The Canadian Integrated Approach To Economic Surveys

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1. Introduction

Statistics Canada's approach to gathering and disseminating economic data has developed over several decades into a highly integrated collection and estimation system that is built to feed the framework of the Canadian System of National Accounts (CSNA). The System of National Accounts (SNA) framework was first used in the 1960s as a tool to organize and prioritize the economic survey and data estimation systems using the 1968 United Nations Standard on National Accounts. It is now based on SNA93 (United Nations et al. 1993). The Canadian system covers all the accounts of the SNA93, which will be outlined in the next section of the paper, and covers key measures and accounts on a provincial or regional basis. The wide range of variables and dimensions of the SNA have been determining factors in the design, characteristics and basic infrastructure of the data collection and estimation system which feeds it.

This paper outlines the CSNA framework used in designing the survey and the administrative data system used to feed it. It then describes the Unified Enterprise Survey system used to collect both the establishment- and enterprise-based surveys used in compiling the CSNA. The paper also describes the central frame used to design and draw samples for survey and administrative data estimation. The paper concludes with an overview of work yet to be done in the evolution of this higher integrated approach to economic statistics.

2. What is the Canadian System of National Accounts?

The CSNA covers most aspects of the international standard (SNA93) at various frequencies and details (Table 2.1). There are two basic architectures in the CSNA: both have a great impact on how the survey system is designed and maintained. The first relates to the production account which, in Canada, takes the form of an annual set of rectangular 'supply' and 'use' tables. First, the supply table measures the output of commodities (725 commodity groups) by industries (300 industries). Second, the use tables articulate the use of commodities by industries as intermediate inputs to production and the final demand for commodities by the institutional sectors of the economy. (In Canada, there are only four institutional sectors: Households and Non-profit Institutions serving Households, Corporations, Governments and Non-residents). The supply and use framework has been a major influence in the structure and design of the survey and estimation system, which covers the entire economy on an annual basis with a combination of surveys and administrative data.

The supply and use tables provide the annual benchmarks for gross domestic product (GDP) using the production approach or estimation of value-added by industry—by subtracting intermediate inputs from outputs of industries. In order to articulate the production account by industry, the data must be collected at the level of production units or kind of activity units: the unit in the economy where the production process is homogeneous in producing a principle output.

The table of final demand of commodities by industries provides the link from the production accounts to the second architecture of the CSNA: that is, the distribution and use of income, capital accumulation and financial and wealth accounts by institutional sector. In Canada, these accounts are estimated on a quarterly basis—60 days after the reference quarter—and are benchmarked using the supply and use tables when the annual survey and administrative data become available 12 to 15 months later. The accounts are released 12 months after the reference quarter. The data used to produce the preliminary accounts by sector are highly dependent on data collected from high level institutions within the sector where the savings and investment decisions are made. For businesses, this means consolidated data at the enterprise level.

The consolidation of the distribution and use of income accounts (including capital accumulation accounts) produces two independent estimates of GDP through summing factor incomes and summing final demand adjusted for inventories and imports. This provides the link from the supply and use tables to the institutional sector system.

2.1 The survey system in relation to the CSNA

In order for all of the three estimates of GDP to be measured consistently, a key feature of the economic survey system is an accurate mapping between all levels of institutional units. The structure of enterprises from the top consolidated level down to the production units must be articulated on the survey frame to ensure consistency between enterprise-based and establishment-based surveys and estimation systems. In Canada, this is complicated by the need for the structure to provide information on the geography of the units so that regional accounts can be estimated in tandem with national level estimates. The central Business Register of Canada's economic survey system is discussed in Section 4.

Another important feature of using the SNA as the framework in design of the survey system is a need for consistency in definition and detail of the variables collected. For the CSNA, a chart of accounts has been established to map SNA variables to standard business accounting variables. This enables the survey system to collect the appropriate variables to measure economic aggregates of output, value-added, factor and proprietors' income and investment and consumption expenditures. The Chart of Accounts also enables the use of other administrative data, such as income tax data, also derived from business accounting systems to minimize response burden. The essential variables of the survey system, or the principle statistics, are outlined in Annex 2.

Using the CSNA as the framework, Statistics Canada has developed a unified survey system, which covers the entire economy on an annual basis. The survey collection and use of administrative data is based on common variable definitions and a well-developed single frame of businesses with varying degrees of structural complexity.

Table 2.1. Principal Statistics		
	Key variables	**Frequency, detail and geography**
Production Accounts	• gross domestic product • gross output of commodities and industries • intermediate inputs of goods and services • value-added by industry	• annual supply and use tables • 300 industries • 725 commodities • national and provincial
Production of Income	• compensation of employees • gross operating surplus	• annual by industry • 300 industries • national and provincial • quarterly national aggregates by four institutional sectors
Primary Distribution of Income	• labour income • proprietor's income • property income • gross sector and national income • sector and national disposable income	• quarterly national aggregates by four institutional sectors • annual by province, national, household and government sectors
Secondary Distribution of Income	• transfer income • consumption expenditures • transfers paid • net disposable income • net saving	• quarterly national aggregates by four institutional sectors • annual by province, national, household and government sectors
Capital Accumulation Accounts	• gross fixed capital formation • capital transfers • capital consumption allowances • net lending/borrowing	• quarterly national aggregates by four institutional sectors • annual by province and government sectors only
Financial Accumulation Accounts	• acquisitions of financial assets • incurrence of financial liabilities	• net financial investment • quarterly national aggregates for 4 institutional sectors and 30 sub-sectors
Other Changes in Volume of Assets Account		• unpublished
Balance Sheet Accounts	• gross and net non-financial capital stocks • net financial position • national/sector net worth	• quarterly national aggregates by four institutional sectors • annual for 30 sub-sectors

The survey system consists of a set of 200 annual surveys designed to measure all of the revenue and operating expense variables associated with the production account for each of the 300 industries in the supply and use tables. These surveys also collect data on production, revenue and intermediate use of goods and services statistics by commodity group, and are aimed at the production unit or establishment level. These surveys are complemented by an economy-wide survey of investment expenditures, which is used to build the investment flows and capital stock estimates of the CSNA (Annex 1).

3. The Unified Enterprise Survey

3.1 Overview of the Unified Enterprise Survey

The current implementation of Statistics Canada's integrated approach to economic surveys was established in the late 1990s. At that time, Statistics Canada redesigned its entire framework for conducting annual business surveys. The goal was to integrate all business surveys into a single master survey program called the Unified Enterprise Survey (UES). The UES was created to achieve a number of objectives as part of the Project to Improve Provincial Economic Statistics (PIPES) (Statistics Canada 1997). The general goal of the UES was to improve the consistency, coherence, breadth and depth of the business survey data.

The UES was designed to collect more industry and commodity detail at the provincial level than was previously possible while, at the same time, trying to avoid overlap among different survey questionnaires. The UES covers all the major industries in Canada—manufacturing, wholesale, retail and services. Some small industries, like aquaculture and couriers, are also surveyed. More than two-thirds of the Gross Business Income is covered by the UES. Statistics Canada's business surveys are the responsibility of different program areas, such as distributive trades, services, transportation and manufacturing—dispersed in over a dozen subject matter divisions.

The UES is a vast program, which includes the collection of both enterprise- and establishment-based statistics. The establishment part of the UES is described in the current section and in Sections 5 and 6. The enterprise part is presented in Section 6.

Enterprise Statistics Division (ESD) was therefore created as a central area charged with managing and co-ordinating all establishment-based UES activities. It is a highly integrated and interdependent approach to conducting business surveys, which involves many service area partners. ESD co-ordinates the work of these partner divisions, including the business register, centralized collection services, operations research and development, methodology services, tax data and standards.

The UES strategy emphasizes a centralized approach where many operational activities are concentrated in ESD, allowing subject matter areas to focus on data validation, analysis and subject matter specific research. The UES has allowed Statistics Canada to achieve a much more robust annual statistics program compared with what existed before PIPES. Nevertheless, the constantly changing environment of business surveys, including the new ways businesses are organizing and operating in the global economy (new business models), financial pressures

within Statistics Canada and increased reliance and response burden on large businesses, dictates a need for further improvements in our survey programs. An integrated (unified) approach to business surveys is more and more essential in helping us to understand and resolve these issues.

