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Latest Developments in the Canadian Economic Accounts

Satellite Accounting in Canada

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Satellite Accounting in Canada

1. Introduction

Over the last three decades, satellite accounting has gradually become quite popular all around the globe. The idea emerged in the 1980s, was set out formally in System of National Accounts (SNA) 1993 and was established more fully in SNA 2008.

Statistics Canada produced its first satellite account in the 1980s, with a focus on the tourism industry. Since then, it has built and maintained several other satellite accounts. This paper provides short summaries of those accounts. Readers wishing to see more details can refer to the references provided at the end of the paper.

But before these satellite accounts are described, the paper begins by addressing the questions: Why satellite accounting? What was the origin of this concept? It then goes on to discuss, briefly, what is meant by satellite accounting and how this statistical approach has been adopted internationally. After the descriptions of the different satellite accounts, this paper ends with brief conclusions.

2. Why satellite accounting?

The international SNA, most recently updated in 2008, is an enormously successful framework for describing the world economy and the national and sub-national economies. The central SNA concept, gross domestic product, is perhaps the best known and most widely used economic statistic available. Yet, no system can be all things to all people and the SNA certainly has its limitations.

Some say more attention should be given to other aspects of well-being, such as beneficial activities that are outside the SNA production boundary (household work, volunteering and free environmental services, for example) and leisure activities. Along similar lines, some argue the SNA should also concern itself with activities that subtract from human welfare such as environmental air, water and land pollution. Long-term sustainability is the big issue, they say, not short term growth in the market economy. A case can be made that some of the elements that contribute most to GDP are in reality costs rather than benefits and should therefore be deducted rather than added. Much of government spending (law and regulatory enforcement, defence and waste remediation for example) might fall in this category. It is often argued as well that the economic aggregates that are so central to the SNA ignore much of what is most relevant to social well-being: income and wealth distributions.

These criticisms derive from the fact that the SNA relies on market price aggregates to assess social value and is focused on the macro economy. When goods and services have no market prices they are, with a few important exceptions, excluded from the GDP calculation. The rationale for this approach is that market prices are an objective and democratic kind of valuation, representing how the population votes for alternative consumption priorities by choosing how to spend their money. Household work and volunteering are valuable, yes, but they have no objective valuation. Pollution hurts human welfare, yes, but its negative impact has no objective valuation. For that matter, the beneficial services provided by a healthy environment (clean air, for example) are not generally priced in the market either.

Critics also point out, from time to time, that while the SNA is quite detailed, the statistical estimates it yields are not detailed enough. Moreover the classifications of products and industries it relies on — in Canada, the United States and Mexico the main ones are the North American Product Classification System (NAPCS) and the North American Industry Classification System (NAICS) — do not contain explicit entries for some very important economic activities, such as culture, tourism and services intended to protect the environment. Non-expert users often find the SNA opaque, burdened with obscure concepts and classifications and unfamiliar terminology.

Some of these criticisms could be addressed in the SNA if it abandoned its reliance on the market price valuation principle. But that would be throwing out the baby with the bathwater. Measuring activities in the market economy is the raison d'être of the SNA. Without the objective valuations provided by market prices, national accounts estimates would be little more than the assumptions of economic analysts. Who is to say how much cooking,

cleaning and childcare in the home are worth? Or the negative effects of pollution? The SNA is an enormously successful statistical framework that has proven itself to be so for more than 70 years.[1] It should not be radically overhauled in this way.[2]

Fortunately, there is a better alternative. Satellite accounts offer a means of borrowing some of the best features of the international SNA while giving freedom to depart from some of its restrictions. Often people want to know the size of a particular activity, such as tourism or the digital economy, in relation to the total market economy. Satellite accounts provide a way of determining this. Alternative valuations can be adopted and the production boundary can be redefined. Product and industry classes can be recombined in other ways that may be more convenient for some purposes. Alternative, more familiar vocabulary can be adopted. And all of this can be done while linking directly into the large, internally consistent and carefully curated databases offered by the SNA.[3]

A recent survey by the United Nations Economic Commission for Europe (UNECE), administered by Statistics Canada, covered over 80 countries and identified 241 satellite accounts. It was part of the work program of the Conference of European Statisticians. The main objectives were to determine the extent of satellite accounting around the world and explore why and in what directions satellite accounting studies are increasing.

