

Perspective on Response Rates and Nonresponse in Establishment Surveys¹

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1. Introduction

In Canada, as in other countries, public access to good statistical information about business activity depends very much on the willingness of enterprises to respond cooperatively to government surveys. Most such surveys are conducted by Statistics Canada under the Parliamentary authority of the Statistics Act, which guarantees the confidentiality of data about individual businesses while making it mandatory for companies to answer statistical inquiries and to complete survey forms. Voluntary cooperation is crucial because Statistics Canada very rarely enforces the mandatory provisions of the Act through the courts, preferring to rely on gentle albeit persistent persuasion and the good corporate citizenship of Canadian enterprises.

This short paper is about the responsiveness of Canadian enterprises to Statistics Canada surveys in recent years. It addresses the question: To what degree do businesses answer Statistics Canada survey questions as they are required to by law? The paper begins with a short overview of the Canadian statistical system, focusing in particular on the part of that system that conducts *business* surveys. Then, in a third section, it turns to the subject of defining and measuring survey response and non-response, an area that sometimes can be prone to ambiguity. Section 4 presents a summary of survey response rates in Canadian business surveys. A final section offers conclusions.

2. Overview of Canadian enterprise surveys

Canada's statistical system is highly centralized, with most statistical collection, compilation, analysis and publication work being done by Statistics Canada. The agency carries out a full census of population every five years. It also conducts a wide range of annual household and business surveys, and a variety of monthly and quarterly surveys. Among the many annual surveys are one on the commodity composition of household spending, a general social survey, surveys of business activities and characteristics (for example, of investment spending, research and development activity, Internet commerce, and foreign ownership), and surveys of industrial and services production by business establishments (for example, in agriculture, manufacturing and business and personal services industries). Monthly surveys include the Retail Trade Survey, the Survey of Manufacturing, the Industrial Product Price Index Survey, the Quarterly Survey of Business Financial Statements and the Labour Force Survey

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among others. The agency also compiles statistics from administrative records, such as the monthly external trade statistics (from Customs data). Administrative data are used increasingly in combination with survey data in an effort simultaneously to improve statistical quality, to reduce costs and to lighten the burden on the survey respondent community. Canada's national accounts are compiled and published by Statistics Canada, as are statistics on demography, travel, environment, health, education, justice, labour and general government. It is a large agency, currently with some 5,600 full- and part-time employees (excluding field interviewers, whose numbers vary greatly over the five-year census cycle).

Business surveys account for a substantial share – between 45 and 50 per cent – of Statistics Canada's total program. There are about 200 of them.² Most Statistics Canada business surveys use the agency's Business Register as their sampling frame. The Register keeps up-to-date records on the size (revenue and employment), industrial code (NAICS) and contact information (name, address and telephone number) of all Canadian businesses with annual sales revenue exceeding \$Can 30,000 – some 2 million enterprises (Table 1). Feedback from surveys about the accuracy of the Register's industrial codes and contact information, and about out-of-business units, is an important source of information for purposes of keeping the Register current. For the largest and most complex³ businesses the Register also keeps track of the way the enterprise is organized, identifying its individual 'statistical establishments'. A relatively small number of large and complex enterprises account for a big share of the Canadian economy. In fact, the top 1000 non-financial enterprises account for about 30% of total gross business income and the top 7000 account for half.

Table 1
Business Enterprises in Canada
End of 2004

		Simple	Complex	Total
Incorporated				
1	Financial	17,400	1,025	18,425
2	Non-financial	1,299,750	18,425	1,318,175
3	Total	1,317,150	19,450	1,336,600
Unincorporated				
4	Financial	223,975	1,000	224,975
5	Non-financial	651,075	275	651,350
6	Total	875,050	1,275	876,325
Total				
7	Financial	241,375	2,025	243,400
8	Non-financial	1,950,825	18,700	1,969,525
9	Total	2,192,200	20,725	2,212,925

Excludes businesses with revenues of less than \$Can 30,000 per annum.
Complex enterprises have establishments in more than one industry and/or region and simple enterprises do not.