The UES principles include:

- Frame/sampling and coverage: using a single unduplicated frame, a common sample design and an enterprise centric approach to ensure full unduplicated coverage of all establishments; focusing on large complex enterprises for profiling and survey samples; using tax data for smaller simple enterprises; expanding coverage of business surveys to include all sectors of the economy; and obtaining sample sizes appropriate for the production of provincial estimates by industry.

- Content and collection: using common concepts, terminology and classifications (standards); eliminating duplicate data requests using an enterprise centric strategy and questionnaires with a common look and feel; using the Enterprise Portfolio Manager (EPM) program for most important businesses; and using electronic data collection and integrated data collection options.

- Processing and post-collection: using common generic processing systems and methods (common edit and imputation methodologies); using centralized UES warehouse for processing and analytical purposes; and allocating head office expenditures and enterprise-level survey responses to accurately measure value-added by industry using the North American Industrial Classification System (NAICS) and by province.

- Outputs: providing timely, detailed and reliable economic data; allowing the production of provincial input–output tables, while imposing minimal burden on respondents; eliminating incoherence between the establishment data and enterprise data; and providing more analysis facilitated through the centralized UES warehouse.

3.2 Overview of ESD within the Business and Trade Statistics Field

The UES program is managed in a matrix environment through a streamlined number of strategic and operational committees, with partner divisions providing methodological, frame, standards, collection and application development services. ESD's role is to collaboratively orchestrate this group of subject matter clients and partners, and to plan, manage and process the UES so as to meet operational and strategic objectives.

ESD is also responsible for providing core UES-related services associated with content harmonization and preparation of mailout materials, collection monitoring and budget management, respondent relations (complaint resolution), processing of collected data, the development and maintenance of the centralized UES data warehouse and associated tools and the monitoring and assurance of overall UES data quality. Through ESD, the best ideas and practices from all UES survey managers are incorporated in the standard UES systems used by all participating divisions. The use of these generalized systems across all UES surveys reduces

development and maintenance costs for the agency and allows us to maintain a constantly improving and flexible processing system for the UES. These functions are essential to meeting UES objectives and are not replicated in other divisions. Beyond the UES, ESD provides corporate respondent relations services across all Statistics Canada business surveys, including survey complaint resolution and the EPM program for large, complex businesses.

Given that many surveys are conducted within a program framework, an efficient procedure for providing frames for individual surveys is to maintain a multipurpose frame database that meets each survey's needs. For a program of business surveys, this database is called the 'Business Register.'

4. The Business Register

4.1 Description

The Canadian approach to economic surveys is based on a central frame developed and maintained at Statistics Canada called the Business Register (BR). The BR (Cuthill 1990) was developed in the 1980s as part of a larger initiative to create generic tools and frameworks for conducting business surveys. The BR is now the backbone of more than 90 surveys and is managed by the Business Register Division (BRD) - a central division that provides services to survey programs areas. The BR is made up of a suite of files, programs and processes that interface with businesses through direct profiling, survey responses and feedback and, indirectly, through administrative files such as taxation files.

The BR is a list of businesses engaged in the production of goods and services. Among them are both incorporated and unincorporated businesses, except some smaller entities.[1] The BR covers all sectors of the Canadian economy: commercial, non-profit, religious, government or institutional activities.

Since businesses can vary in structure and complexity, there is a need to define a standard set of rules to adequately measure production units. Once the structure is established, various pieces of information are maintained. They include identification, location, contact information, organization, classification (NAICS) and basic information such as the number of employees and gross business income.

4.2 Structure

The enterprise and establishment levels are the main ones used for conducting business surveys. Based on these, enterprises are categorized as complex or simple in structure. A complex enterprise is one that is comprised of multiple establishments operating in different industries (NAICS 4). Conversely, a simple enterprise is one with a single establishment or with multiple establishments all involved in the same activities (NAICS 4).

1. Excluded are unincorporated businesses with no employees and with taxable sales lower than $30,000.

Table 4.1. Number of enterprises			
	Number of enterprises	**Number of establishments**	**Percentage of revenue**
Complex enterprises	21,000	115,000	62
Single establishment enterprises	2,240,000		38

Legal structure

To be created, a business needs a legal status, which implies a legal structure. Such a structure enables the business to communicate with government organizations such as the taxation agency - the Canada Revenue Agency (CRA). Each year, businesses[2] must communicate with the CRA using a unique Business Number (BN) to report their income tax statement, to declare taxes collected as well as payroll deductions. These reports from the CRA are transferred to Statistics Canada under agreements, and constitute the basis of the updating signals for the BR. The legal structure is maintained on the BR.

Operational structure

In their daily operations, businesses manage and organize themselves differently than for their legal operations. Their structure is dependent on management methods related to various business lines as well as accounting practices. For instance, a single legal entity may be operating several plants and may own both wholesale and retail companies. These may all be under only one legal entity, but the operational structure could have two or more organizational and production units. The latter type is of interest to the BR.

Usually,[3] to be part of the BR, an operational unit should have employees, material, a manager and be recognized as an accounting unit. The type of accounting unit forms the basis of the operational structure on the BR. There are five types:

- Investment Centre: responsible for accounting, which provides profits and investments.
- Profit Centre: responsible for specific revenues and costs.
- Cost Recovery Centre: responsible for recovering its costs by charging them to other centres for goods and services provided.
- Cost Centre: unit for which costs are identified for management purposes.
- Revenue Centre: responsible for generating revenues.[4]

2. Some self-employed companies are not required to have a BN.
3. There are exceptions; for example, an operational unit may not directly have employees but could share them with other units.
4. It may have some marginal costs.

The operational structure is totally dependent on business cycles and management decisions. As a result, the concepts intended to be measured may not be in line with the operational structure, hence the need for standard definitions of enterprise and production unit.

Statistical structure

For sampling purposes, it is very desirable to have homogeneous units in order to have an efficient sampling design. But more importantly, it is mandatory to define standard units in order to correctly measure production as well as the flow of goods, services and capital. One survey might gather information on employment, while another may collect data from financial statements. For these purposes, a common definition of businesses is needed. At Statistics Canada this is called the statistical structure. The statistical structure is a construction based on a series of rules to define and store on the BR a standard four-level structure hierarchy for all businesses. The highest level is the enterprise, while the lowest is the location. In between are the company and establishment levels.

- Enterprise: This is the highest level of the hierarchy and has a complete set of financial statements. This is also the level where information about the international financial position is maintained. An enterprise may have one or more company.

- Company: A level of somewhat homogeneous production with information related to balance sheets that enables derivation of the profit margin and return on investment. A company may have more than one establishment.

- Establishment: The most homogeneous level in terms of production. It can provide information on total production output, cost of material, services and wages and salaries. An establishment may have one or more location.

- Location: A unique physical production unit. The information available relates to employment.

In the context of single production entities, all levels are created, but they all represent the same unit. For each of the lowest level units, a NAICS industrial activity code is assigned. NAICS codes are then assigned to higher levels based on a dominance rule.

4.3 Link with surveys

While the BR is responsible for maintaining the central frame, individual survey programs are responsible for defining their respective needs. For each cycle (annual, quarterly, monthly) of the survey, a BR extraction is produced and the resulting file constitutes the sampling frame. Then the sample is selected and collection entities are prepared for in-sample units. Since the statistical structure is a Statistics Canada construct, it may not always directly relate to an existing structure of the business capable of providing the requested information. As a result, collection arrangements need to be organized with reporting units. This may range from an aggregated report for multiple units to a series of reports with more detail than required. In all cases, an

allocation process is needed to distribute the collected information into the selected units in order to link responses with concepts defined by the survey.

All the information related to time-in-sample is kept and managed through sample control files. This allows survey methodologists to control the needed overlap (or non-overlap) between surveys to maintain the sample rotation strategies. Further, it provides the necessary information to reduce and manage the response burden of enterprises.

Finally, the survey information regarding changes to the contact person, business structure, size and the presence or lack of activity is then fed back to the BR for updating.

