



Wealth in Canada: Recent Developments in Micro and Macro Measurement

Catherine Van Rompaey (Statistics Canada)

Paper prepared for the 34th IARIW General Conference

Dresden, Germany, August 21-27, 2016

Session 2D: Household Wealth I

Time: Monday, August 22, 2016 [Afternoon]

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Acknowledgements

This paper reflects the work of the Financial and Wealth Accounts team, under the leadership of Emmanuel Manolikakis in Statistics Canada's National Economic Accounts Division. The author wishes to acknowledge the contributions of Kathryn Young for the material on the Annual Household Distribution Tables. Helpful input was also received from Shawna Brown, Matthew Hoffarth, Jo Ann MacMillan, John Nicoletta, Patrick O'Hagan and James Tebrake of Statistics Canada.

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I. Introduction

Monitoring household wealth is a key policy concern in Canada, with increased focus on questions such as the adequacy of the pension system, the potential effects of residential real estate bubbles and the sustainability of rising consumer debt. A number of initiatives have been put in place to strengthen national accounts measures and improve their timeliness, to refine the sectoring of households and to supplement core estimates with new indicators and satellite accounts. Most recently, funding has been secured for a triennial Survey of Financial Security, and plans are in place to integrate these data with estimates from the National Balance Sheet Account to produce regular timely distributional estimates in the Canadian national accounts. Macro measures of household assets, liabilities and net worth will be introduced by income quintile, age group, labour market status and household type in the context of broader distributional measures of disparities in income, consumption and saving.

This paper will begin with a two sections providing brief retrospectives on the measurement of household wealth in Canada from macro and micro perspectives, with a focus on developments that position the statistical program for planned micro-macro linkage activity. A third section will describe recent efforts to develop annual household distribution tables as an added dimension of Canada's macroeconomic accounts, including an overview of available data sources and preliminary methodology, implementation challenges and selected illustrative findings. It will conclude with project time frames and next steps.

II. Historical retrospective: Macro measures

The household sector in Canada's National Balance Sheet Accounts

National Balance Sheet Accounts (NBSA) were first released by Statistics Canada in the early 1980s, and covered non-financial assets, financial assets, liabilities and net worth for all sectors of the economy. Credit aggregates were later introduced, increasing the relevance and profile of the program. Improvements to timeliness in the early 1990s allowed for increased integration of the financial flows and balance sheets with the “real” accounts, and served as a precursor to integrated sector accounts later released as part of a comprehensive revision to the Canadian national accounts in 1997.

In the early 2000s, the frequency of NBSA and International Investment Position was increased from annual to quarterly, and the valuation of certain asset types, specifically tradable securities, was improved to better reflect market value. This change substantially improved measures of household wealth in terms of trend-cycle movements, accuracy and interpretability.

Pension Satellite Account

A new pension satellite account was released in 2010, detailing the private- and public-sector components of the Canadian pension system in a dynamic asset-stock/income-and-contribution-flow framework. The account was released as an extension to the National Balance Sheet and covers the entire universe of the retirement regime in Canada, including government-sponsored social security, employer-sponsored pension plans and individual, tax-sheltered registered saving plans. The Pension Satellite Account continues as part of the regular annual releases of the Canadian national accounts program, with a time series of stocks and flows on the Canadian retirement regime available back to 1990.¹ This change has led international progress in the recognition and disclosure of funded, underfunded and unfunded pension assets and liabilities.

Stock-flow matrix presentation of the pension satellite account

	Opening wealth position	Inflows: contributions, investment income	Outflows: withdrawals	Revaluations and other volume changes	Closing wealth position
Social security					
Employer-sponsored plans					
Individual registered saving plans					
Total					

Financial Indicators

A series of financial indicators were introduced as part of the regular releases of the National Balance Sheet Account in 2011 to assist in the interpretation of standard statistics, facilitating the monitoring of soundness, stability and performance of the various sectors of the economy. They provide insight into

¹ See Statistics Canada 2008, *Preliminary Results of the Pension Satellite Account, 1990-2007*.

relationships among economic and financial statistics such as debt, assets, incomes and output, enhancing the analytical content of the statistics taken individually.

In the case of the household sector, the indicators include financial ratios providing analytical insight on financial risk, leverage, sustainability, liquidity and the wealth effect on consumption. Examples include ratios of household debt to GDP, net worth, disposable income, and total assets as well as the ratio of homeowner's equity to the value of real estate, and household real estate as a percentage of disposable income.²

The household debt service ratio, originally limited to interest payments, was recently improved to include both obligated principal and interest payments as a proportion of household disposable income. This newly featured ratio, which provides a fuller picture of debt obligations facing Canadian households, has become a widely cited quarterly indicator in the Canadian media.³ Detail on the principal and interest components is available separately for both mortgages and non-mortgage loans.

Implementation of new international standards: recent comprehensive revisions

More recently, the Canadian System of Macroeconomic Accounts was brought into alignment with international standards in SNA2008, BPM6 and GFS14 in two successive comprehensive revisions released in 2012 and 2015. Both revisions introduced important improvements to the household sector that positioned the program for future development.