² The term 'survey' is applied to a variety of statistical inquiries, some quite large and others very small. As noted in the text, today many 'surveys' blend information collected directly from a sample of household or business units with related administrative information collected via the tax system.

³ Enterprises are considered 'complex' if they are located in more than one province or territory, have establishments in more than one industry, or are a member of a formal partnership or joint venture. Given the paramount importance of the industrial and provincial-territorial dimensions for statistical purposes, it is the multi-location and multi-establishment aspects of complexity that are most significant.

3. Measurement of survey non-response

There are grey zones around the concepts of business survey ‘response’ and ‘non-response’. In this section these zones will be explored, using as an example the Unified Enterprise Survey (UES).

The UES is the largest regular business survey by far in Canada. It collects information about the value added and commodity inputs and outputs of industries. Like many other Statistics Canada business survey samples, the UES annual sample is drawn from the Business Register. The survey covers about two-thirds of the economy (agriculture, transportation and certain services industries are exclusions) and is stratified by industry and province/territory.

Table 2 shows the disposition of the UES sample for survey reference year 2002. The original sample size was 53,932 establishments and it represented a universe with estimated annual gross establishment revenues of \$Can 1.7 trillion.

Table 2
Disposition of the Unified Enterprise Survey Sample
Reference Year 2002

	Sample		Sample weight	
	Count	%	\$Millions	%
1 Total original sample	53,932	100.0	1,684,609	100.0
Not mailed				
2 Data obtained from tax records	4,149	7.7	32,254	1.9
3 Data sought from tax records but not obtained	1,912	3.5	16,930	1.0
4 Chronic refusal	1	0.0	1	0.0
5 Discovered to be out of NAICS scope	611	1.1	7,383	0.4
6 Discovered to be out of business	553	1.0	8,734	0.5
7 Excused from survey	481	0.9	74,614	4.4
8 Contact information found too late to mail	4	0.0	6	0.0
9 <i>Sub-total: Not mailed</i>	<i>7,711</i>	<i>14.3</i>	<i>139,922</i>	<i>8.3</i>
Non-response				
10 Failed to respond by survey deadline	8,555	15.9	261,172	15.5
11 Refusal	147	0.3	2,568	0.2
12 Non-response but data obtained from tax records instead	8,950	16.6	96,867	5.8
13 <i>Sub-total: Non-response</i>	<i>17,652</i>	<i>32.7</i>	<i>360,607</i>	<i>21.4</i>
Survey frame limitations				
14 Unable to locate	1,207	2.2	12,602	0.7
15 Unable to contact	115	0.2	996	0.1
16 Discovered to be inactive	253	0.5	2,960	0.2
17 Discovered to be out of business	759	1.4	9,047	0.5
18 Discovered a change of ownership	94	0.2	1,904	0.1
19 Discovered an amalgamation	41	0.1	486	0.0
20 Discovered to be out of scope	2,633	4.9	21,047	1.2
21 Discovered to be a duplicate establishment	145	0.3	6,493	0.4
22 <i>Sub-total: Survey frame limitations</i>	<i>5,247</i>	<i>9.7</i>	<i>55,535</i>	<i>3.3</i>
Response				
23 Complete response	21,462	39.8	992,082	58.9
24 Partial response	1,860	3.4	136,463	8.1
25 <i>Sub-total: Response</i>	<i>23,322</i>	<i>43.2</i>	<i>1,128,545</i>	<i>67.0</i>
26 <i>Sub-total: Response including tax data</i>	<i>32,272</i>	<i>59.8</i>	<i>1,225,412</i>	<i>72.7</i>

For 7,711 units (line 9), representing 14% of the sample units and 8% of the sample weight, no survey questionnaire was in fact mailed out. In most of these cases this was because

the survey managers pulled those units from the sample and substituted data from tax records instead (line 2). This is a recent change to the survey methodology and it is done for some of the smallest businesses as a burden-reducing and cost-saving measure. In some instances it proved impossible to track down the tax record, for one reason or another, before the survey closing date (line 3) and by the time this was determined it was too late to mail out a questionnaire.