4.4 Updating mechanisms

The BR is updated on a continuous basis using three mechanisms. For large and complex enterprises, updating is achieved through direct profiling, which consists of contacting the enterprise and establishing its structure and contact points. This is a manual process conducted and maintained in the BRD. For most enterprises, sources for updates are administrative files produced by the CRA. Among their legal obligations, enterprises must submit three sets of information to the CRA: Goods and Services Tax collected (GST), payroll deduction (PD) retained from employees, and annual income tax forms.

The GST and PD files are obtained on a monthly basis, and constitute prime information to determine the presence of activity as well as to detect new enterprises. Enterprises also provide information, such as number of employees (PD) or taxable sales (GST), on the size of the enterprise. The annual income tax files provide a more detailed picture of each enterprise. In this case, two files are available: one for incorporated businesses (T2) and one for unincorporated businesses (T1).

Finally, when enterprises are contacted during the course of a survey, whether it is to make collection arrangements or at the actual collection time, any new information or change to the structure and classification of enterprises is fed back to the BR. This information is then used to update it.

5. UES Advantages and Achievements

At the beginning of the UES program, many divisions played an important role in putting the survey together. However, there were also many conflicting interests as subject matter divisions felt they were loosing control of their surveys. In order to get the participation of all the divisions, each survey was introduced while maintaining its main collection and sampling specificities. Some of the main efficiencies of a centralized approach were lost. However, the SNA required detailed financial information, which was very difficult to collect from the businesses since it increased the response burden quite significantly.

Over the last three years a great deal has been accomplished to improve the UES and many goals of the initial principles were achieved. The timeliness target of releasing survey results within 15

months of the reference year-end were achieved for most UES surveys as of reference year 2001; shaving as much as 9 months off the previous norms. A systematic multi-year plan to replace survey data with tax data for simple businesses across all surveys was implemented thus significantly reducing response burden. Collection costs have been reduced significantly (almost 20%) through the aforementioned initiative in addition to the use of a 'score function' to prioritize delinquent respondents and edit follow-up activities in the centralized collection areas.

Over the last few years, ESD has implemented a fully redesigned systems infrastructure, which integrates tax data in the UES process and ensures that all tax data are available in a systematic way for business surveys. The processing environment has been re-engineered using BANFF [Statistics Canada's new SAS-based generalized edit and imputation system (BANFF Support team 2005)] to enable us to produce estimates much earlier in the survey cycle (before collection is finished), thus ensuring a more top-down approach to data validation and enabling more analysis.

Statistics Canada has been able to significantly reduce response burdens in the last few years - and plans further reductions - by making greater use of tax data and using shorter questionnaires based on the Chart of Accounts (COA) (Statistics Canada 2004). The COA is a list of business accounts from Balance Sheet and Income Statement. It has a hierarchical structure and is based on business accounting concepts and practices, which allows us to bring our data requests more in line with standard accounting and business reporting practices.

The EPM program has matured and now covers most of the largest businesses in Canada. Pilot work on coherence analysis of establishment versus enterprise data has set the foundation for introducing such data confrontation into the ongoing UES production process for reference year 2003.

ESD has also achieved most, if not all, of the basic objectives for the UES. These objectives include the use of a common survey frame; integrated sampling and estimation; common concepts and definitions; common look and feel for questionnaires and mailout materials; common/generic collection and processing systems with lower maintenance and development costs; and a common database through which we can leverage our data holdings. Centralizing the UES management and core process functions in ESD has meant timely delivery of change initiatives (timeliness improvements, tax replacement, system and database enhancements) in a cost effective manner. Continuous improvement of these processes to optimize all aspects of the UES is also at the heart of the ESD mandate. The following sections provide details of these achievements.

5.1 Timeliness

The length of time between the end of the reference period and the appearance of the estimates for publication was problematic in the start-up years of the UES surveys. The pilot year for new surveys and the following transitioning of existing surveys into the UES covered the reference years 1997 to 2000. All components within the survey process contributed to the problem; questionnaire and collection applications development, data collection, survey operations processing and analysis. However, the principles of the UES clearly identified timeliness as a priority given the importance of relevant data to the user community.

In June 2001, a UES task force was instituted to deal with the timeliness issue, with ESD taking up the leadership and co-ordination role. The task force devised a plan for improving the timeliness of all survey processes within the UES. They set a target of 15 months after the reference period, to be applied to reference year 2001. For all future reference years, the 15-month target would be maintained and, where possible, further improvement to a 12-month target would be sought. As of reference year 2003, all surveys have been released within 12 to 15 months.

5.2 Centralized processing systems and databases

A principal goal of the UES was to create a suite of centralized tools that could be used to both process and analyze data. The rationale for the centralization of these services included:

- reducing development costs to move away from stovepipe, stand-alone systems and approaches;
- developing best practices that can be embedded in the processing tools and shared across the bureau;
- centralizing the databases to move from a distributed model to corporate data management;
- creating a single point of access to and centralized security for all UES-related data, rather than multiple access points and multiple/differing security levels; and
- rationalizing hardware to minimize the number of servers.

In the early stages of the UES, many of these systems were developed independently of one another. This was not so much by choice as it was a result of the requirement to get the system up and running in time to meet the UES production schedule. One of the major accomplishments of ESD over the last two years has been incorporating the UES processing system and databases into an integrated suite of tools that have a common look and feel and a shared methodology.

5.3 Use of administrative data in business surveys

Significant progress has been achieved in making greater use of tax data. In the UES, survey data are being replaced with tax data in many cases—both as planned tax replacement and for survey non-response (17,000 tax records from a sample of 55,000 in reference year 2003). More importantly, this initiative is allowing us to reduce response burden for smaller enterprises. Over 50% of simple businesses previously in sample are no longer receiving a UES questionnaire. ESD has also implemented a fully redesigned systems infrastructure, which integrates tax data in the process and ensures that all tax data are available in a systematic way for business surveys.

Research continues on the best ways to fully use the available tax data to further reduce response burden. Several simulations have been done with different rates of tax replacement for simple enterprises. These simulations have clearly shown that a small sample of simple businesses or characteristics surveys is needed to model the non-financial information.

The UES tax strategy consists of two separate initiatives. The first is the use of tax data to estimate for the smallest businesses within the population, those cumulatively representing the lowest percentage of total revenue. For UES, from 1998 to 2001, a 'Royce-Maranda exclusion threshold' of 5% was used (Royce-Maranda 1998). For reference year 2002, the threshold was increased to 10%, reducing the UES sample by some 4,000 units. Table 5.1 shows the share of the take-none population relative to the total population for the entire UES program from 1997 to 2001. It is evident from this table that data for the majority of businesses in Canada are obtained from administrative records.

Table 5.1. Take-none Population vs. Total Population of the Unified Enterprise Survey Program

Reference year	Number of industries surveyed	Take-none population	Total revenue take-none population ($billion)	Total population	Total UES revenue ($billion)
1998	18	181,270	7.2	400,823	485.9
1999	20	411,985	31.3	940,647	891.4
2000	40	301,421	60.1	843,970	1,505.8
2001	42	331,326	73.1	857,968	1,558.8
2002	42	527,720	92.1	898,229	1,610.4
2003	42	566,680	112.9	901,499	1,672.3

The second initiative involves obtaining data for a subset of businesses from administrative records rather than through the survey process. This initiative incorporates both a 'pre-identified' component and replacement for non-response. The pre-identified component involves pre-selecting units within the UES sample and obtaining their administrative data rather than burdening them with a questionnaire. The replacement for non-response component involves using administrative data to replace and impute questionnaire responses for delinquents. Table 5.2 shows the number of sampled units for which administrative data were used in lieu of survey response.

Table 5.2. Unified Enterprise Survey tax replacement progress, reference year 2003

Industry	Number of simple single enterprises in the sample	Pilot year pre-identified tax replacement targets	Pre-identified tax replacement units received	Non response tax replacement units received	Total tax replacement units received	
					Number of units	Percent of simple single sample
Distributive Trades	12,199	4,212	3,460	2,488	5,948	49
Service Industries	18,094	6,630	6,150	3,113	9,263	51
Manufacturing	10,728	4,652	3,765	2,018	5,783	54
Other	496	0	0	120	120	24
Total	**41,517**	**15,494**	**13,375**	**7,739**	**21,114**	**51**

Note: When the reduction in sample due to the 10% Royce-Maranda threshold is included, the effective tax replacement rate for the UES is 61% in reference year 2003.