The following sections highlight specific improvements introduced in the 2012 and 2015 comprehensive revisions to the Canadian System of Macroeconomic Accounts that pertain to the household sector.

Full market valuation

In 2012, direct investment position estimates in the international investment position account were converted from a historical cost to a market valuation. In addition, listed and unlisted inter-company equity assets were valued at market prices, moving all of the relevant assets to a market valuation.

Non-profit Institutions Serving Households and Aboriginal Governments

Prior to the comprehensive revision in 2012, there were three main resident institutional sectors in the Canadian SNA: the persons and unincorporated business sector, the corporate sector and the government sector. The persons and unincorporated business sector included non-profit institutions serving households (NPISH), credit unions, life insurance companies, fraternal organizations and collective investment schemes such as pension plans and mutual funds. Due to data limitations, this sector also encompassed activities of aboriginal governments.

With the 2012 comprehensive revision, the Canadian SNA adopted the basic SNA institutional sectoring detail throughout the sequence of integrated accounts. The former persons and unincorporated business sector was split between households and non-profit institutions serving households. The current account for credit unions, life insurance companies, collective investment schemes and fraternal organizations was moved to the financial corporations sector to match the transactions in the financial

² See Statistics Canada 2012, *Financial Indicators from the National Balance Sheet Accounts: Update*.

³ See Statistics Canada 2015, *Household Debt Service Ratio – Interest and Principal*.

accounts. The incomes and outlays of non-financial corporations were identified separately from financial corporations, allowing for a better aggregation of financial accounts institutional sectors.

Work to build the NPISH sector began with the creation of a more broadly defined satellite account of non-profit institutions and volunteering, first released in 2004. The non-profit institutions serving households portion of this broader non-profit sector was implemented in the core SNA in 2012, with estimates built from a variety of sources including administrative files on registered charities and other non-profit institutions. A range of statistical improvements to better define the universe and account for measurement deficiencies were undertaken in addition to the sectoring changes. These included delineating the purchases of households from the NPISH sector. Revised industry and final demand estimates were correspondingly introduced in the supply-use framework.

Despite significant data gaps and after extensive consultation, a separate sub-sector for aboriginal government was created and released as part of the 2012 comprehensive revision.

Pensions on an entitlement basis

With the comprehensive revision in 2015, the Canadian System of Macroeconomic accounts aligned to the SNA2008 standard of actuarial measurement of defined benefit pension plans. Pension entitlements may be built up by employer or employee contributions. SNA2008 recommends that estimates of household wealth for defined benefit pension plans be based on the actuarial liability for future benefits rather than on the value of pension plan assets, which was previously the case in the Canadian SNA.

In 2015, household compensation income for defined benefit pension plans was introduced on an accrual basis. The accrual estimate represents the portion of the present value of future pension obligations attributable to a specific year. In SNA terms, this is articulated as the sum of actual and imputed contributions to pension plans. Imputed contributions represent the current portion of actuarial deficit (or surplus) in employer actual contributions due to employees for current period employment, including administrative expenses. When large actuarial lump-sum 'catch up' payments are made, these are treated as financial transactions and no longer as income flows.⁴

Household property income for defined benefit plans was also revised to an accrual basis. Income receipts on pension assets is the sum of the monetary (cash) interest and dividends received by the plan and imputed interest for underfunded or overfunded actuarial liabilities.

Pension assets were also revised as a result of the new accrual-based treatment of pensions. In the past, pension assets (though at market valuation) were accumulated on a cash basis—meaning that the asset was only recognized when a cash contributions were made to the fund. Depending on the actuarial outlook of a fund, employers often took contribution holidays, which were sometimes followed by large lump-sum 'catch-up' payments. This resulted in a somewhat volatile profile of the asset through time in the pension fund sector. In that scenario, it was not possible to have a true picture of pension assets

⁴ Annual benchmarks for the accrual estimate are derived from Statistics Canada's Pension Plans in Canada program and administrative data from the quarterly Survey of Trusteed Pension Funds. Data is confronted with pension expense indicators from business financial surveys, in particular the Quarterly Survey of Financial Statements, and adjusted to assure coherence in the estimates.

owing to the household sector at any point in time. The move to record pension contributions on an entitlement basis resulted in a revision to the profile of pension assets held by pension fund managers, with an “other asset” receivable accumulating over time, providing a more accurate picture of pension assets and liabilities.

Residential real estate

The value of residential real estate is estimated using the Perpetual Inventory Method (PIM) for the structure component, and land to structure ratios used to derive the total estimate, but with an expanding set of indicators. In 2015, the incorporation of information from municipal tax assessment files available from provincial authorities were referenced, and following the standard procedure, the latest results from the 2012 household Survey of Financial Security were incorporated. This led to an upward revision in residential land values, as prior estimates had underestimated the upswing in the real estate market over the recent period.

Currently available housing price measures cover only new housing and exclude the growing condominium market. Going forward, new, more comprehensive real estate price indexes covering existing homes and condominium apartments are now in development in response to G20 data gaps.

