a larger LSR for that sector.

Residential real estate

16. In Canada, residential structures (produced asset) and land surrounding residential structures (NPA) are constructed separately and then added together to derive total residential real estate. This is not always the practice in other countries.

Macro-micro data

17. Macro-based estimates of household assets and liabilities have been developed internally for purposes of comparison with micro-based household asset and debt survey results. Notably, household sector macro estimates (the bulk of residential real estate) are very close to the independently-derived household asset-debt survey aggregated micro data estimates. A forthcoming technical paper will articulate the NBSA household sector assets and liabilities as a means of underlining the links between the micro-macro data.

18. Statistics Canada also has in progress ─ largely for federal-provincial equalization formula purposes ─ a project to evaluate municipal residential real estate assessment data. A secondary output result of this work may be to provide a second cross-check on the estimates of residential property in the NBSA.

Consumer durable goods

19. Time series estimates for the stock of consumer durables are also derived using the perpetual inventory method. This is the same methodology applied to the capital stock and housing estimates. Personal expenditure on consumer durable goods is cumulated to obtain stock estimates for a given year. This calls for information about the value of expenditures, price indexes, average service life assumptions and the choice of depreciation method. The perpetual inventory method essentially consists of adding investment flows to the capital stock for each year and subtracting depreciation. There is no benchmark opening stock. Rather quarterly expenditure data back to 1947q1 are used to build 1961q1 data, which is appropriate given that the longest average service life used is 14 years.

20. Average service lives are similar to those used in the U.S., with the exception of motor vehicles where a shorter life is used. Depreciation is calculated using straight line depreciation for all durables, except new automobiles and trucks, based on the average service life the good. For motor vehicles, depreciation is calculated using the geometric rate based on service lives. Implicit deflators for all commodities are data are taken directly from the national accounts databases for personal expenditure on goods and services.

21. There are no sectoring issues related to consumer durable goods, as there are all classified to household sector assets. However, it should be noted that leased automobiles are treated in the Canadian SNA as being effectively sold to individuals in personal expenditure, with corresponding borrowing flows. The rationale is two-fold: That the individuals typically lease the automobiles for a significant portion of the average service life; and, that upon lease termination, the vast majority of these are re-sold to individuals[10]. As a result, both individual purchases and leases of automobiles are included in the stock of

[10] In the very small percentage of cases where the motor vehicles are sold to business or exported, upon termination of lease, a negative adjustment is made to personal expenditures.

durable consumer goods in the household sector, along with the debt incurred to finance these items. Individuals have legal ownership of purchased vehicles and are considered to have economic ownership of leased vehicles.

Trends in household non-financial assets

Household net worth

22. Non-financial assets represent 43% of total assets of this sector, and as such contribute significantly to changes in household net worth. With a housing boom over most of the last 5 years, the driving force behind many quarters' changes in net worth has been additions to and revaluations of the stock of residential real estate.

23. Leverage with respect to accumulated debt related to residential real estate and consumer durables has not increased. The ratio of consumer credit and mortgage debt to household net worth has remained in the 18% range over the last 5 years, despite acceleration in borrowing over this period. This reflects, in part, the strong appreciation of both household non-financial and financial assets over this same period.

National wealth

24. Household non-financial assets (including consumer durables) account for a significant proportion of national wealth – specifically, 44% of economy-wide produced assets and land[11].

[11] That is, excluding natural resources.