5.4 Respondent burden reduction

When the UES was conceived under the PIPES initiative, it was recognized that, in the short to medium term, the improvements in coverage and quality would increase the response burden. Following the pilot survey for reference year 1997, industry surveys were added annually, culminating in the inclusion of the Annual Survey of Manufactures (ASM) for reference year 2000. Questionnaire content, driven chiefly by SNA requirements, was ambitious. While there was an established principle of ensuring that the variables requested were consistent with record-keeping practices of the business community, in reality there was little time to fully test the consistency of our needs with the capability of businesses to report. There was no accounting framework consistent with Generally Accepted Accounting Principles (GAAP) on which subject matter divisions could shape their survey questions or through which the SNA could express its data needs. Using tax data, a fundamental PIPES principle, was, for the most part, not yet feasible: standardized electronic tax data was just becoming available and was deemed to be unreliable and too late to be of real use. Under the Royce-Maranda guidelines, however, the

smallest firms representing the bottom 5% of revenues were eliminated from the sample and estimated using tax data. For the largest most complex businesses, the EPM Program was established to manage relationships and facilitate data reporting. This was accomplished by negotiating reporting arrangements and prioritizing surveys in concert with subject matter clients.

Reduction in questionnaire content and the Chart of Accounts

Since the introduction of the ASM, major steps have been taken to reduce the respondent burden associated with the UES. Faced with increased collection difficulties and poor response to some questions, starting in reference year 2001, divisions slashed the size of their questionnaire, typically from 12 to 14 pages to 4 or 5. This reduction in size resulted from a combination of requesting fewer variables and moving detailed instructions from the form to accompanying guides. While the latter strategy likely did not cut the time required to complete the forms, it was felt that the survey questionnaire would at least appear to be far less intimidating, thereby eliciting a better response. For reference year 2002, many initiatives came on stream to tackle the burden issue more aggressively. The financial concepts used in the UES questionnaires and in the tax financial statements are sometimes different. Statistics Canada's Methods and Standards Committee decided to incorporate the Chart of Accounts standard. The COA was designed to be GAAP-compliant and consistent with SNA and subject matter needs. The COA has established a correspondence between the survey and tax concepts, which has successfully helped in the tax data replacement. In some instances, the survey concepts were adapted to better suit the needs of the businesses.

From the survey year 2000 to 2004, the expected response burden, as measured by hours required to complete surveys, decreased by almost 40% through a combination of tax replacement and reductions in survey questionnaires (Table 5.3). This significant reduction provided relief to a large number of small businesses previously receiving UES questionnaires.

Table 5.3. Reduction in response burden hours for the Unified Enterprise Survey

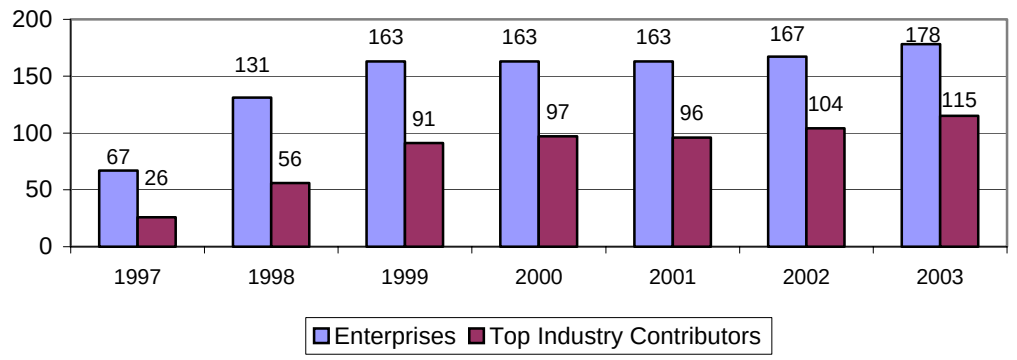
Survey grouping by industry	2000	2001	2002	2003	2004
Services	22,478	26,026	18,010	24,750	12,410
Trade	43,253	38,852	27,696	21,500	19,669
ASM	49,044	51,221	53,704	40,125	39,148
Other	2,270	2,701	1,939	2,000	763
UES totals	**117,045**	**118,800**	**101,349**	**88,375**	**71,990**

Increased EPM coverage

The EPM Program has been effective in improving response, timeliness and quality of survey data. A great deal of this success has been the result of lessening the burden imposed on EPM enterprises. This has been achieved through streamlined reporting arrangements and the development and extensive use of electronic spreadsheets customized to match companies' accounting records and aligned to the business survey questionnaires. Subject matter divisions

continue to refer enterprises to the EPM program for problem resolution. ESD is partnering with Transportation Division to introduce 'subject matter EPMs.' The objectives are to extend the coverage of EPM treatment without additional resources and to give subject matter managers experience in dealing with large, complex businesses. As it is envisioned, the subject matter EPM would have responsibility for a small number of companies and would focus on maintaining, rather than building, the relationships. The EPM program would continue to provide co-ordination and support.

Chart 5.1. Enterprise Portfolio Manager Coverage, 1997 to 2003



Recognizing the increased and growing importance of large businesses, the EPM program continues to encourage subject matter divisions to treat respondents as their customers in order to foster a more enterprise-centric view of these large businesses and to communicate corporate intelligence to Statistics Canada staff. ESD is now working towards a better integration of our respondent relations and EPM Programs to find new innovative ways of dealing with more large businesses. The number of companies covered and the knowledge we have about these important respondents have been improved, so we can increase response rates and data quality. At the same time, ESD is exploring the consolidation between BR profilers and EPMs as part of the latest Strategic Streamlining Initiatives.

6. UES Collection and Processing

Before collection takes place, samples have to be selected. Since the establishment part of UES is generic, the UES establishment design is therefore presented globally. Its enterprise counterpart is then presented under the respective financial surveys.

6.1 UES establishment sample design

The starting point for the UES design is the production of a survey universe file from the BR at the time of sampling. First, the frame is stratified by four-digit NAICS classifications and by province. Based on this frame, small establishments accounting for a total of 10% or less of the revenue in each stratum are not considered for sampling and are called take-none units. Not

surveying these small units has the double advantage of reducing response burden for small firms and making the design more efficient.

For the rest of the units, the population, though truncated, is still skewed. The stratum is essentially divided into a census portion for large units and a survey portion for the other ones. The boundary between the two groups and the sample size allocation are optimally determined to achieve desired quality levels for the available budget (63,000 establishments in 2004). The take-all portion (census) is also supplemented by some important units identified by subject matter specialists. Finally, the take-some portion (survey) is further divided into two strata by size. For the take-some portion, sampling is achieved by a simple random selection, without replacement, within each stratum.

Currently, the take-none portion is estimated using tax data. The take-some portion is partly obtained from surveyed establishments and partly from tax data. Indeed, about 50% of each take-some stratum is surveyed. For the other half, tax data are used in lieu of surveyed information for financial variables. Estimation for the take-all portion comes entirely from surveyed information.

6.2 UES collection and processing systems

As seen in Section 5, one of the advantages of UES is its centralized processing systems. The current suite of tools includes:

- The Unified Survey Tracking Analysis and Retrieval Tool: USTART is a SAS-based, web-deployed analytical tool that provides analysts and survey managers access to all the data contained within the UES Data Warehouse. USTART offers the analyst data retrieval, querying and report building-functionality. In addition, it provides analysts with access to all the UES metadata and scanned UES images. Currently there are over 512 USTART users in 24 Statistics Canada divisions.

- The Facility to Review Impute and Correct: FRIC is a Visual Basic correction and analysis tool that allows analysts to produce ‘flash estimates’ at the industry (NAICS) and geography (GEO) dimensions and to drill through to the microdata to examine top contributors and outliers. FRIC allows the analyst to correct capture, processing or response errors at the micro level. FRIC includes a series of edits to ensure consistency following microdata changes by analysts. There are currently over 175 FRIC users across seven Statistics Canada divisions.