Other Changes in Assets Accounts

While Financial Flow and National Balance Sheet Accounts have long been available at Statistics Canada, the link between them in the integrated sequence of SNA accounts, the “Other Changes in Assets” accounts were not, until recently, explicitly published. This account implicitly includes revaluations and other volume changes.

With the release of the 2015 comprehensive revision, the aggregate other changes in assets accounts were published explicitly. While articulating the required detail on revaluations and other volume changes has not yet been undertaken, it remains a priority for future development.

Future development planned

In the wake of the 2008 global financial crisis, an assessment of G20 data gaps and the anticipated sign-on to the SDDS + enhanced dissemination standard led to investments in new data development for household wealth in Canada. A federal budget announcement in 2015 secured permanent funding for a triennial household wealth survey, the Survey of Financial Security, along with annual distributions of household wealth from the Canadian national accounts. The micro-macro linkage activity associated with development of these Annual Household Distribution Tables, within the context of distributions of income, consumption and savings, will be the subject of the concluding section of this paper.

In a subsequent federal budget announcement in 2016, additional funding was secured for new improvements to the granularity and detail published in the National Balance Sheet Accounts to better articulate the relationships in the sequence of accounts. This include building From-Whom-to-Whom detail and an accompanying interest and dividends (property income) matrix, linking interest and dividend flows to financial instruments on the balance sheet.

From-Whom-to-Whom detail in the financial and wealth accounts

While Statistics Canada has long recognized the value of From-Whom-To-Whom detail in the financial and wealth accounts and publishes selected FWTW detail in financial instruments, additional work to date has been limited to feasibility studies and proposals. Recent funding investments have enabled the development of these estimates, with a commitment to publish data by 2020.

This three-dimensional approach to compiling sectoral balance sheets and flows will articulate who is financing whom, in what amount, and with which type of financial instrument, including detail on cross-border exposures. In order to develop required detail, published series will be supplemented with additional data and presented in the recommended matrix format.

In the case of the household sector, this will enrich the understanding of financial risk and exposure in a variety of ways. For example, it will provide a breakdown of equity relating to financial and non-financial corporations. Links to the Pension Satellite Account will also allow for a fuller articulation of exposure of private pension funds and other registered savings vehicles and an increased understanding of financial security in retirement.

Interest and Dividends Matrix

The development of an Interest and Dividends Matrix will provide a comprehensive framework for analyzing relationships between stocks of financial assets and liabilities by sector and financial instrument and their corresponding property income flows. This will augment the analytical value of the financial and wealth accounts and also serve as a powerful coherence tool, leading to improvements in data quality by articulating links between the "real" and "financial" accounts.

For the household sector specifically, the development of the interest and dividends detail will fully exploit administrative information to provide improved estimates of household sector investment income, returns and savings. It will complement information currently available from the Pension Satellite Account.

III. Historical Retrospective: Micro measures of wealth

The Survey of Financial Security (SFS) is a wealth survey of Canadian Households undertaken by Statistics Canada. Prior to its introduction with reference year 1999, occasional assets and debt modules were included on former Survey of Consumer Finances every 7 years from 1957 to 1984. The sample size for the 1999 survey was 23,000 dwellings, with a dual frame design. Roughly 21,000 was drawn from an area frame, while the remaining 2,000 was drawn from geographic areas in which a large proportion of households were high-income, defined as at least \$200,000 total income or investment income of at least \$50,000. Among the significant developments since the previous assets and debt survey in 1984 was significant growth in the use of tax-sheltered individual pension savings vehicles in the form of Registered Retirement Savings Plans (RRSPs).

Subsequent to the initial release of the 1999 SFS, an innovation was introduced into Canadian wealth measurement in the form of a new methodology to estimate the wealth value of employer pension plans. This marked the first time a comprehensive picture of financial security of Canadians was available.

A second release of the 1999 results focusing on private pension savings demonstrated that employer pensions were the most important component of financial wealth for many Canadians, increasing median net worth by 35%. It provided important new insights on the characteristics of those who held wealth in this form and those who did not. The wealth value took the form of a net present value of expected future benefits to which the pension member is entitled. The methodology was the object of an extensive consultation process prior to its publication with associated analysis in December 2001.⁵ The pension wealth values were estimated on both a "termination" or Accrued Benefit Obligation (ABO) basis and "going concern" or Projected Benefit Obligation (PBO) basis. The termination value was featured in aggregate net worth.

A repeat of the Survey of Financial Security was undertaken in 2005, with the results released in December 2006. For this iteration, due to budgetary restrictions, the sample size was limited to 9,000 dwellings. For the 2005 release, the wealth value of occupational pensions, according to the methodology developed for the 1999 survey, was included in official net worth aggregates featured in analysis for public release. This more complete picture is deemed to represent a more accurate portrayal of the financial security of Canadians and provide additional insights into the preparedness for retirement of families and individuals as the population ages. To increase the analytical value of the SFS micro file, selected characteristics of registered pension plans were added to the database via a link to regulatory data on registered pension plans from the Pension Plans in Canada (PPIC) program.