In addition, questionnaires were not mailed to some other sample units for a variety of different reasons. One of the sampled units was identified as a chronic non-respondent, so no form was mailed on this occasion. A pre-mailout search revealed some of the sampled units to be out of scope (usually this means they were in a NAICS industry different from the one recorded in the Business Register, which was used for sampling purposes) or out of business, or they were excused from the survey at the discretion of the survey managers usually because the total burden on these particular establishments was considered too great when their involvement in surveys other than the UES was also taken into account. Finally, in 4 cases (line 8) the contact information in the Business Register was discovered to be out of date and had not been updated by the mailout deadline.

So 46,221 (53,932 – 7711) questionnaires were actually mailed out. Of these, 8,555 failed to respond by the survey deadline despite efforts by Statistics Canada's collection staff to get their attention and persuade them to do so. More disturbingly, 147 of the businesses surveyed simply refused to comply (line 11). These 8,702 cases (8,555 + 147) are clearly instances of survey non-response. Beyond these there were 8,950 additional businesses that failed to respond but for which Statistics Canada was able to obtain business income tax records as a substitute source of information (line 12). Tax data are a less-than-complete but fairly good substitute for the information that is sought on the UES questionnaire. These latter cases were certainly instances of non-response if the objective is to assess the degree of business cooperation with the survey effort. However, they might be regarded as instances of partial response to the extent the objective is to measure the accuracy of the survey results.

It turned out that 5,247 (line 22) of the sample units were poorly identified in the survey frame and should not, in hindsight, have been mailed out in the manner they were. These units represented about 10% of the original sample or 11% of the questionnaires actually mailed out. The most common problem was in the industry classification: In about half of these cases the business was found to have a different NAICS code from the one recorded on the Register and as a result, was out of scope for the survey (line 20). In some instances, the company address on the Register proved wrong and it was not possible to find the correct address by the survey closing date. In others, the business was found to be out of business entirely, or alive but inactive. Sometimes the business was discovered to be recently amalgamated with another business, or sold to new owners who were unable to report on the business' activities for the survey reference period, before they took control.

The number of businesses that responded to the survey by sending back their questionnaires was 23,322 (line 25), representing 43% of the original sample or 50% of the number of questionnaires actually mailed out. Expressed relative to the total sample weight (gross business income), these respondents accounted for 67% of the original sample and 73% of the questionnaires mailed out. When the number of responses is expanded to include cases where tax data were substituted for non-response, the rate rises to 60% of the original sample units, 73% of the original sample weight, 70% of the questionnaires mailed out and 79% of the sample weight for questionnaires mailed out.

At a very broad level, there are two primary reasons for calculating response rates: (a) to assess the degree of business cooperation and (b) to help assess the accuracy of the survey results. As the above discussion illustrates, there are many different rates that can be calculated, each serving different purposes. In the UES, the following rates are monitored:

- (i) The *weighted survey received rate*, which is the weighted revenue associated with all questionnaires received, including those discovered to be out-of-scope and out-of-business units,⁴ divided by total sample weighted revenue excluding the pre-identified tax replacement units. This rate was 76.7% in the 2002 survey year.
- (ii) The *total weighted survey received rate*, which is the weighted revenue associated with all questionnaires received, including those discovered to be out-of-scope and out-of-business units, plus the weighted revenue of units for which tax replacement data were used divided by total sample weighted revenue. This rate was 82.9% in the 2002 survey year.
- (iii) The *weighted survey coverage rate*, which is the weighted revenue associated with all completely or partially filled questionnaires, divided by total sample weighted revenue of in-scope, in-business units. This rate was 71.3% in the 2002 survey year.
- (iv) The *total weighted survey coverage rate*, which is the weighted revenue associated with all completely or partially filled questionnaires plus sample units for which tax data were used, divided by total sample weighted revenue of in-scope, in-business units. This rate was 77.1% in the 2002 survey year.

The first two rate calculations shed light on the extent to which businesses cooperated in the survey and the last two are relevant in connection with the assessment of survey accuracy. Rates (i) and (iii) exclude the influence of tax data while rates (ii) and (iv) include it.