- Edit and Imputation: A SAS-based, web-deployed batch Edit and Imputation system using Statistics Canada generalized systems. Over the last year, ESD has converted its Edit and Imputation system from GEIS to BANFF (the System Development Division and Business Survey Methods Division re-designed generalized imputation system). The UES Edit and Imputation system utilizes generalized functions such as error localization, deterministic, donor, proration and estimation. Every survey that is part of the UES passes through this system.

- Allocation/Estimation: A SAS-based, web-deployed system used to allocate survey information from the collection entity to the statistical establishment or location. In addition, the Business Survey Methods Division has constructed a survey estimation module that ESD has incorporated within the processing system. The estimation module calculates the final survey weights, coefficients of variation, response rates and imputation fractions. All UES surveys pass through this system.

- The Integrated Questionnaire Metadata System: IQMS is a Visual Basic application that stores the majority of the UES metadata (cell descriptors, formats and code sets). It is also the tool that survey managers use to enter their data capture edits and output specifications. The tool is evolving to become the warehouse for all UES-related metadata. Currently there are 162 IQMS users across 7 Statistics Canada divisions.

- The Enterprise Portfolio Manager Information System: EPMIS is a Visual Basic application that allows survey managers to monitor the interactions between the key provider managers and Canada's largest businesses. The system allows managers to review reporting arrangements, response rates, EPM comments and other relevant information. There are currently 160 users of EPMIS in 17 divisions.

6.3 Allocation

As seen in Section 6.1, even if UES is interested in surveying units (establishments) according to the statistical structure, there is a need to make collection arrangements with enterprises. Indeed, businesses do not necessarily keep their books exactly in the form we think. As a result, negotiations between Statistics Canada and businesses are required to determine the most appropriate responding unit (collection entity). Then, a questionnaire is sent for each collection entity, which may represent any collection of establishment. Once survey results come back, an allocation process is triggered to provide information at the establishment level.

Then, an allocation process attempts to find the share of each establishment in the enterprise mainly based on revenue, but also in some cases on expenditures, wages and salaries and depreciation.

First, the UES historical information about the enterprise is considered. If the structure is similar, the share of each establishment from the previous year is used and applied to the questionnaire-level data. Otherwise, or if it is not available, information from the tax files is used. Again, the process is similar but the share is only available for the provincial breakdown. Finally, the Gross Business Income available on the BR is used. Based on these data surveys, allocation from revenue and the three other variables are produced and combined to obtain an establishment level allocation[5] for each enterprise.

5. In fact, only the NAICS 4 by province breakdown is produced.

6.4 The Enterprise Financial Program

By definition, the data collection process for an establishment-based survey is done at a different structural level than for the same process in an enterprise-based survey. For example, both types of survey may request information on revenues, some expenses and operating profits; however, the enterprise report will provide data at the consolidated level while the establishment's survey data will be closer to the enterprise's production unit's results. In spite of the difference, it should be possible to reconcile the data obtained from the two processes.

In order to make the comparison possible, both surveys must work from the same frame source, a single BR, which provides all of the information on the enterprise's statistical structure. To that effect, both the annual establishment surveys and the Annual Financial and Taxation Statistics (AFTS) draw their frame on the same day in late October before the reference year.

For the reconciliation process, we also must have data for all establishments within a surveyed enterprise and finally, we need to have data on the transactions within affiliates in Canada[6] in order to eliminate them. This reconciliation is important as both type of surveys (sub-annual and annual) are important blocks in the construction of the CSNA and therefore, need to be coherent.

The mandate of the Enterprise Financial Survey Program (EFS) is to monitor the size, financial structure, financial position and performance of the corporate sector in Canada. It covers all incorporated businesses in Canada and includes a direct survey of all complex enterprises with revenues or assets $250 million.[7] It collects information on consolidated balance sheets and income statements and corporate taxation. The program includes two survey processes: the Quarterly Survey of Financial Statements and its annual counterpart, the AFTS.

The EFS is part of the UES program. One of the goals of EFS is to understand the relationships between an enterprise and its production units (establishments) by linking and reconciling the data collected at the two levels. While most of the production surveys are conducted at the establishments level, EFS is at the highest consolidated level—the enterprise level.

6.4.1 The Quarterly Survey of Financial Statements

The Quarterly Survey of Financial Statements (QSFS) gathers information on consolidated corporate balance sheets and income statements, statements of changes in financial position,[8] financing patterns, rates of return and other financial performance ratios for the financial and non-financial sectors of the Canadian economy.

6. For example, the Enterprise Financial Survey collects consolidated operating revenues where the amount of sales to Canadian affiliates are eliminated.
7. The assets threshold is $500 million or more for funds and management companies.
8. The data on the statements of financial position are not directly collected but are derived from the other information collected.

Objectives and uses

The primary objective of the Quarterly Financial Statistics is to measure the financial position and performance of incorporated businesses (financial and non-financial) in Canada by industry aggregations. This information provides a critical input into the measurement of corporate profits and capital consumption allowances in the CSNA. It also provides information on financial holdings and transactions in the CSNA sector accounts. The quarterly survey data are combined with additional information for the business and other sectors in order to produce complete economy-wide accounts, which show the creation and distribution of wealth as well as the financing of economic activity.

In addition, the flow of funds and outstanding positions between Canadian residents and non-residents is measured in 'Canada's Balance of International Payments' and in 'Canada's International Investment Position,' respectively. Both of these series make use of the quarterly survey data in measuring corporate financial activity with non-residents.

The quarterly concepts and definitions, for the most part, are based on the guidelines of the Canadian GAAP, while the CSNA data are based on the 1993 SNA guidelines. As a result, the QSFS data must be adjusted to be consistent with the 1993 SNA concepts prior to being used by the CSNA.

Coverage of the QSFS

The QSFS universe encompasses over 1 million enterprises, and its population is drawn every quarter from Statistics Canada's BR. It covers virtually all industries except government business enterprises or non-profit corporations.

Its population is divided in three distinct strata.[9] The largest enterprises are included in the take-all stratum, while those of medium size are included a take-some stratum. From those two strata, roughly 5,500 enterprises are selected every quarter and are directly surveyed. Smaller enterprises are not sampled. Instead, the data for the take-none portion are estimated by applying a statistical model based on estimates from the surveyed population and other parameters. While the take-all and take-some strata include only 2% of the enterprises, this survey portion accounts for the vast majority of assets (86%) and more than two-thirds of revenue (70%).

The QSFS data are benchmarked every year with the most recent results of the AFTS. The survey portion and the take-none portion of the universe are benchmarked separately. The quarterly data are published approximately 60 days after the reference period.

9. The take-all strata lower boundaries are calculated during sampling selection but cannot be lower than $250 million for assets or revenues (except funds and management companies). The take-none stratum generally includes enterprises with revenues below $15 million and assets below $10 million.

6.4.2 The Annual Financial and Taxation Statistics

The AFTS is also an enterprise-based program, which compiles and produces information on corporate balance sheets and income statements along with several financial performance ratios. This information is available with greater industrial detail than the QSFS. Also, the AFTS includes corporate tax information, which is not available from the QSFS. The tax information includes a reconciliation between book profit and taxable income plus taxes payable to federal and provincial governments.

Objectives and uses of the AFTS

The objective of the annual series is to cover business activity within a calendar reference period.[10] The data produced by the AFTS are used by the CSNA to estimate corporation profits, taxes and some other items. They are also used in the Financial Flow and National Balance Sheet Accounts to derive benchmarks for financial asset and liability stocks, and borrowing and lending flows for financial and non-financial industries.

The AFTS data are also used to produce Financial Performance Indicators for Canadian Businesses (FPICB). The FPICB is source of key financial ratios by industry. The indicators are designed to serve as financial performance benchmarks against which individual firms and industries can be compared. It allows firms to precisely position themselves within their peer group.

