New Data Products for the For-Hire Truck Transportation Industry

Fred Barzyk, Transportation Division, Statistics Canada
Jennifer Withington, Producer Prices Division, Statistics Canada

Introduction

Given the ever increasing demand for relevant and accurate information on the service sector, including transportation, Statistics Canada has invested significant resources in developing and re-designing two of its transportation data series; The For-Hire Motor Carrier Freight Services Price Index (FHMCFSPI), a new data product; and the Quarterly Trucking Survey (QTS), a survey re-design of the previous Quarterly Motor Carriers of Freight (QMCF) survey. The FHMCFSPI has been developed to fill a data gap by providing data users with a formally designed and produced price index, in place of using average revenue estimates (e.g. revenue per tonne-kilometre) to track price change. The QTS has been designed to be more focused, streamlined and timely in order to improve data quality and overall usefulness.

This paper presents an overview of both series. It provides a general description of their purpose, design, and data limitations. A brief comparative analysis is provided.

The For-Hire Motor Carrier Freight Services Price Index

In 2010, Producer Prices Division of Statistics Canada first published the For-Hire Motor Carrier Freight Services Price Index (FHMCFSPI) as part of its Services Producer Price Index Program. This monthly national index is published quarterly and tracks the

changes through time in the prices of services provided by general and specialized freight trucking companies. The index is generally released one quarter after the reference period and data are currently available going back to 2007, published on a 2007=100 basis. This index is but one of several new price indexes developed for measuring price change in the business service sector under the Services Producer Price Index (SPPI) program at Statistics Canada.[1]

This new price index provides a better deflator for Statistics Canada's System of National Accounts for this sector of the economy, and can also be used by businesses to measure their performance against industry standards, to plan marketing strategies or to prepare business plans for investors. Governments use index data to develop national and regional economic policies and to develop programs to promote domestic and international competitiveness. The data are also used by trade associations, business analysts and investors to study the economic performance and characteristics of the industry.

Scope and Methodology

The survey frame is derived from the Statistics Canada Business Register which contains about 5,500 establishments in this sector. Establishments with under $1,000,000 annual revenue were excluded from the frame. These are assumed to be owner-operators of trucks who lease themselves and their trucks out to the larger trucking companies.

The units on the frame are stratified by 5-digit NAICS (48411 - General Freight Trucking, Local, 48412 - General Freight Trucking, Long Distance, 48421 - Used Household and Office Goods Moving, 48422 - Specialized Freight (except Used Goods) Trucking, Local, 48423 - Specialized Freight (except Used Goods) Trucking, Long Distance).

The sample is a cross-sectional design, with the sample and weighting information derived from transportation activity data obtained through the Business Register Frame in STC.

The sample consists of trucking businesses which were selected based on establishment revenue and stratified by 5-digit NAICS. Each NAICS stratum was further stratified by take-all (large units) and take-some (smaller units). Collection, obtained directly from respondents, is quarterly for monthly pricing and the survey is conducted in two phases. The first phase consists of identifying and collecting baseline information on typical shipment/services by the carriers in our sample. A questionnaire is sent to each respondent with telephone follow-up. Surveys are sent to respondents at the beginning of each quarter to ensure timeliness and follow-up is done with delinquent respondents.

In the second phase and thereafter, respondents are sent another questionnaire on a quarterly basis which includes service specifications that were established with respondents in the first phase. They are asked to provide monthly specific shipment price information for the predetermined representative commodity groups/services offered that are business specific. In this phase, respondents are also asked to identify the main reason for any price change. Each quarter, businesses continue to price the same specifications, which form the basis of the price indexes.