Pension assets included in SFS net worth cover private registered pension plans and individual savings plans only, and do not include a wealth value of entitlements for government-sponsored plans (the Canada and Quebec Pension Plans). Including such a value was considered for the 2005 SFS, particularly to improve the understanding of the lower end of the wealth distribution, but has yet to be implemented.

Internal funding was secured for a repeat of the Survey of Financial Security in 2012, following the same basic methodology with a sample size restored to 20,000 dwellings. A new stratified multi-stage dual

⁵ See Cohen, Frenken and Maser, 2001.

frame design was introduced exploiting tax data for detailed geographical areas, with separate strategies for urban and rural regions.

Survey results for 2012 reconfirmed previous findings that the principal residence was the largest asset for Canadian households, representing one-third of total assets. The median reported value was \$300,000 in 2012, up 83.2% from previous results in 1999 and 46.6% more than in 2005.

About seven in 10 Canadian families had private pension assets in 2012, similar to previous findings, while the median amount held increased to \$116,000 in 2012, up from \$77,400 in 2005.

As noted previously, the 2015 Federal budget announced permanent funding for the Survey of Financial Security on a three year cycle, with the next survey planned for reference year 2016. Collection is slated to occur starting in September of 2016, with results released by the end of the following year. New content areas under consideration include additional detail on housing (mortgage interest rates, sources of funds for down payments and refinancing).

IV. Household distribution tables

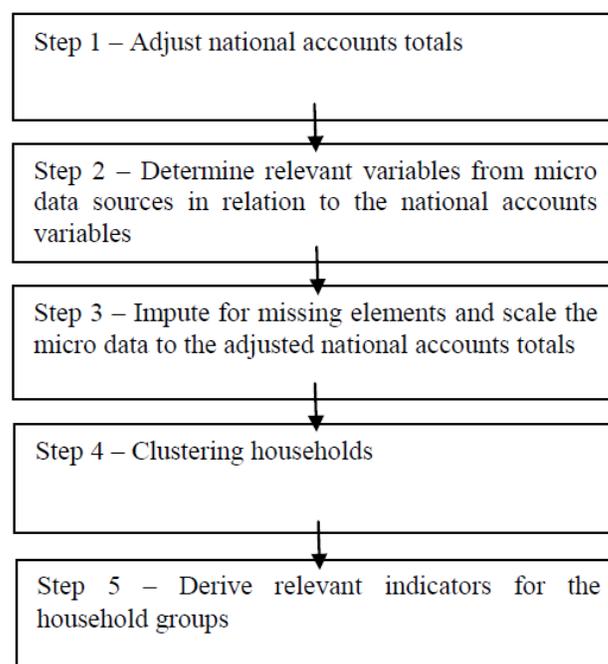
Background and project objectives

As noted previously, funding for annual distribution tables on household wealth linked to Statistics Canada's National Balance Sheet Accounts was permanently secured via investments aimed at addressing G20 data gaps, in conjunction with a triennial household Survey of Financial Security. These estimates are being developed in the context of a broader macro-micro linkage project to estimate distributions of national accounts income, consumption and saving for the household sector.

The work addresses recommendations of the Stiglitz, Sen and Fitoussi *Report by the Commission on the Measurement of Economic Performance and Social Progress* and subsequent work on the OECD/Eurostat Expert Group on Disparities in National Accounts (EGDNA). The report recommends increased emphasis on the household perspective and to consider household income and consumption jointly with wealth. It also recommends increased prominence to distributional data on the household sector for a richer understanding of economic well-being.

Work undertaken in Canada will aim to follow the broad approach recommended by the EGDNA, with specific adjustments unique to the Canadian context. While wealth was not in scope for the OECD guidelines, the basic approach will be followed for all variables in an integrated micro-macro linkage framework. It consists of first adjusting national accounts totals for specific issues (sectoring, the treatment of non-resident households and population coverage), then mapping relevant variables from micro sources to national accounts concepts and classifications, imputing for missing elements and scaling the resulting micro-data to the adjusted national accounts totals. Households are then clustered into equivalised income quintiles prior to deriving relevant indicators by household group.

Figure 1. A step-by-step approach for the estimation of distributional information



Available data sources at the micro level

Wealth: the Survey of Financial Security

As discussed previously, in the case of wealth, the annual household distributions will be anchored to the triennial Survey of Financial Security (SFS). The Survey of Financial Security collects information from Canadian families on assets, debt, employment, income and education. Information is collected on the value of all major financial and non-financial assets and on money owing on mortgages, vehicles, credit cards, student loans and other debts.

The Survey of Financial Security covers the resident population in the ten Canadian provinces. As is the case for many household surveys, persons living on reserves and other Aboriginal settlements, official representatives of foreign countries living in Canada and their families, members of religious and other communal colonies, members of the Canadian Forces living on military bases or camps, and persons living full-time in institutions (inmates of penal institutions and chronic care patients in hospitals and nursing homes) are not covered. Altogether these exclusions represent approximately 2% of the population.