The UNECE survey found that the most common topics addressed were tourism, environment and health. Primary reasons mentioned for developing these accounts were (1) giving greater prominence to a particular activity, (2) bringing more detailed statistics to an activity than are directly available in the core national accounts and (3) extending the conceptual boundaries in the core national accounts for production, consumption and/or assets.

3. What is satellite accounting?

SNA 2008 identified two main types of satellite accounts: thematic and extended. Thematic accounts generally provide more detailed information than can be found directly in the core accounts, possibly with the addition of rearranged classification systems, non-SNA statistics and different presentational structures. They do not depart from the basic principles of SNA 2008. Extended accounts also use concepts, structures and statistics from the core accounts, but are not limited by them. They may extend the production, consumption and/or asset boundaries to include products, activities and asset types originating outside the market economy that are out-of-scope for the core national accounts, or may adopt other conventions that are inconsistent with SNA principles. Finally, for completeness some might say there is also the blended type of satellite account, which reflects both the thematic and the extended approaches.

To date, all the satellite accounts developed in Canada were built by Statistics Canada, in partnership with other federal government departments, provincial agencies and various non-governmental groups. Some are purely thematic and others are extended. The accounts created in Canada so far are as follows:

- Value of household work satellite account (extended)
- Tourism satellite account (thematic)
- Canadian System of Environmental-Economic Accounting (extended)
- Non-profit institutions and volunteering satellite account (extended)
- Research and development satellite account (extended, at the time)
- Culture satellite account (thematic)
- Pension satellite account (thematic)
- Natural resources satellite account (thematic)

1. "As the 20th century drew to a close, the U.S. Department of Commerce embarked on a review of its achievements. At the conclusion of this review, the Department named the development of the national income and product accounts as 'its achievement of the century'." Steven Landefeld, Survey of Current Business, January 2000.
2. The international System of National Accounts has never claimed to be more than a measure of the market economy. However, people do tend to want more than that. Life is a lot more than the market economy. Hence the need for alternative statistical frameworks, such as satellite accounts.
3. There are costs as well as benefits from moving away from the international standard SNA into satellite accounts. One country's satellite account may not be easily comparable to another's and it may not be possible to aggregate satellite accounts from different countries. The OECD and the UN are working to encourage some standardization, but this process takes time and it also conflicts with one of the major benefits of satellite accounting – their flexibility. In addition, satellite accounts are more vulnerable to political influence since they often depend on outside financial and other support from their main clients.

- Transportation economic account (thematic)
- Cannabis satellite account (extended, at the time)
- Digital economy satellite account (thematic)

However, it is sometimes difficult to delineate what is and is not a satellite account. There are a number of other Canadian studies that could possibly be added to this list. Examples are special product and industry decompositions that were done for the softwood lumber industry and the agriculture and agri-food sector. Another example is a special study that is done occasionally of the underground economy in Canada. There have also been studies and special tabulations of clean technology products, human capital, infrastructure assets and investments, value-added exports and household income and financial asset distributions that could have been called satellite accounts. The common feature of these studies is that they are structured around and in most cases fully consistent with the core national accounts.

Internationally, countries have done satellite accounting in some other areas. Health, education, water, fisheries and outdoor recreation are some topics that have been addressed this way.

The internationally developed and agreed SNA 2008 standard is invaluable for many reasons, one of which is that it helps keep politics out of economic statistics. Without such an accepted standard, statistical agencies would face greater pressures to adapt national accounts concepts and structures for political reasons. A concern about satellite accounting, though, is that international standards are not yet well established. Indeed, the flexibility that is inherent in the satellite approach tends to abet political influence. It also makes it very difficult to aggregate satellite accounts from different countries. Fortunately, though, some progress is being made on this front.[4] It must also be observed that satellite accounts, unlike NAICS industries and NAPCS product classes for example, are not mutually exclusive. For instance, some of the tourism value added that is identified in a tourism satellite account may also be part of the culture value added observed in a culture satellite account.

The remainder of this paper briefly summarizes the satellite accounting work that has been done in Canada over the last few decades.

4. Value of household work satellite account

Gross domestic product is sometimes viewed as a deficient statistic because it excludes production of services by households in the home, such as cooking, cleaning and child care. One reason these services are excluded is because there are no associated market price transactions, although this is also the case for production of services by governments, which are included in GDP on a cost basis. Another, perhaps more important and practical reason is that it is very difficult to estimate the value of household work consistently across countries and in a timely fashion. Many countries do not conduct time use surveys and among those that do, these surveys tend to be conducted infrequently because they are costly, impose significant response burden and can be seen as an invasion of privacy.