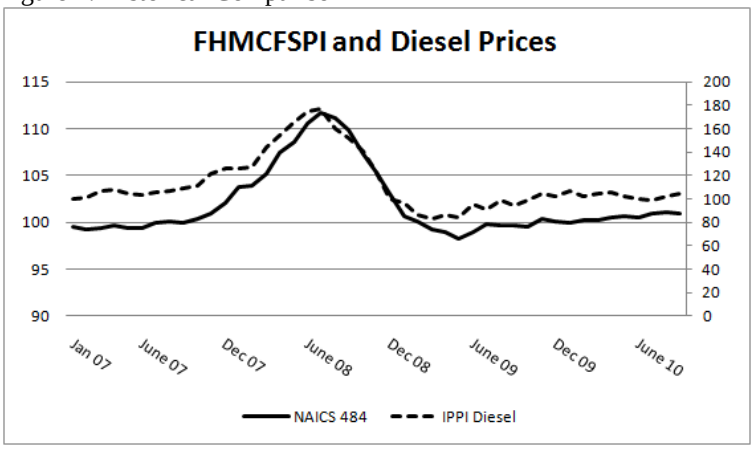
When the services specified are no longer being provided or representative, new specifications are obtained from the respondent. In such cases an explicit adjustment is made to remove the effect of any change in quality, ensuring that we are measuring pure price change. Given the nature of the industry, frequent changes to for-hire trucking services specifications are not expected. Trucking companies are asked to provide estimates in cases where they did not have the specific shipment for the selected month.

Non-response imputation for missing prices is imputed using the averages of designated cells. Estimates are produced by calculating a weighted average of price relatives by industry, which are chained together to form an index series. The For-Hire Motor Carrier Freight Services price index is a national index that uses establishment revenue as its weighting source, updated when possible.

Data Series Analysis

A brief historical comparison of the price index from January 2007 to September 2010 is presented in Figure 1. Data from the Industry Product Price Index (IPPI) for diesel fuel prices is also included.

Figure 1: Historical Comparison



Source: Statistics Canada, Table 332-0004 and Table 329-0065

From the graph it is evident that a noticeable price driver is the movement of fuel prices, which when significant, often lead to corresponding fuel surcharge increases.[2] The impact of fuel charges is particularly strong when the economy is robust and there is sustained demand for truck transportation services, allowing trucking companies to pass more of the increases on in price. Normally, base prices are relatively fixed on an annual basis with fuel surcharges being adjusted in response to fuel prices (i.e. fuel surcharge schedules are set by month). It is interesting to note that both the trucking index and diesel prices peak in the same month, namely July 2008.

The Quarterly Trucking Survey

The Quarterly Trucking Survey (QTS) is a redesigned version of the former Quarterly Motor Carriers of Freight (QMCF) survey. The

QTS collects the financial data needed to estimate value-added for the trucking industry, and to analyze its impact on the Canadian economy. The QTS is the main (if not only) source of sub-annual information on the financial performance of the trucking industry in Canada. QTS data are used by the Canadian System of National Accounts, federal and provincial governments, and trucking companies and associations for a variety of reasons such as: economic analysis, policy formulation, monitoring the industry and even benchmarking.

The target population for the survey consists of companies that have at least one establishment classified as truck transportation (NAICS 484) and which have annual trucking revenues of $30,000 or more. The QTS questionnaire has been redesigned to be shorter and focus on the main financial variables such as the total operating revenue and total operating expenses. Data are published by 5 digit NAICS, by province/territory and by revenue size.

Situation prior to the redesign

From 1994 until 2008, Statistics Canada conducted three surveys – one quarterly and two annual surveys – to measure the size, structure and economic performance of the trucking industry. For these surveys, the trucking industry was segmented by revenue size and type of operation, i.e. for-hire carriers and owner-operators. The *Quarterly Motor Carriers of Freight* (QMCF) survey was administered to for-hire carriers with $1 million or more in annual revenue. These same businesses received the *Annual Motor Carriers of Freight* (AMCF) survey. The remaining businesses, for-hire carriers with revenue from $30,000 to $999,999 and all owner-operators with revenue of $30,000 or more, received the annual *Survey of Small For-hire Carriers and Owner-Operators* (SFHOO). Table 1 illustrates the coverage of the surveys.

Table1: Previous Trucking Surveys Coverage

Annual revenue	For-hire carriers		Owner-operators
$1,000,000 and more	QMCF	AMCF	SFHOO
$30,000 to $999,999			

The QMCF questionnaire carried 103 data cells, including detailed revenue and expenses, distributions of revenue, employment, powered equipment in service, distance travelled and safety information. The AMCF questionnaire, which had 84 data cells, focused on income statement and balance sheet data, fuel consumption and non-powered equipment. The AMCF was considered a "Q5" survey in the sense that the sample for this survey was identical to the fourth quarter (Q4) QMCF sample.