This Survey of Financial Security is a sample survey with a cross-sectional design and a sample size of approximately 20,000 dwellings. The sample design includes over-sampling of high income/high wealth respondents. Data are generally collected directly from respondents, while in some cases additional information is extracted from administrative files and derived from other Statistics Canada surveys and other sources via record linkage. Examples include the use of personal tax data records and regulatory information on the terms and conditions of employer-sponsored pension plans. Interviews are conducted via Computer-Assisted Personal Interviewing (CAPI) with an average interview length of approximately 45 minutes. The survey is not mandatory and response rates are approximately 70%.

In general, in the case of wealth, micro-based estimates from the SFS align very well to household sector national accounts aggregates published in the National Balance Sheet Accounts. This is the case from both a conceptual and a statistical perspective. The following table shows a comparison of the estimates for the latest results in 2012, along with implied coverage ratios. The table shows results before and after the most recent Comprehensive Revision to the Canadian Macroeconomic Accounts released in 2015, illustrating that changes introduced served to better align the estimates.

Survey of Financial Security (SFS) and National Balance Sheet Account (NBSA)					
Pre- and Post-2015 Comprehensive Revision					
<i>(billions of dollars)</i>					
	SFS 2012	NBSA 2012Q3 pre- revision	NBSA 2012Q3 post- revision	Coverage Pre- Revision (SFS/NBSA)	Coverage Post- Revision (SFS/NBSA)
Total Assets	9,368	8,632	9,327	108.5%	100.4%
Total Financial Assets	4,666	4,589	4,778	101.7%	97.7%
Life Ins.& Pensions	1,871	1,614	1,878	115.9%	99.6%
Other Financial Assets	2,795	2,975	2,900	93.9%	96.4%
Total Non-Financial Assets	4,701	4,042	4,549	116.3%	103.4%
Real Estate	4,186	3,490	3,980	119.9%	105.2%
Other Non-Fin. Assets	515	552	569	93.4%	90.6%
Total Debt	1,337	1,681	1,688	79.5%	79.2%
Mortgage Debt	1,030	1,063	1,063	96.9%	96.9%
Other Debt	307	618	626	49.7%	49.1%
Net Worth	8,030	6,951	7,639	115.5%	105.1%

The broad categories shown in the table do not reflect the standard classification of asset and debt instruments published in the National Balance Sheet Account, which is consistent across all economic sectors. Rather, it has been adapted to better align micro and macro estimates and to be more appropriate to distributional data for the household sector. Differences from the standard classification are in the area of pensions and retirement savings vehicles in particular. The adapted classification draws from the Pension Satellite Account which, as noted previously, is an annual Statistics Canada release published as an extension to the standard financial and wealth accounts.

As highlighted previously, recent comprehensive revisions to the Canadian System of Macroeconomic Accounts have served to better align macro and micro estimates. Improvements introduced in 2012 and 2015 include breaking out separate sectors for Non-profit institutions serving households and aboriginal governments, moving pensions to an entitlement basis and better-delineating flows between households and pension funds, moving to a full market valuation and statistical improvements to residential real estate assets.

One remaining coverage difference of note is for consumer credit, reflected in the category non-mortgage debt in the micro-macro comparison table shown above. In this case, the SFS shows a considerably lower estimate than the NBSA, at 49% of the macro value. While this may partly reflect a tendency among respondents to under-report credit card debt, conceptual differences may also explain a large part of the gap. On the SFS, respondents are instructed only to report amounts still owing on their last bill excluding new purchases, while in macro estimates these amounts are correctly shown as household liabilities when estimates are compiled from the lenders' perspective.

Income and Consumption: the Social Policy Simulation Database and Model

Regular annual household surveys are available in Canada for both income and consumption and include the Canadian Income Survey and the Survey of Household Spending. In the case of income, a number of other data sources are also available. A broad range of sources are integrated at the micro-level in the database underlying the Social Policy Simulation Model, a micro-simulation tool updated annually at Statistics Canada and available as a publicly-released micro-data file.

The Social Policy Simulation Database and Model (SPSD/M) is designed to analyze the financial interactions of governments and individuals in Canada. It aims to assess the cost implications or income redistributive effects of changes in the personal taxation and cash transfer system. It is a non-confidential, statistically representative database of individuals in their family context, designed with enough information on each individual to compute taxes paid to and cash transfers received from government. The Social Policy Simulation Model is a static accounting model which processes each individual and family on the SPSP, calculates taxes and transfers using legislated or proposed programs and algorithms, and reports on results.

The SPSP is constructed by combining individual administrative data from personal income tax returns and unemployment claimant histories with survey data on family incomes, employment and expenditure patterns. The techniques used to create the database and avoid confidential data disclosure include various forms of categorical matching and stochastic imputation. While no one record on the database contains information for the same individual from the four bases, the database is constructed in such a way as to provide a micro-statistically representative sample of Canadians.

Certain adjustments are made to correct for known deficiencies in the survey sources using auxiliary information. For example, the institutional and elderly population are added with Census proportions and the high income population is improved using tax filer information. Further adjustments are made to compensate for item non-response in underlying survey data (e.g. the ability to increase the number of families receiving social assistance). As is the case with underlying survey data, however, the SPSP coverage does not extend to the territories of Yukon, the Nunavut or Northwest Territories, persons residing on reservations, or armed forces personnel residing in barracks.