Where time use survey data are available, some countries have addressed this issue by developing a satellite account to estimate the value of household work. Statistics Canada's work on this type of satellite account dates from the 1970s when Professor Oli Hawrylyshn [1976] conducted studies on contract to the agency. There have been other valuation studies since then, notably one by Chris Jackson [1995] at Statistics Canada, though none recently. There have, however, been a number of time use surveys in the last two decades so it is possible to update estimates of the value of household work.

The usual approach is to estimate the number of hours households spend on each category of work in the home, via time use surveys, and then apply an imputed hourly wage to those hours. The wage can be assigned based on wages paid in similar private sector industries. For example, the wage for household childcare services could be imputed as the average wage paid to workers in private sector childcare centres. Alternatively, the wage could be assigned based on the opportunity cost. Thus childcare services provided by a lawyer taking care of children at home could be valued at the average wage of lawyers.

4. See Statistics Canada [2019], in the Appendix: Inventory of International Guidance, Handbooks and Manuals.

Studies of this nature routinely assign a large value to household work, often in the neighborhood of 40% of GDP. This is especially relevant in the current COVID-19 circumstances, where a lot of work that was previously done in the private sector by restaurants, drycleaners, childcare centres and others, and was included in GDP, is now being done in the home and is excluded from GDP. If GDP was defined more broadly, its drop in recent months would be much smaller.

The value of household work satellite account is a good example of one that seeks to address questions for which the core national accounts are an unsuitable source of information. By international convention, the production boundary in the national accounts excludes household work. Satellite accounts face no such limitation, so the issue can be readily addressed by expanding that boundary to include household work.[5]

5. Tourism satellite account

Canada built its first thematic satellite account for the tourism industry in the late 1980s and early 1990s. It was sponsored and paid for by a government agency called the Canadian Tourism Commission at the time. The principal goal was to provide credible statistics highlighting the important contribution of tourism to the economy. The account continues to be developed and kept up to date today.

Tourism is not an industry that can be found directly in the standard industrial classification system. Rather, it is a composite of portions of several industries found there: food and beverage services, accommodation services, transportation services, tour operators and so on. Some of the output of those industries cannot reasonably be regarded as tourism, as for example when the residents of a city eat at restaurants within that same city. So tourism expenditures are conceptualized using the United Nations World Tourism Organization definition. This is, essentially, outlays on goods and services purchased by persons outside their usual environment, specified operationally as out-of-town for non-routine overnight trips and for non-routine 40-kilometre-or-more same-day trips, including all trips crossing international borders. There are some specified exclusions, such as travel for study extending more than one year or travel by diplomats, migrants or members of the armed forces.

The tourism account yields estimates of the value added by the tourism industry relative to gross domestic product, and the number of jobs attributable to tourism demand. It provides a breakdown of tourism spending by residents and non-residents. In addition, the composition of tourism activity by industry component is estimated.

The tourism satellite account was later expanded to provide breakdowns for each of Canada's ten provinces and three territories.

This account has proven to be durable — it continues to be updated regularly after more than three decades — and successful in terms of meeting its objectives. Tourism is important to the Canadian economy and the satellite account provides an integrated set of time series statistics that facilitate the analysis and understanding of the activity.

6. Canadian System of Environmental Economic Accounting

Statistics Canada began working on an environment satellite account in 1991 when the government provided five-year funding for the project as part of its Green Plan for Canada. These were the early years for environmental accounting, although there were already several countries working on such accounts. Statistics Canada collaborated with the Office for National Statistics in the United Kingdom to host the first of many biennial international conferences on the topic.

5. A major part of the motivation for a value of household work satellite account is that it is more inclusive, from a social perspective. In developed countries, work in the home was mostly done by women in the past and this remains so in much of the developing world today. Women's vital role in providing for human needs, it is argued, should not be ignored just because it is not fully ''marketized".

Canada's environment account program has grown and improved steadily since then. Today it is built within the framework of the Canadian System of Environmental Economic Accounting (CSEEA), endorsed by the United Nations in 2012. This system contains three groups of accounts:

1. Asset accounts recording the stock of environmental assets, which are those components of the environment that provide benefits to society in general and the economy in particular.
2. Physical flow accounts recording the flows of natural inputs into the economy and the flow of residuals from the economy to the environment.
3. Environmental activity and other flow accounts recording transactions that reflect activity undertaken to preserve and protect the environment.