The SFHOO survey had two components. A computer-assisted telephone interview (CATI) with 64 data cells was administered to respondents to obtain data about revenue distributions, employment, equipment, distance travelled and fuel consumption. This information was then combined with revenue and expense data from tax data to complete the picture.

Limitations of the old design

Although this design served well for many years, by 2005 it was becoming clear that these surveys were in need of redesign or, at a minimum, reengineering. All three surveys required considerable, and growing, manual intervention and were being processed using aging systems on a mainframe computer which was due to be phased out. The format and content of key inputs to the survey process, such as the frame and tax files, were continually changing, which required regular rethinking and patching of the processing systems. As these issues grew, the timeliness of the surveys gradually deteriorated.

Aside from these issues, the QMCF survey had several additional limitations. There were two issues related to the coverage of the QMCF. First, the distinction between a for-hire carrier and an owner-

operator could not be easily determined. There was concern that some larger for-hire businesses were not in the QMCF survey population because they had been incorrectly classified as owner-operator businesses. Also, the QMCF survey only covered businesses with annual revenue of $1 million or more. While these businesses represented about 75% of the aggregate revenue of the trucking industry, they accounted for little more than 5% of the businesses. The QMCF could not be considered a key sub-annual indicator of the financial health of the trucking industry if the vast majority of industry participants were not in-scope for the survey.

Response burden was also a significant issue with the QMCF, as it carried more variables than either of the two annual surveys. Response rates were not particularly high and the extensive content of the QMCF was clearly a contributing factor.

Objectives of the redesign

The key objectives of the redesign were to:

- Improve and update the survey design, collection and processing systems
- Improve industry coverage of the quarterly survey
- Improve response rates through reduced and rationalized content
- Improve timeliness

The survey design was considerably simplified by dropping the distinction between for-hire carriers and owner-operators and replacing the fixed revenue thresholds with statistically optimal thresholds that vary by province and industry group based on the distribution of the businesses within the population. The two annual surveys were replaced with a single survey such that both the quarterly and annual surveys measured the same population, i.e. trucking businesses with $30,000 or more in annual revenue. Also, new systems were designed for the collection and processing of the survey data.

Questionnaire content was streamlined. Questions that were rarely answered or for which data could not be released were dropped along with content that could be obtained from other sources. Much of the content on the QMCF was moved to the annual survey; some was dropped. The combination of reduced content and up-to-date systems was expected to result in faster processing and improved timeliness in the release of the survey results.

Results of Redesign

The redesigned (and renamed) Quarterly Trucking Survey (QTS) was first conducted in the first quarter of 2009. The latest release from the survey was for Q3 2010. In terms of industry coverage, the QTS measured an average of 53,900 active businesses during 2009 compared to the 3,600 that the QMCF covered in 2008. The expansion of industry coverage was not as dramatic when considering aggregate revenue, which averaged $9.2 billion quarterly for the 2009 QTS compared to $7.4 billion for the QMCF. The improvement in industry coverage is summarized in the Table 2.

Table 2: Comparison of QTS and QMCF

Survey coverage	**QTS**	**QMCF**
Number of companies		
2008		3,600
2009	53,900	
Aggregate revenue		
2008		$7.4 billion
2009	$9.2 billion	
Q1 to Q3 2010	$10.2 billion	

Survey content for the QTS was dramatically reduced to help ensure that the data could be collected and processed quickly. Just nine data variables are now collected compared to the 103 variables that were collected on the QMCF. The result has been a significant improvement in responses rates. Table 3 provides a comparison of

weighted response rates (for total operating revenue), where the rate represents the proportion of the total operating revenue accounted for by units that responded to the survey. The higher the weighted response rate, the more reliable the published estimate. Clearly, reducing respondent burden has significantly improved the quality of the QTS data.

Table 3: Response rates

Weighted response rates	**QTS**	**QMCF**
2000 to 2007 annual averages		53 to 57%
2008 annual average		42%
Q1 2009 to Q3 2010	76%	

Timeliness, as measured by the number of months between the end of the reference period and the release of the data, has also improved and continues to get better. From Table 4, data are being released almost 1.5 months sooner than the past and more significant improvements are expected over the next several releases. Our target is to be able to release the release the quarterly data within 3 months of the end of the reference quarter.