The database contains more than 300,000 composite individuals residing in over 100,000 households in ten Canadian provinces, for a time series extending back to 1995. There are approximately 600 variables covering detailed socio-economic and demographic data as well as information on weekly employment histories, expenditure patterns and itemized tax deductions. The full family structure for each individual on the database allows one to identify the familial relationships between all household members.

The SPSM database is constructed by integrating information from a broad range of micro-data sources, including:

- Canadian Income Survey / Survey of Labour and Income Dynamics (SLID)
 - Detailed information on income, family structure
 - Sample of over 50,000 individuals within 20,000 households
- Personal Income Tax Returns (T1 Family File)
 - Detailed distributions derived from a sample of approximately 2,000,000 personal income tax returns selected from Statistics Canada's T1 Family File.

- Synthetic information on high income Canadians to supplement SLID
- Over fifty deduction/tax credit items for each synthetic individual
- Employment Insurance Claimant History Data
 - 200,000 individuals; over 250,000 claims
 - Human Resources Development Canada administrative claim data
 - Benefit type, duration, phase, and repeater status
- Survey of Household Spending (SHS)
 - Household expenditures for 48 categories (coinciding with macroeconomic accounts classifications)
 - 10,000 households

While designed for micro-simulation of the distributional effects of tax and transfer policy, many of the features of the SPSD make it ideally-suited as a starting point for integrated household distributions of macro estimates of income, consumption and saving. The integration of wealth would be an important step towards building a micro database that could serve as underlying foundations of the household sector in the national accounts.

A vision for micro-macro linkages on the Canadian household sector

As a general strategy for developing distributional estimates on income, consumption, saving and wealth of the Canadian household sector, the first stage will be to build an integrated micro database incorporating the contents and characteristics of key micro-data source files. The database underlying the Social Policy Simulation model, while not fully consistent with SNA concepts and framework, goes a considerable distance towards that goal. As noted, the SPSD leverages the strengths of a broad variety of micro sources to create a large, statistically representative database of "composite" individuals and households. It exists for a long time series that can be exploited to generate historical distributional estimates. It is constructed for public release and protects the confidentiality of individual respondents.

Following the spirit of the OECD guidelines on disparities in national accounts, work to augment the suitability of the SPSD as the micro-foundations for the national accounts will include the following:

- The integration of micro-data on wealth from the triennial Survey of Financial Security.
- The imputation of national accounts concepts that are not available from micro sources. Important examples include imputed rents, FISIM, employer social contributions and social transfers in kind.
- The scaling of micro-based estimates to meet national accounts controls.

The resulting micro-database can be used to generate distributional estimates for household groups. Ideally, given that the SPSD is a publicly available micro-file, the augmented national accounts version of the database can also be made available publicly, allowing maximum flexibility in analysis for sophisticated data users. At the same time, standard pre-defined indicators can be regularly produced and highlighted for headline release by Statistics Canada.

How to get there: practical issues and constraints

As is the case in any such undertaking, a number of important challenges and constraints must be addressed to achieve the ideal implementation strategy. With the project mid-way through an initial development phase, practical challenges encountered include, for example, the investment required to integrate wealth data in the micro-database, the timeliness of source inputs to the SPSP, and the development of appropriate raking techniques to assure the coherence of distributional data. Also, as noted, since the Survey of Financial Security will be undertaken every three years, a mechanism must be developed for interpolating and projecting estimates on an annual basis. Each of these issues is discussed briefly below, along with preliminary ideas for a broad estimation strategy that achieves project objectives.

Integration of wealth to the micro-simulation database

While micro-based wealth estimates have only been available on an infrequent, occasional basis in the past, the fact that the SFS will now be undertaken on a regular 3-year cycle presents an important opportunity for both macro and micro analyses. Integrating wealth into the Social Policy Simulation database would make it more useful and relevant to its own community of users, in addition to serving the requirements for an integrated database to serve as the micro-foundations of national accounts distributions.

Current production constraints and the investment required to build processes and systems to integrate the data are considerable, however. While this activity is planned, a short term strategy to use the SFS directly may be required until regular, ongoing integration can be established.

Estimating wealth distributions in the non-SFS years

Unlike income and consumption, which are available as an annual time series of micro-estimates, given the occasional availability of the SFS in the past, estimating a historical time series will be more challenging. Going forward, since the information will be available triennially as opposed to annually, the inclusion of wealth in the integrated household micro-database can only be undertaken on a three-year cycle.

In order to construct annual household distributions of wealth for public release, a variety of strategies are being investigated. These include testing modeling techniques using income or other corollary information, sensitivity analysis on distributional changes across available SFS years, and analysing significant valuation changes for specific years in the NBSA and investigating alternative sources for key wealth variables from which household characteristics can be drawn or inferred. Possibilities for alternate sources of wealth distributions include private sector databases on mortgage and other credit history, regulatory information on pensions and administrative information on the ownership of real estate. The ultimate strategy implemented will likely include a combination of integrating auxiliary data to interpolate and project distributions for specific variables and the use of indirect modeling techniques.