These accounts are recorded in both physical and monetary terms, when this is feasible. In some cases, they are in physical terms only and in others, in monetary terms only.

The CSEEA provides a conceptually integrated set of statistics for studying the relationship between the environment and economic activity. It presents detailed annual time series statistics describing:

1. The size of Canada's natural resource assets and their contribution to national wealth.
2. The extraction of these same resources and their disposition among businesses, households, governments and the rest of the world.
3. The generation of various wastes (liquid, solid and gaseous) by industries, households and governments and the management of these wastes.
4. The expenditures made by businesses, households and governments for the purposes of protecting the environment and the contribution of environmental and clean technology goods and services to the economy.

Natural resource asset accounts provide a broader dimension to national wealth by helping to measure the stocks of natural resources such as energy resources (for example, oil and gas), mineral resources (for example, zinc and potash) and timber. These asset accounts are also part of the core national accounts. They are included among the estimates of Canada's natural resource wealth in the national balance sheet accounts and national wealth, which cover both produced and non-produced assets. The natural resource asset accounts also encompass land, water and ecosystems.

Physical flow accounts record the annual flows of natural resources, products and waste products between the economy and the environment. The statistics measure the activities of industries, households and governments. The supply and use tables supply some of the source data, for example in the energy and greenhouse gas emission accounts, but many other sources are also used, notably for the waste accounts. Where it is possible, the same classifications and accounting methods are used as those in the national accounts so the estimates can be linked.

Expenditures motivated by environmental protection are recorded in an environmental and clean technology products economic account. For this purpose, environmental and clean technology is defined as any process, product or service that reduces environmental impacts: through environmental protection activities that prevent, reduce or eliminate pollution or any other degradation of the environment, resource management activities that result in the more efficient use of natural resources, thus safeguarding against their depletion; or the use of goods that have been adapted to be significantly less energy or resource intensive than the industry standard.

Many of the accounts within the CSEEA are well established. Others are still under active development, such as those for oceans, ecosystems and physical flows of plastics. Overall the CSEEA is unique compared to the other satellite accounts summarized in this paper since it is built within the UN-endorsed SEEA framework. It can be argued it has graduated from satellite account status and is now part of the broad set of accounts — SNA plus SEEA — that all nations should maintain.

7. Non-profit institutions and volunteering satellite account

The satellite account of non-profit institutions and volunteering was first released in 2004 and initially covered the years 1997 to 2000. It was developed as part of the government's Voluntary Sector Initiative with the aim of giving greater prominence to non-profit and voluntary activities in the Canadian economy. Further development and maintenance of the account was terminated in 2011 when the core national accounts began to incorporate non-profit institutions as a distinct institutional sector (although voluntary activities, which have no market valuation, were not included). Later, in 2019, responding to requests for more comprehensive statistics on Canada's non-profit and volunteering sector, Statistics Canada published updated, more detailed annual estimates of the economic contribution of non-profit institutions and volunteering from 2007 to 2017.

Overall, the approach taken in building the satellite account was mostly to work within the established core national accounts framework, breaking out the components of the non-profit institutions sector in greater detail. It is primarily a thematic account, adhering to established national accounts concepts and classifications. However, volunteering was also included in the satellite account, calculated based on hours of such activity as reported on time-use surveys combined with replacement cost valuation methods. In other words, by including volunteering, the account also expands the underlying concepts of the core accounts, which as noted exclude volunteering.

The non-profit institutions and volunteering sector in Canada is defined to include not just religious, cultural, social service and other such institutions but also hospitals, universities and colleges. Defined this way, and including volunteering, the sector is estimated to be equivalent to 8.5% of gross domestic product in 2017. The satellite account presents the sources and uses of funds within the sector, for 12 sub-sectors. It derives gross and net output, and employment, for each sub-sector by articulating primary inputs and intermediate consumption expenditures. When the estimates were prepared for the period up to 2017, a provincial dimension was also added to the account. The account is annual, but quarterly estimates for some components may be added in future.

The experience of developing the satellite account proved quite helpful when it came time to break out a distinct sector for non-profit institutions serving households (NPISH) in the core national accounts. This sectoring approach was recommended in SNA 2008 and Statistics Canada adopted most of the recommendations from that international standard in 2012.