Coverage of the AFTS

The AFTS covers all incorporated business in Canada, including government business enterprises,[11] but it excludes management of companies and enterprises, funds and other financial vehicles and public administration.[12] In addition, non-profit enterprises that are considered to be part of the incorporated business sector are included. As with the QSFS, the AFTS draws its annual frame from the BR at Statistics Canada. This frame is produced once a year and is used by all UES survey programs (enterprise- or establishment-based). The AFTS universe includes nearly 1.2 millions enterprises. Three sources of data are combined to form a census of all units included in the population. First, the responses from sampled units in the QSFS are annualized and included in the annual file. Second, the Public Institutions Division from Statistics Canada provides the data for the provincial and federal government business enterprises. Finally, all remaining records in the population are estimated using administrative

10. The administrative data from the Canada Revenue Agency are based on financial data files for the fiscal year which ended in the calendar period. The data is thus estimated from a combination of both calendar (QSFS) and fiscal period (Generalized Index for Financial Information), which may not coincide perfectly with the calendar period.
11. Annual data for government business enterprises are collected and obtained from Statistics Canada's Public Institutions Division.
12. Data for management of companies and enterprises, funds and other financial vehicles are available on a quarterly basis from the QSFS while public administration data are produced and published by the Public Institutions Division.

corporate taxation data collected by the Canada Revenue Agency through its Generalized Index for Financial Information (GIFI).[13]

Both the QSFS and the government business enterprise data are collected at the enterprise level. However, since the CRA corporate tax filing requirements do not require data at the consolidated enterprise level, GIFI data are prepared at the single legal-entity level. The data from single legal-entities belonging to a multi-legal corporate family are simply rolled-up to the enterprise level. The annual financial and taxation data are published 14 months after the reference year.

7. Head Office Survey

As part of the UES program, the Head Office and Other Business Support (HO) Survey was instituted for reference year 1998 as a direct result of PIPES. The UES program conducts business establishment-based surveys, as per the NAICS, with the exception of the HO Survey, which measures business support or ancillary activity by geographic location. The unique nature of the HO Survey is grounded in its importance to the SNA to estimating the GDP.

In the Canadian market environment, the business enterprise for purposes of classification and measurement can be categorized into technical and support activities. The former activity results in the production of goods and services either for further production or for sale to other economic entities - be they other businesses, consumers, governments or residents abroad. By definition, the business ancillary activity directly supports the technical activity, either primary or secondary, resulting in services used by the enterprise; they are not intended for use outside of the enterprise. In general, the support activity is small relative to the technical activity. Therefore, for purposes of the SNA, a complete and unduplicated measure of GDP requires both the economic output of technical and support activities for all business enterprises. Nearly all UES surveys measure technical activities that are in fact inter-business enterprise economic transactions (i.e., outside the enterprise). The one exception is the HO Survey, which in turn measures the support activities that are intra-business enterprise (i.e., to technical entities of the same enterprise).

Examples of business support activities are head offices that could be international, national or regional; captive or own-account transportation distribution centres; and other services directly internal to the enterprise and supporting the production activity. Head offices can provide central functions that are important to the enterprise and include sales, purchasing, accounts, computing, investment and maintenance. Also, they may provide management of the technical activity, purchasing services on behalf of technical units, determining corporate strategy, buying and selling of legal entities and financial management (i.e., investment and portfolio management). Head offices activity is common in large complex business enterprises but less so in simple small enterprises.

13. GIFI is part of the filing requirement when corporations submit their annual Corporate Income Tax Return to the Canada Revenue Agency.

The sample selection of units for the HO Survey, like all other UES surveys, is done from the BR - that identifies support activity units at the location level, and technical activity at the establishment level, of the statistical hierarchy of the enterprise. If the business enterprise has at least one technical establishment unit that is in-sample for an UES survey, then that support unit (or units, since enterprises can have multiple head offices) of the enterprise is sampled for the HO Survey. The NAICS code assigned at the location level for the support will reflect the actual industrial activity of the unit.

Once the financial data is collected through the HO Survey it is checked manually for coherence with all other establishment-based UES data for each individual enterprise. This is to ensure that it is complete and that there is no duplication between the technical units and the support units in the given enterprise. Then, revenues and expenditures are allocated from the support units to the technical units of the enterprise. The allocation of these financial variables is based on the ratio of wages and salaries of each technical unit to the aggregate of wages and salaries for the enterprise. Through this method, the output of the support activities in any given enterprise is accounted for and distributed to the technical production activity. It is important to note that the adjustment at the enterprise level of revenues and expenditures is only done in the context of the SNA in the calculation of GDP. Specifically, there is no adjustment applied to the NAICS-based survey estimates given by definition—these are considered to be purely establishment-based surveys.

Currently, the HO Survey covers a major part of the business universe, as is the case with the UES program. However, it does not cover the whole of the business sector: specifically, the energy and telecommunications sectors are currently not in scope for the UES. However, the feasibility of expanding the HO Survey coverage to the entire economy is underway. This study complements and depends highly on a major project within Statistics Canada to redesign the BR. In a methodological sense, the HO Survey is a census of all support activity. In the future expanded context of the survey, research is underway to put it on a sample basis, as with all other UES surveys that would require stratification (sample selection) and estimation (weighting) methods.

8. Conclusion

The UES is still, not surprisingly, undergoing transformation. The full integration of ASM and other services surveys, the greater use of tax data, the need to focus on larger businesses in our respondent relations program, the addition of characteristics surveys, the development of a comprehensive ESD data warehouse, the integration of coherence analysis in the production flow and the efforts to constantly improve timeliness and quality all add up to a lot of change. The UES is not yet fully mature: it will continue to require further adjustments and improvements. In addition, not all of the UES' objectives have been fully achieved. ESD has made important progress towards many of these objectives, such as central frame and sampling, common systems, central data store, better timeliness, co-ordinated respondent relations, EPM and consistent content. However, still more work is needed in areas such as the details available for the SNA, coverage of the UES, more use of tax data, an enterprise-centric approach to data collection and a better understanding of large enterprises and their data. While striving to meet

these challenges, the UES will continue to adapt its organization and services as needed, to respond to the priorities and requirements of the department's business survey program.

The greatest threat to the business statistics program is respondents' growing reluctance to provide data through our traditional survey questionnaires. We must change the way in which we interact with these businesses. Respondents are now less willing to complete the many separate survey requests we send them each year. They expect from us a more co-ordinated, integrated and unduplicated approach to data collection, with the option of responding electronically in a user-friendly environment. We need to continue to meet this challenge by understanding our total data needs and dealing with companies in an integrated way (from the companies' perspective), instead of one survey at a time. Our challenge is to transform our surveys, our collection activities and our respondent relations program to interact with companies in a way that makes sense both for them and us. This will require a complete survey inventory of all our data requests by company—focused on the larger businesses. We will need to co-ordinate all our contacts with enterprises, so that we ask for data items only once. We must also continue to review our content and make maximum use of tax data, and continue to improve our systems and processes. ESD and the UES have provided us with the correct framework for doing all of this. We now need to expand this enterprise-centric approach so that we can better manage response burden, take full advantage of our data holdings and interact with businesses in a fully integrated way for all Statistics Canada surveys.

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Annex 1

The Capital Expenditure Survey

The mandate of the Capital Expenditure (CAPEX) Survey is to measure annual intentions and realized capital expenditures. The survey provides, on a calendar year, a series of annual estimates of investment in or expenditures on fixed capital in Canada. Fixed capital is produced capital that is used in the process of economic production, generally over a period of years.

The survey consists of two survey cycles. In the spring, a questionnaire is sent to respondents with investment questions concerning the preceding year (actual data). In the fall, our questionnaire consists of two parts: the first part contains questions for the year that is just ending (preliminary data) and the second part requires data for the upcoming year (intentions data). This is the only major Statistics Canada survey relating to a period in advance of its release date.

The Capital Expenditure Survey is a Unified Enterprise Survey and, as such, shares concepts and methodology with the rest of the UES surveys. The survey is establishment-based and its sample selection is co-ordinated with the UES program.

The main output of the CAPEX program is the publication, *Private and Public Investment in Canada, Intentions.* In addition, *Capital Expenditures by Type of Asset* and *Foreign and Domestic Investment in Canada*, are also published.

All the data in these publications are available on CANSIM (Canadian Socio-Economic Information Management System).