4. Recent experience with non-response

The Unified Enterprise Survey, referred to in the previous section, was initiated in reference year 1997. It was relatively small and somewhat experimental in that year. Frame problems – miscoding of establishments, out-of-date contact information and the like – were significant when the survey first started, but the Business Register was substantially improved between 1997 and 2001 and as a result, frame issues have moderated in recent years. Tax data were not used as a substitute for survey records in the initial years, but they have been employed more recently and plans call for them to be exploited increasingly in the future.

⁴ Questionnaires received back from the field with an indication the business they were sent to is out of scope, out of business, amalgamated, transferred to new owners, or located at a new address are useful even though they do not contribute directly the survey results *per se*. These questionnaires provide information that is used to update the Business Register – which of course is helpful for the next iteration of this and other surveys – and to adjust the survey weights.

Table 3
Surveys, Sample Sizes and Response Rates in Canadian Surveys
Reference Years 2001 and 2002

		# surveys		Sample size		Response rate	
		2001	2002	2001	2002	2001	2002
Number of surveys							
1	Agriculture surveys	31	32	99,952	131,463	90.9	88.4
2	Balance of payments surveys	29	29	17,706	17,072	68.9	65.0
3	Education, culture and tourism surveys	5	3	4,629	1,193	84.3	73.9
4	Wholesale and retail trade surveys	11	10	48,262	47,110	76.6	81.4
5	Environment-related surveys	2	0	3,223	0	73.0	--
6	Pension-fund surveys	2	1	3,360	167	64.8	91.0
7	Financial surveys	5	5	91,293	90,837	57.6	61.3
8	Investment surveys	3	3	83,091	89,398	64.2	64.5
9	Labour surveys	3	3	22,166	20,121	89.9	90.1
10	Manufacturing, construction and energy surveys	43	41	43,401	44,913	83.9	77.6
11	Prices surveys	11	11	5,367	6,435	88.5	87.3
12	Science and innovation surveys	9	8	36,366	25,075	73.9	76.9
13	Services industries surveys	24	18	34,422	29,203	59.9	74.3
14	Transportation surveys	28	24	10,359	10,624	78.8	75.1
15	Miscellaneous surveys	7	6	47,704	31,649	63.3	65.2
16	<i>Total</i>	213	194	551,301	545,260	72.5	74.3

Table 3 offers a broader perspective on recent rates of business response to Statistics Canada surveys. The table includes the full range of business surveys – 213 of them in 2001 and 194 in 2002. Unfortunately weighted coverage rates are unavailable in this broader context. The response rates reported here are defined simply as the percentage of survey questionnaires received back, exclusive of post office returns (cases where the contact information was inaccurate or survey units were determined to be out of business). Usage of tax data is ignored here.

As can be seen in the table, the response rates range from a low of 57.6% for five financial surveys in 2001 to a high of 91.0% for a pension-fund survey in 2002. Some of the categories in the table show considerable variation between 2001 and 2002 and this is because the specific surveys conducted can vary from one year to the next (some surveys are biennial or occasional, rather than annual). For the aggregate of all surveys, the response rates average 72.5% in 2001 and 74.3% in 2002. Surveys of the agriculture industry, labour variables and prices have the highest percentage response rates (in the 80s and 90s), while the financial, balance of payments and investment surveys have the lowest rates (generally in the 60s). The most important factor accounting for these differences is probably the complexity and burden associated with the different surveys: Generally speaking, those with the highest response rates have the shortest and simplest questionnaires, while those with the lowest response rates have longer, more onerous questionnaires.

5. Conclusions

Percentage response rates experienced by Canadian business surveys, as traditionally calculated, are typically in the low 70s. They can range into the 60s, or even the 50s occasionally, when the questionnaires are lengthy and onerous and they can easily climb into the 80s, or even the 90s, if the forms are short and simple.

In recent years, Statistics Canada has been using business tax information increasingly as a partial alternative to survey data. Whether used as a direct substitute for survey records, or as highly correlated instrumental variables, tax data can be utilized quite effectively to reduce the burden on small and medium size businesses while simultaneously reducing costs and, possibly, improving statistical quality. As tax data are used more and more, the traditional response rate definitions become less useful and Statistics Canada is turning gradually to weighted coverage rates instead.