The non-profit and volunteering satellite account is a good example of a hybrid case, with both thematic and extended accounting features. The non-profit sector part of the account is constructed using concepts and statistical estimates from the core national accounts and simply reorganizes information that is already there. The volunteer work part of the account differs in that it goes beyond the production boundary in the core accounts to include imputations for the value of volunteer work.

8. Research and development satellite account

Statistics Canada released a research and development satellite account in 2008. The account was developed in preparation for a major restructuring of the core national accounts, the goal of which was to capitalize research and development expenditures. Previously, these expenditures were not treated as capital spending, neither in Canada nor in other countries, although there were some exceptions such as software development outlays. International discussions leading to the new standard SNA 2008 determined that henceforth such expenditures would be regarded as another form of capital investment. To prepare for this restructuring of the core accounts, which was implemented in two phases, in 2012 and 2015, a satellite account was prepared as a transitional measure to learn more about the conceptual issues, data requirements and other implications of this capitalization.

The study covered the period 1997 to 2004 and defined research and development investment expenditures as they are delineated in the *Frascati Manual*. The share of research and development investment expenditures was estimated to be 2.9% of gross domestic product in 2004.

The satellite account was never updated after its release in 2008. There was no need to do so, since research and development expenditures were capitalized in the core accounts in 2012.

9. Culture satellite account

The culture satellite account is sponsored by the federal Department of Canadian Heritage and its various partners and is developed and maintained by Statistics Canada. It was first released in 2011 and continues to be updated regularly.

The satellite account is thematic in nature and does not deviate from or expand upon the core national accounts concepts. Its approach is to select the classes within NAICS and NAPCS that pertain to culture and sport and reorganize them in a coherent manner following the Canadian Framework for Culture Statistics, an organizing structure discussed and agreed to by a diverse group of cultural organizations across the country. The account follows national accounting principles and allows users to compare culture and sport production and consumption activities with those of the broader economy.

Culture is defined as creative, artistic activity and the goods and services produced by it, and the preservation of heritage. Sport is defined as an individual or group activity, often pursued for fitness in leisure time, fun or competition.

The satellite account describes culture and sport activities in terms of domains and sub-domains, which are groupings of products (selected NAPCS classes) and the industries that produce them (NAICS classes), in a creative chain. For instance, an author engages in creative, artistic activity by writing a manuscript of a novel on contract to a book publisher, who in turn purchases design services for a cover from a graphics design firm. Further activities involve the publisher transforming the manuscript into a book, managing copyright and licensed materials and producing copies including already copyrighted or licensed materials, for distribution through wholesalers to retailers. Retailers in turn sell the book to consumers. This example illustrates that while not all of the activities included in the chain are creative, all add value to the culture product as it goes through the various stages of production. All are within the scope of the satellite account.

Culture product domains include, for example, the written and published works domain which encompasses all the economic activities from the creation to the final product made available to consumers. Books represent a sub-domain within the written and published works domain. There are six culture domains in total.

Sub-domains are either core or ancillary. Core culture sub-domains produce goods and services that are the result of creative artistic activity (e.g., books, works of art and crafts) and whose main purpose is the transmission of an intellectual or cultural concept, whereas ancillary culture sub-domains produce goods and services that are the result of creative artistic activity (e.g., designs, architectural plans), but whose primary purpose is not the transmission of an intellectual or cultural concept.

There are also two primary transversal domains: education and training as well as governance, funding and professional support. A transversal domain supports all culture domains, including their sub-domains, and allows for movement along the creative chain. For example, this includes educational programs for culture professionals and funding for cultural or sport programs. Industries and products within transversal domains are not fundamentally culture but they are an integral part of culture since culture domains could not exist without them. The transversal domains produce goods and services that support all core and ancillary culture sub-domains and are often referred to as crosscutting domains. A third transversal domain is called the multi-domain. This includes five industries where each contains some culture content that affects more than one main culture domain. Several culture industries are not associated with any culture domains and sub-domains: the culture portion of convention and trade show organizers; internet publishing and broadcasting, and web search portal industries. These culture industries all affect more than one culture domain, but are not easily allocated to a single domain, so they are instead aggregated together into the multi-domain.

The culture satellite account is much like the tourism account. It is motivated, actively supported and financed by federal and provincial government departments. From a conceptual perspective, it is structured strictly within the national accounts framework. Its basic strategy is to recombine classes within NAICS and NAPCS in order to define new industry and product categories for culture and sport.