Objectives and uses of the CAPEX Survey

The object of the Survey is to collect accurate and timely measures of current investment. Besides collecting data on capital construction and capital machinery and equipment, the Survey also collects and distributes information on the following:

- capacity utilization
- repairs
- service lives
- disposals (selling price, age, book value)
- land
- investment put in place by own work force versus contractors
- reasons for change in investment
- work in progress
- assets acquired for lease to others
- percentage of investment directed at improving productivity
- purchases of used assets.

The program has two prime internal clients: the System of National Accounts (SNA) and the Investment and Capital Stock Division (ICSD) itself. In the SNA, the program estimates are the foundation of estimates of business and government investment in fixed capital in the quarterly accounts, the input–output accounts and for productivity. The survey provides the income and expenditure accounts with a benchmark for capital in time for the fourth quarter of the reference year, and commodity detail before closing the reference year. The Survey supplies the commodity detail for the input–output benchmarking of annual capital. Data are also provided on the contract/own-account split for capital. Some of the data are also used in the financial flows and balance of payments.

Internal to ICSD, the program provides data on capital investment, retirements and asset life to the perpetual inventory model used to produce national wealth and capital stocks. These, in turn, are also a primary building block of the balance sheets in the SNA. The quarterly capacity utilization rates program depends on the survey for business information on capacity.

More generally, these datasets provide a valuable resource for research and policy setting by areas such as the Bank of Canada and Finance. The information on capital spending provides analysts with a useful indication of market conditions; both in the economy at large and in particular industries. This is in part because capital expenditures account for a large and highly variable proportion of gross domestic product, and also because of the role of capital in economic production.

These series are a direct input into the provincial equalization payments formula for the revenue base. CAPEX supplies series on machinery and equipment, repairs, cost of materials and government sector construction. These series are all used directly in the formula.

In addition, with particular reference to the intentions phase of the survey, information on the relative size of the planned Capital Expenditures Program, both in total and for individual industries, gives an indication of the views business management hold on the future market demands in relation to present productive capacity. The information is used by federal and provincial governments and agencies, trade associations, universities and international organizations for policy development and as a measure of regional activity.

Coverage and sample selection

The survey frame consists of all organizations in Canada that could invest in fixed capital. A probability sample is selected annually from the Business Register. Each of the CAPEX surveys is sent to 30,000 sample establishments (out of a universe of approximately 2 million), for a total of more than 60,000 questionnaires each year.

The sampling unit selected for the Capital Expenditure Survey is the establishment, which best corresponds to the gathering and disclosure of investment data.

Before sampling begins, all units from the private sector not in the mining and manufacturing industries are grouped together using the following method: all establishments operating in the same province, in the same six-digit-code industrial sector and under the same enterprise are

grouped together in a single super-establishment. The income of the super-establishment is the sum of all income for the establishments that comprise it, while the remaining information is taken from the head of the group, either the head office, where possible, or the establishment with the highest income, where applicable. For the public sector, all the units are in the sample.

Once the new universe is constructed with the new super-establishments, all units with income of less than a certain limit are eliminated from the frame unless they constitute head offices or laboratories, in which case the units are chosen with certainty. This procedure is instituted to avoid 'losing' these units, which generate practically no income, but might account for substantial investment.

The sample is then stratified by geographic location, industrial classification and also by Country of Control. The geographic division is based on the 13 provinces and territories, with no other refinement. Nine Countries of Control were considered in the stratification: Canada, USA, Germany, Japan, France, Great Britain, Sweden, Italy and Netherlands. The remaining countries were grouped together. For the industrial stratification, the 1997 NAICS is used at the level required for estimation purposes. If, for example, for a certain industry, the most disaggregated level published corresponds to the 3-digit NAICS, this will be the stratification level.

Once the initial stratification has been introduced, we compute the coefficient of variation (CV) to be targeted using the revenue variable to reach the CV set for the most disaggregated publication level—in our case, by province and different industrial classification levels.

For the take-some strata, selection is based on a simple random process under the constraints of minimizing the overlap with the UES. In the take-all strata, all units are sampled with certainty.

Other data sources and analysis

The data from the surveys are analysed and the final actual investment figures are augmented by data taken from other sources: building permits, trade journals, press releases and company reports. This is done to include investment from new organizations that may not yet have appeared in the Statistics Canada business survey frames, or from non-sampled organizations that are making very large investments.

In addition to our direct survey of establishments, the Capital Expenditures Program obtains data from other parts of Statistics Canada and other federal departments on capital expenditures for the following sectors:

- agriculture from the Agriculture Division;
- municipal governments from the Public Institutions Division;
- residential construction from the Current Investment Indicators Section of ICSD;
- oil and gas extraction (the actual investment) from the Manufacturing, Construction and Energy Division; and
- mining from Natural Resources Canada.

The data are cross-tabulated for Canada, the provinces and the territories by industrial sector for the various components of investment (construction and machinery and equipment, by type of asset) and for the two categories: private and public. Our newest initiative is the production of investment data by country of control.

It should also be noted that all of these data are released on a calendarized basis in order to facilitate easy integration into the national accounts and eliminate any discrepancies with other calendar-based indicators of capital.

Annex 2

Canadian System of National Accounts Requirements for Principal Statistics Related to the calculation of gross domestic product

Purpose and limitations

The purpose of this document is to specify a minimum set of data requirements that will allow the System of National Accounts (SNA) to produce annual provincial benchmarks for the gross domestic product (GDP) and Gross Output. These are the data that the Industry Statistics Branch (ISB) should deliver to the SNA every year for every province and territory in Canada. These variables could be produced either by conducting surveys or by using administrative data (for example, tax data).

It is very important for the ISB to provide 'characteristics' data, such as revenue and expense details, employment, class of customer, etc. It is recognized, nonetheless, that it may be sufficient to collect characteristics data less frequently than the principal statistics.

Principal statistics

Production Statistics
Total Revenues
Total Operating Revenues[1]
- Sales outside the enterprise
- Sales of goods produced (fabricated, harvested, or extracted) and services provided
- Sales of goods purchased for resale (in the same condition as purchased)
- Sales of refurbished or reconditioned goods
- Sales within the enterprise
- Sales of goods or services to other establishments within the same enterprise
- Own account production
- Machinery and equipment produced for own use
- Construction activity on own account

Current Expenses
Purchases of materials, parts, utilities, and supplies for processing or for own use
Purchases of goods for resale (in the same condition as purchased)
Purchases of goods for refurbishment or reconditioning and subsequent resale
Total Purchased Services[1]
Total Expenses
Total Operating Expenses[1]
Total salaries and wages[1]
Employer portion of employee benefits[1]
Total depreciation and amortization expenses (excluding amortization of forward-looking costs)[1]

[1] See Appendix A for definitions.

Opening Inventory[2]
Raw materials, purchased components and supplies
Goods in process
Finished products
Goods purchased for resale (in the same condition as purchased)

Closing Inventory[2]
Raw materials, purchased components and supplies
Goods in process
Finished products
Goods purchased for resale (in the same condition as purchased)

Other
Destination of Shipments

Incorporated/unincorporated split

GDP can be calculated as the sum of all incomes or as the sum of all final expenditures (including net exports). Incomes are earned by the factors of production (i.e., labour and capital) as compensation for their contribution to the production of goods and services. Because users of national accounts data are interested in the division of income between labour and capital, the GDP contains separate 'labour income' and 'other operating surplus' (i.e., capital income) categories.

For incorporated (T2) businesses, it is clear that operating profit is an income attributable to capital, and therefore, belongs in the 'other operating surplus' category. For unincorporated (T1) businesses, however, the owner of the business typically provides his or her own labour as well as his or her own capital. Thus, it is unclear how much of the unincorporated business profit is attributable to capital and how much is attributable to labour. Therefore, the profits of unincorporated business are shown in a category called 'mixed income,' which is a mixture of labour income and capital income.

The stratification of survey estimates by T1 and T2 is required to estimate the mixed income component of GDP.

Provincial detail

All principal statistics are required annually by province. In order to produce accurate provincial statistics, data must be collected on an establishment basis as much as possible. Allocation from a collection entity to establishments across multiple provinces should be avoided as much as possible.

[2] Inventory data are important mainly for the goods producing industries and distributive trades.