Short term strategy to improve timeliness

The SPSP is constructed on an annual basis, but, given that the goal is to construct a micro database for public release, the timeliness of the underlying source data is dependent on availability of public use

micro-files. In practical terms, this has led to lag in the incorporation of up-to-date distributional information from household surveys on income and consumption.

In the case of consumption data, the Survey of Household Spending moved to new design with reference year 2009 which incorporated a diary component in keeping with standard international practice. Cost constraints, however, have meant that the diary component could only be undertaken for a portion of the sample, increasing the complexity of producing public use micro files.

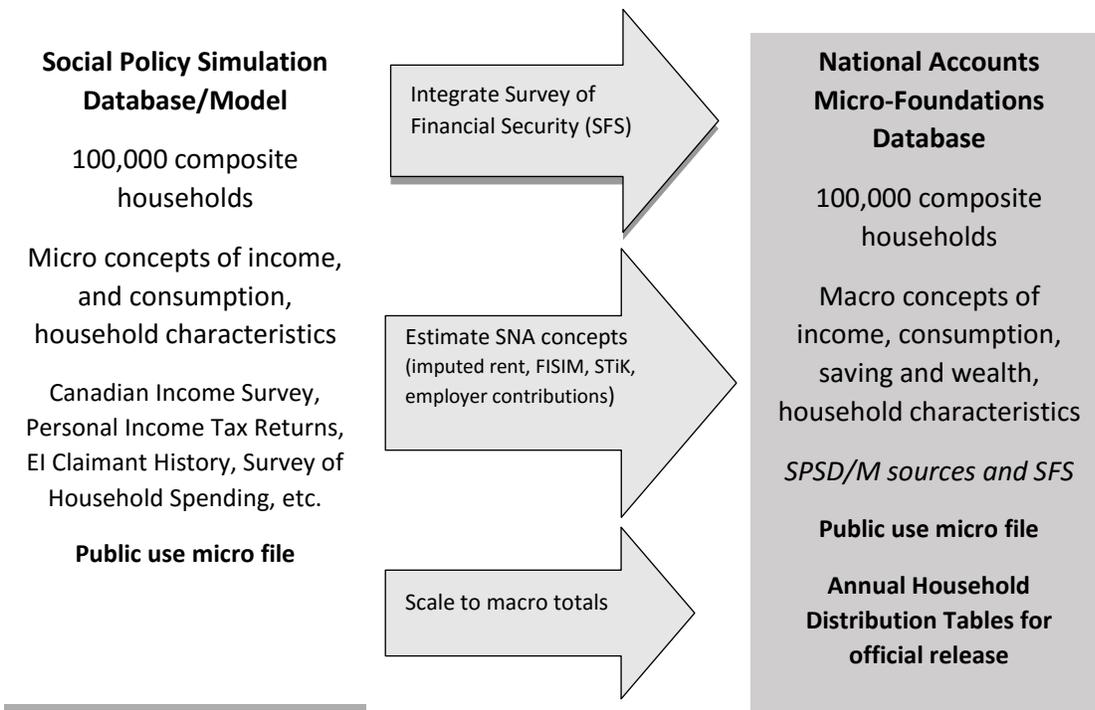
Currently source data incorporated into the micro-simulation database lags by several years and, while techniques are employed to "grow" estimates to match current population controls and income and tax growth rates, implicit distributions effectively reflect source data from 2009 in the case of the Survey of Household Spending. In the case of income, 2010 information is currently the latest incorporated, but the production of updated public use files is in progress.

While the ultimate aim (and most efficient solution) is to work with partners to speed up the production of PUMFs and their incorporation in the SPSD, this will require a long term investment. As an interim strategy in order to meet required timeframes for project deliverables, a separate process for "benchmark" years and the current projection period will be required. The more recent period will incorporate up-to-date source data using confidential master survey files. The length of the projection period will be shortened over time as public use files on income and consumption are available and integrated into the SPSD.

Figure 2

General Estimation Strategy for the Annual Household Distribution Tables

Benchmark Period



Raking techniques to ensure coherence

Since the Annual Household Distribution Tables will draw on a variety of data sources, an adjustment process is required to ensure consistency within the resulting tables. In the example of wealth tables by income quintile, this would mean maintaining the relationships between assets, debts, net worth, etc. within each quintile (i.e., relationships down the columns of the tables) and also ensuring that the sum of the quintiles equals the macro total from the National Balance Sheet Accounts (relationships across rows).

Raking techniques will be used to ensure internal consistency. In its most basic form raking can be described as alternately prorating the rows and columns to sum to known totals. A key characteristic of raking is that it ensures specified relationships are respected while minimizing changes to individual cells in the table.

Raking techniques have been tested on preliminary wealth distributions, and suggest that while raking is an appropriate approach, the choice of parameters may have an important influence on the result. Alternate strategies are being evaluated to determine the optimal parameters leading to a stable, high quality across years and for specific household characteristics or groups.

Illustrative findings on wealth distributions

As noted, the ideal strategy is to estimate distributions via an integrated micro-database for income, consumption savings and wealth. These early results of wealth distributions consistent with the NBSA are based uniquely on the Survey of Financial Security, which, as has been demonstrated, aligns very well with macro estimates.