10. Pension satellite account

The adequacy of Canada's pension system to meet the needs of seniors has been a topic of active discussion for many years. The pension satellite account was developed to bring together several relevant data sets in a coherent stock-flow framework, linked to the core national accounts. More specifically, the pension satellite account can be viewed as a disaggregation of pension-related information from the income and expenditure accounts and the financial and wealth accounts. There are no national accounts framework extensions in this account.

The first release of the account's pension asset estimates was in 2008 and the first full stock-flow release was in 2009, covering the level of pension assets and pension inflows and outflows for the period 1990 to 2007. The account has been kept up-to-date on an annual basis since then.

The account comprises several classes of pension assets: social security benefits including the Canada and Quebec Pension Plans, Old Age Security and the Guaranteed Income Supplement; employer-based pension plans including both defined benefit and defined contribution plans, from both the private and the government sectors; and individual registered (tax-favoured) saving plans. Other investment schemes that might be motivated partly by retirement saving goals, such as tax free savings accounts, unregistered individual portfolios of bonds and equities and homeownership, are out of scope.

For each pension asset type the account records, on an annual basis, opening assets, inflows (contributions, investment income), outflows (withdrawals), revaluations, any other changes in assets, and closing assets. The OECD [2018] is now requesting that member countries submit annual pension information in a table template that is broadly similar to the pension satellite account. It expands the structure with respect to the split between defined benefit and defined contribution plans and provides more flow detail. The OECD table also shows the over- or under-funded status of the various groupings of plans, a key metric for the financial health of pensions. At the end of 2018, the pension satellite account estimates that pension wealth was $3.9 trillion, accounting for over half of households' financial assets. As life expectancy continues to rise and fertility rates continue to be low or fall further in the years ahead, the adequacy of the pension system is likely to be a topic of sustained interest. The pension satellite account provides important financial time series statistics in support of these discussions.

11. Natural resources satellite account

Canada is a vast country, the second largest in the world by land area, and its territory is rich with a wide variety of renewable and non-renewable natural resources. These resources play a key role in the economy. Overall, about 10% of Canadian gross domestic product and over 3% of jobs in 2019 were attributable to the natural resources sector. The natural resources satellite account aims to provide a single, comprehensive, well-integrated picture of this natural resource base.

The natural resources satellite account was first released by Statistics Canada in 2017. It is another thematic account, based primarily on statistics from the supply and use tables. There are no national accounts framework extensions in this account. It rearranges information from the supply and use tables to allow users to observe better and understand more fully natural resource economic activities in Canada. The account brings together production statistics from selected industries related to natural resources and also includes production taking place in industries that are not usually defined as natural resource industries, but rather as manufacturing (such as metal refining) or other related industries.

The satellite account defines in-scope natural resource activities as those producing goods and services originating from naturally-occurring assets. These assets comprise mineral and energy resources, water, natural timber and aquatic and other natural biological resources. The services required for extraction and initial processing of natural resources are also included. However, intensively cultivated biological resources such as agricultural crops are excluded. Overall, the account includes four sub-sectors: energy, forests, minerals and mining, and hunting, fishing and water. From a product perspective, the account focuses on extracted energy goods and associated extraction services, electricity, refined petroleum products, forest products and associated services, sawmill, pulp and other wood products, metallic and non-metallic mineral products and associated services, and hunting, fishing and water

products. From an industry perspective, the account spotlights the energy, mining, forest, hunting, fishing and water industries and selected downstream industries.

The natural resources account reports intermediate consumption and output for natural resources industries, associated primary income flows, inventory changes, exports and imports, from 2007 to date. The main source data are annual, from the supply and use tables, but quarterly estimates have also been derived. A human resource module provides associated estimates of employment and a provincial and territorial decomposition is also available for some time series in the account.

12. Transportation economic account

The transportation economic account provides a broad measure of transportation services produced and consumed in Canada. Originally inspired by the United States Bureau of Transportation Statistics [2016] satellite account, the Canadian account covered only for-hire and own-account transportation services by the business and government sectors, but beginning in 2019 the account also includes own-account transportation services of households, defined as transportation services produced by households for their own use. It reorganizes information from the supply and use tables to portray a broader concept of transportation activity. Transportation is defined to include air, rail, water, truck, urban transit, personal automobile, taxi, pipeline, courier, postal and warehousing activities plus transportation services provided directly to households by members of those same households.