Tax Data

There are limitations in the use of income tax data to calculate Gross Output and GDP. The three main limitations with respect to calculating Gross Output are:

1. insufficient information to calculate trade margins
2. insufficient information to calculate Value of Physical Change (VPC) of inventories
3. imprecise delineation of revenues derived from economic production versus other revenues

Any inaccuracy in the Gross Output estimate will, in turn, affect the accuracy of the GDP estimate. There are two major additional limitations with respect to calculating GDP. They are:

1. imprecise delineation of expenses related to economic production versus other expenses
2. imprecise delineation of wages and salaries from other expense categories

Finally, there are two limitations which affect all tax data variables. They are:

1. industrial allocation
2. netting out

An explanation of each of these limitations is presented below.

<u>Trade Margins</u>

In the SNA, gross output by industry is equal to:

	Revenue from sales of goods and services including sales of GPRS
Less	Purchases of GPRS
Add	VPC (GIP and Finished Goods)

Where:

GPRS = Goods Purchased for Resale
VPC = Value of Physical Change of inventories
GIP = Goods in Process

Tax data does not contain the detail necessary to compute trade margins as defined by:

	Sales of goods purchased for resale (in the same condition as purchased)
Less	Purchases of goods for resale (in the same condition as purchased)

Value of Physical Change of inventories

Tax data does not provide the necessary detail to calculate the Value of Physical Change of inventory. The VPC is equal to the change in quantity of inventory held (i.e., quantity of closing inventory less quantity of opening inventory) multiplied by the average market price during the accounting period. The idea is to remove gains and losses associated with price changes for products that are held in inventory, and to reflect market prices as closely as possible.

In the tax data, the unit price used to calculate closing inventory may be different than the unit price used to calculate opening inventory, especially if there has been turnover of inventory. Even if the physical quantity of inventory is exactly the same at the end of the period as at the beginning of the period, the closing inventory may differ from the opening inventory because they may be valued using different unit prices. Furthermore, even if both opening and closing inventory are valued using the same unit price, the unit price used may be different than the average market price that prevailed during the accounting period.

Opening and closing inventory data obtained through surveys inherently pose the same challenge when the data are expressed in dollar values. One advantage, however, of the survey approach is that in many instances it is practical to obtain both quantity and price information related to inventories. This greatly facilitates the calculation of VPC.

Another limitation of using tax data to estimate inventory change is that tax filers may use generic line items (L8300: Unspecified opening inventory cost amount or L8500: Unspecified closing inventory cost amount) instead of using the detailed line items that specify the category of inventory. Even if the tax filer does use the detail line items, there are no line items for Goods Purchased for Resale inventories.

Delineation of revenues derived from economic production versus other revenues

It can be difficult to get a good breakdown of revenues into those that are related to production versus other revenues because generic line items are often used for reporting instead of detail line items. In the SNA, revenues that are not related to production must be excluded from the calculation of Gross Output.

Examples

There is a generic item, 8039 (SALES FROM RESOURCE PROPERTIES FLDS 8040 TO 8053), that is composed mostly of production-related revenues, but the following are not production-related:

8050	royalty income amount
8051	oil and gas partnership joint venture income amount
8052	mining partnership joint venture income amount

There is a generic item, 8229 (OTHER REVENUE FLDS 8230 TO 8250), that has some components that are production-related revenues, but many are not production-related revenues (some examples are listed below).

8231 foreign exchange gain–loss amount
8232 subsidiary affiliate share income loss amount
8233 other division income loss amount
8234 joint venture income loss amount
8235 partnership income loss amount
8236 realized deferred revenue income amount
8238 Alberta royalty tax credit income amount
8242 non-fishing subsidy grant income amount
8247 patronage dividend income amount

Delineation of expenses related to economic production versus other expenses

It is very difficult to separate expenses related to production and those that are not because generic line items are often used for reporting instead of detail line items. In the SNA, expenses that are not related to production must be excluded from the calculation of GDP.

Example

There is a generic item, 8519.2 (ADVERTISING AND PROMOTION FLDS 8521 TO 8524), that is composed mostly of production-related expenses, but the following is not production-related.

8522 Charitable political donation expense amount

Delineation of wages and salaries from other expense categories

In the T2 GIFI data, some salaries and wages expenses tend to be recorded in line items that look like intermediate inputs. Therefore, salaries and wages tend to be below their true value, and intermediate inputs tend to be above their true value. This distorts the value of the GDP.

Industrial allocation

There is insufficient information available to allocate data (such as income statement data) from legal entities to statistical establishments via the statistical enterprise. Allocating even a single variable, such as total revenue, would be difficult, and allocating an entire revenue and expense structure undoubtedly results in a dubious industrial breakdown of estimates.

Netting out

T2 data are reported at a legal entity level. Transactions between establishments of the same legal entity are netted out. This causes total output and intermediate input to be equally under-estimated, but does not affect the value-added.

Appendix A

Definitions

The definitions presented here apply only to establishments that are not engaged in providing financial services.

Total Operating Revenue

The Total Operating Revenue of an establishment includes any revenue from the sale of goods and/or services.

Inclusions

- sales of plants or plant products
- sales of animals or animal products
- sales of minerals, ores, concentrates, petroleum or natural gas
- sales of goods manufactured
- sales of goods produced as a by-product of another production process
- sales of structures constructed
- sales of goods purchased for resale
- sales of refurbished or reconditioned goods
- commissions and fees for services rendered
- rental and leasing income
- revenue from utility generation, transmission or delivery
- revenue from intellectual property (royalties, franchise fees, copyrights, etc.).

Exclusions

- capital gains, gains from currency exchange, dividends received and interest payments received (these exclusions are for establishments not engaged in providing financial services)
- payments received for financial participation in partnerships or joint ventures, and share income from subsidiaries
- grants, subsidies, tax refunds, tax rebates and tax credits
- gifts received
- insurance claims received
- recovery of expenses or bad debts
- reversal of provisions for forward-looking expenses
- revenue from sale of land
- revenue from disposal of assets.

Total Operating Expenses

The Total Operating Expenses of an establishment include:

- any expense incurred as payment for the receipt of goods and services from another economic agent
- payments made to own employees, or on behalf of own employees, as compensation for labour services provided
- depreciation and amortization expenses.

Exclusions

- payments for income tax and property tax
- payments for the acquisition of capital goods (i.e., machinery, equipment and buildings)
- purchases of land
- geological exploration and development expenses
- natural resource royalties and fees paid to government
- inventory write-downs
- capital losses, losses from currency exchange, dividends paid and interest paid (these exclusions are for establishments not engaged in providing financial services)
- payments made to others for their financial participation in partnerships or joint ventures, profit share payments made to parent companies
- gifts and charitable donations
- bad debt expense and provision
- loan loss expense and provision
- amortization of intangibles other than software and geological exploration and development
- amortization of natural resources.

Total Purchased Services

Include

- payment of commissions and fees for services rendered
- rental and leasing expenses
- insurance premiums paid (other than those paid on behalf of employees, which belong in employer Portion of Employee Benefits)
- repair expenses
- franchise fees
- fees for use of intellectual property of other parties (copyrights, trademarks, etc.)
- payments made to consultants and contractors
- payments made to other establishments to do custom work or repair work on material and products owned by the surveyed establishment.

Total salaries and wages

Include

- wages, salaries, bonuses and commissions paid to employees (including managers)
- fees paid to the board of directors
- employee compensation in the form of goods or services.

Exclude

- payments made to consultants and contractors (belongs in purchased services)
- payments made to other establishments to do custom work or repair work on material and products owned by the surveyed establishment (belongs in purchased services).

Employer portion of employee benefits

Include

- employer's contribution to employment insurance, Canadian Pension Plan/Quebec Pension Plan, and any other insurance plans, pension funds or other employee benefit programs.

Exclude

- bonuses and commissions paid to employees (including managers).

Total depreciation and amortization expenses

Include

- depreciation of machinery and equipment
- depreciation of fixed structures
- amortization of software
- amortization of geological exploration and development.

Exclude

- amortization of research and development, deferred charges, goodwill, patents, franchises, copyrights, trademarks and any other intangibles other than software and geological exploration and development
- amortization of natural resources.