Precise indicators for release have yet to be established, pending further consultation and quality evaluation. They will, however, include breakdowns by income quantiles, age, employment status and household type. We are also considering producing financial ratios (such as the debt service ratio) for specific household groups. Because there is a great deal of regional diversity in Canada and a high demand for regional data, producing distributions by province will also be a priority.

While the aim is ultimately to produce a historical time series, depending on feasibility this may occur subsequent to the initial release of estimates for 2012. The following presents early illustrative findings for wealth distributions comparing two available years for the Survey of Financial Security, 1999 and 2012.

Income distributions

Table 1.1: NBSA Net Worth (\$ millions) by Income Quintile, nominal terms

Net Worth	1999	2012
Income Quintile	% of Total	% of Total
Q1	7%	6%
Q2	12%	13%
Q3	17%	17%
Q4	24%	24%
Q5	40%	40%
Total	100%	100%

Table 1.2: After-Tax Income Ranges for Quintiles

Income Quintile	1999 Nominal terms		1999 2012 constant dollars		2012 2012 constant dollars	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Q1	-3,763,337	17,694	-4,930,013	23,179	-158,732	29,591
Q2	17,700	28,885	23,187	37,840	29,592	48,355
Q3	28,887	41,719	37,842	54,652	48,358	70,720
Q4	41,721	62,125	54,655	81,384	70,722	106,327
Q5	62,126	1,900,363	81,386	2,489,496	106,358	200,289,419
Total	-3,763,337	1,900,363	-4,930,013	2,489,496	-158,732	200,289,419

While the income ranges for quintiles shifted significantly from 1999 to 2012, the share of total household wealth held by each income quintile remained quite stable. The inflation-adjusted after-tax income range for the richest quintile grew from a maximum of \$2.5 million in 1999 to just over \$200 million in 2012 (inflation-adjusted to 2012 constant dollars). Wealth held by households in this quintile also increased over the same time period, but when this value is expressed as a share of total household wealth, there has been no significant change in inequality with the highest earning 20% of households in Canada owning 40% of the total wealth. The share of household wealth held by the lowest quintile has similarly remained consistent. This group owned 7% of total wealth in Canada in 1999, and a slightly lower share (6%) in 2012.

Geographical distributions

Table 2.1: NBSA Net Worth (\$ millions) by Region, 1999 & 2012

	1999	1999	2012	2012
Region	Net Worth	# of HH	Net Worth	# of HH
Atlantic	5%	8%	5%	7%
BC	16%	13%	17%	13%
Ontario	41%	37%	39%	37%
Prairies	17%	16%	18%	17%
Quebec	21%	26%	21%	25%
Total	100%	100%	100%	100%

When analyzing regional distributions of Canadian household wealth, the proportions of wealth held by region did not change much between 1999 and 2012. Where small changes exist in the proportion of wealth owned, they are accompanied by similar shifts in the number of households in the region. For example, Alberta households owned 10% of wealth in 1999 and increased their share to 12% in 2012. This is matched by a 2 percentage point increase in the share of Canadian households in Alberta from 9% to 11%. Most changes in wealth by geography are matched by an equal change in population share.

Age distributions

Table 3.1 NBSA Net Worth (\$ millions) by Age Group of Head of Household, 1999 & 2012

	1999	1999	2012	2012
Age Group	Net Worth	# of HH	Net Worth	# of HH
<35	7%	22%	5%	20%
35-44	18%	25%	13%	18%
45-54	26%	20%	25%	21%
55-64	24%	13%	30%	20%
65+	25%	20%	28%	22%
Total	100%	100%	100%	100%

Households where the head of the household⁶ is aged 35-44 decreased their share of total wealth in Canada from 18% in 1999 down to 13% in 2012. During this same period, households in the 55-64 and 65+ age ranges increased their shares of wealth from 24% to 30% and from 25% to 28% respectively. Demographically, these same groups saw changes in the number of households that match the pattern of wealth changes. The fact that older households hold a greater share of wealth in recent years is not the result of an increase in their average net worth, but rather reflects population aging.

⁶ Defined as the major income earner of the household

Project milestones and next steps

The project to develop annual distributions of income, consumption, saving and wealth in the Canadian macroeconomic accounts is currently mid-way through its initial development phase. At the onset of the project, a governance structure was put in place at Statistics Canada, involving a steering committee with leadership from macro and micro statistical programs. Consultations regarding outputs and strategy were undertaken with Statistics Canada's Macroeconomic Accounts Advisory Committee, an external panel of experts and key data users. Provincial partners, the federal finance department and the Bank of Canada have also been consulted.

In terms of project milestones, the proposed methodology with accompanying documentation is slated for completion by the end of the summer of 2016, along with draft table outputs proposed for publication. By the fall of 2016 an analytical paper with preliminary estimates will be delivered to key project stakeholders for discussion, including provisional estimates for the years 2012 to 2015.

By September 2017 the design of publication tables will be finalized for official release by Statistics Canada in December 2017. Post mortem analysis and user consultations will occur in early 2018, and estimates will continue to be developed and improved as the annual program progresses.

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