The supply and use tables record for-hire transportation services provided on a fee basis by transportation industries. They do not explicitly report own-account transportation services produced by non-transportation industries to support their internal business activities. Rather, the supply and use tables treat own-account transportation services as an ancillary activity of non-transportation industries and embed the related inputs in the cost of producing non-transportation outputs. They also do not record transportation services that households provide for themselves since this activity is outside the production boundary in the core national accounts.

Non-transportation industries commonly buy or lease vehicles, hire vehicle operators and move goods and personnel without purchasing these transportation services from a transportation industry enterprise. For instance, a large-scale manufacturing establishment could decide that using its own vehicles and drivers to move inputs between plants would be more cost-effective than hiring a trucking company. In this way, the manufacturer produces a transportation service for its own consumption, referred to as an own-account transportation service. This activity does not show up in the manufacturing industry's output, since it is not a market output. It is embedded in the industry's expenses. The same is true for all enterprises that do not have transportation as their primary output and that produce transportation services for their own use, other examples being construction, mining and wholesale trade. As such, a large portion of transportation activity taking place is not directly observable in the supply and use tables.

The transportation satellite account makes this implicit transportation activity more explicit. It does so by presenting each main mode of own-account transportation as a separate transportation service industry: air, rail, water and truck. Each produces one output, that being its corresponding own-account transportation product. Including these activities in the account provides users with a better understanding of total transportation activity that cannot be observed simply by analyzing the transportation industry. This is important when developing transportation and environmental policies.

Inputs used in the production of own-account transportation by non-transportation industries are transferred to these newly created industries. They are replaced in equal amount with the outputs of these industries. In effect, the new own-account transportation services industries by mode explicitly capture the activities of the relevant non-transportation industries.

This rearrangement of the supply and use tables results in an increase in the total output, equal to the output produced by the newly created own-account transportation services industries. However, this additional output does not change the economy-wide GDP, because the value added by own-account transportation services is already accounted for in the supply and use table entries of the relevant non-transportation industries.

The satellite account simply reclassifies the own-account transportation services portion of the value added by the non-transportation industries to the newly created own-account transportation services industries.

Household own-account transportation services are valued conservatively by a cost-only approach including estimates of capital consumption and taxes (vehicle and licensing fees) on production. The method is similar to the one used in the core national accounts for owner-occupied dwellings where related expenditures are re-routed as intermediate consumption in a household industry. No imputation is made for the own-account (non-market) labour input.

13. Cannabis satellite account

In April 2017, the Government of Canada tabled legislation in the House of Commons to legalize, regulate and restrict access to cannabis for non-medical purposes. After months of preparatory work, the legislation took effect in October 2018.

At the time, cannabis production, distribution and consumption were illegal and out of scope for Canada's core national accounts. They had to be brought into scope after legalization.[6]

To prepare for this change, Statistics Canada developed a cannabis satellite account. It was expected the illegal cannabis market would continue after legalization, with lower prices, but it was hoped it would gradually lose ground to the legal market. An important goal for the satellite account was to track the transition from illegal to legal.

Lengthy historical time series for illegal cannabis production and consumption were estimated, in grams, using data from health and demographic surveys done in the past. Average prices for a gram of cannabis were estimated in some rather creative ways.[7]

Using the supply=use identity and debatable assumptions, complete illegal cannabis accounts were estimated. The results were released as a cannabis satellite account prior to legalization day, for discussion. Thereafter, accounts for the newly legal cannabis industry were developed as well, using administrative data from the regulatory system and survey results. Eventually, the estimation methods were embodied in the core accounts and the satellite account was deactivated.

Provincial estimates for the two markets were also estimated to allow provincial governments to track progress in the transition from the illegal to the legal market.

The economic importance of cannabis was and remains very small, since cannabis value-added activity represents little more than 0.1% of GDP. Nevertheless its legalization was a big political issue and its effect on the economy could not have been ignored in the national accounts.

The development of the satellite account allowed statistical estimates to be developed in an experimental mode and to expose them to public scrutiny prior to their eventual incorporation in the core accounts. Within the broader national accounts structure, it facilitated the balancing of different aspects of the cannabis market — prices, household expenditures, profits, labour compensation, input costs, inventories, international trade and so on.

6. Production and consumption of illegal goods and services like cannabis are in-scope under SNA 2008, but they had been treated as out-of-scope in Canada's national accounts because of the difficulty of measuring them. Cannabis, both legal and illegal, is now in-scope. This required the estimation of cannabis production and consumption in previous periods, which was done as part of the work on the cannabis satellite account.
7. For the 1960s through to more recent years the estimates rely on studies conducted years ago by academics. For more recent years, anonymous crowd-sourced price data were used.

14. Digital economy satellite account

Statistics Canada released the first edition of its digital economy satellite account in May 2019. It is a purely thematic account, with no departures from standard concepts in the core national accounts. The account presents a working definition of the digital economy as well as initial estimates of the output, value added and jobs associated with activities in the digital economy, both for Canada as a whole and for the individual provinces and territories.

As for most other satellite accounts, this one is derived from the supply and use tables. The industry and product breakdowns in those core accounts are not always sufficiently detailed to reveal economic activities associated with the digital economy. Accordingly, the digital economy satellite account disaggregates and recompiles information from the core accounts in new categories that make digital transactions more explicit. The concepts and definitions of the digital economy are borrowed from the OECD framework [2017] and similar research done by the United States Bureau of Economic Analysis [2018]. The account presents estimates at basic prices for the 2010 to 2017 period. Given the dynamic nature of digital economic activity, it is expected this satellite account will evolve rapidly in the years ahead.

The list of products considered to be included in the digital economy is organized in three broad categories: (1) digitally-enabled infrastructure, (2) digitally-ordered transactions or e-commerce and (3) digitally-delivered products. Infrastructure includes computer hardware and software, telecommunications equipment and services, Internet of Things devices and a variety of other support services and structures. Digitally-ordered transactions comprise the purchase and sale of non-digital goods or services where the order is received and the commitment to purchase is made via the Internet, even if the payment is made by other means. Finally, the digitally-delivered products category includes products transmitted and consumed in digital format. Some examples are digitally-delivered music, books, videos, financial services, software and games.

Value added in the digital economy is estimated to be equivalent to 5.5% of GDP in 2017. It is estimated to have grown about 1.5% more rapidly, per annum, than the total economy over the 2010 to 2017 period.

15. Conclusions

As mentioned, satellite accounts come in two notional varieties, thematic and extended, although in practice they sometimes include elements of both. Thematic ones aim to translate the often jargon-laden and less familiar concepts and classification systems of core national accounting into the parlance and organizational frameworks of the people who use the statistics. Extended accounts grant freedom to statisticians to experiment with new ideas to address important current issues, taking advantage of the many strengths of the established SNA without being overly constrained by the rules and boundaries of that system.

Satellite accounting has grown more popular around the world both because of a desire to make national accounts statistics more understandable and useful for non-experts, and because of a need to make them more relevant for everyone in a rapidly changing world. In general, satellite accounts can be developed relatively quickly because, in most cases, the compiler does not need to conduct new surveys or invest in extensive data development work. Most of the source data and tools the compiler requires are readily available, so satellite accounts can often be built fairly quickly when the need arises. This is especially so in Canada because of the availability of long time series of supply and use tables, containing fully reconciled and curated economic statistics with detailed information by industry, by product class and by final demand category for each of Canada's 10 provinces and 3 territories.

The accounts for tourism, culture, transportation, health and some other topics have been quite successful internationally in making national accounts more useful to non-experts, while those for environment, household work and volunteering have explored important questions about which traditional national accounting has little to say. In Canada's case, some satellite accounts have also been helpful in testing and preparing for major changes in the core accounts — those for non-profit institutions, research and development spending and cannabis production and consumption.

As critical economic issues continue to emerge that are not easily addressed within the standard national accounts system, satellite accounting will undoubtedly continue to provide a way forward. Other big issues of the day —

environmental sustainability, income and wealth inequality, consumer surplus in the digital economy,[8] shifts in output between the market and household economies and, more generally, the need for broader measures of well-being than GDP — pose big measurement challenges that lend themselves to experimentation in satellite accounts. Eventually, with the passage of time and the refinement of these accounts, some of the more successful satellite approaches can potentially be adopted within the international SNA standard.

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8. The reference here is to the proliferation of seemingly invaluable services that consumers get without explicit charge via the Internet, such as Google searches, maps, translations, online office software and other tools; Facebook, Twitter and LinkedIn interpersonal connectivity; and online purchasing with much wider choice options via Amazon and other smaller firms.

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