Table 4: Release Timelines

Timeliness	**QTS**	**QMCF**
2006 to 2008 average		6.9 months
Q1 2009 to Q2 2010 average	6.5 months	
Q3 2010	5.2 months	

Comparative Analysis of the FHMCFSPI and QTS

A brief overview of the two series is presented in Table 5.

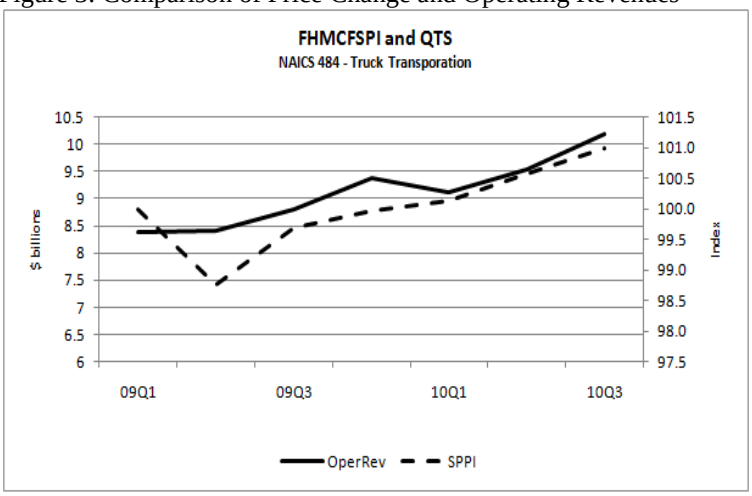
Table 5: Comparison of FHMCFSPI and QTS

Data Items	FHMCFSPI	QTS
1. Frequency	Monthly	Quarterly
2. Geography	National	Province/Territory
3. NAICS detail (5-digit)	48411, 48412, 48421,48422 and 48423	48411, 48412, 48422 and 48423 (including 48421)
4. Time series starts	January 2007	2009 1st Q

The results from both surveys are frequently analyzed and compared for coherence. Trends and anomalies are verified with each data source. The samples of both surveys are compared frequently to determine overlap, as well as burden relief through sample rotation. The pricing data give timely insight into events and trends that are happening day-to-day for this industry (impact of rising fuel costs, stronger Canadian dollar, as examples). This is useful input for verifying and corroborating the QTS results, and vice versa.

The QTS is the newer series, and as such has only seven quarters of published data.[3] Figure 3 presents a time comparison between the price change for truck transportation (FHMCFSPI – converted to quarterly averages), and the operating revenue from the trucking industry (QTS) for the period 2009 1st Quarter to 2010 3rd Quarter. Overall, the series track well over this period, reflecting the steady recovery of the Canadian economy since the second quarter of 2009. Comparing the two endpoints of the data series, operating revenues rose 21.5%, while prices increased by only 1.0%, reflecting a large real growth attributed to increased economic activity.[4]

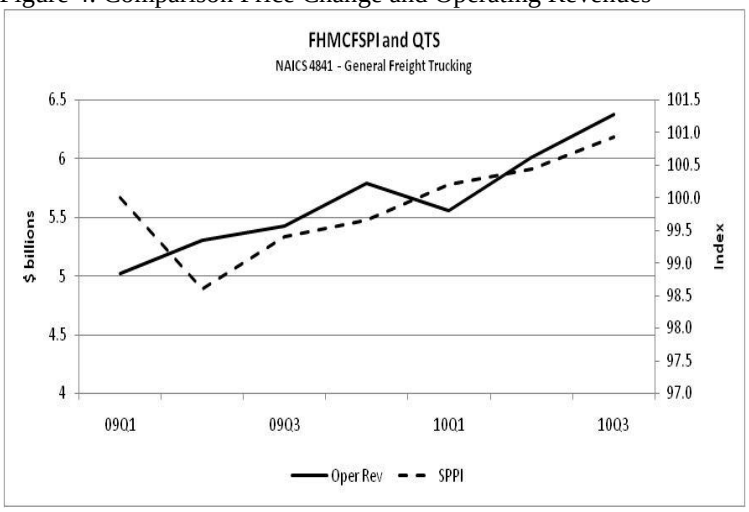
Figure 3: Comparison of Price Change and Operating Revenues



Source: Statistics Canada, Table 332-0004 and Transportation Division.

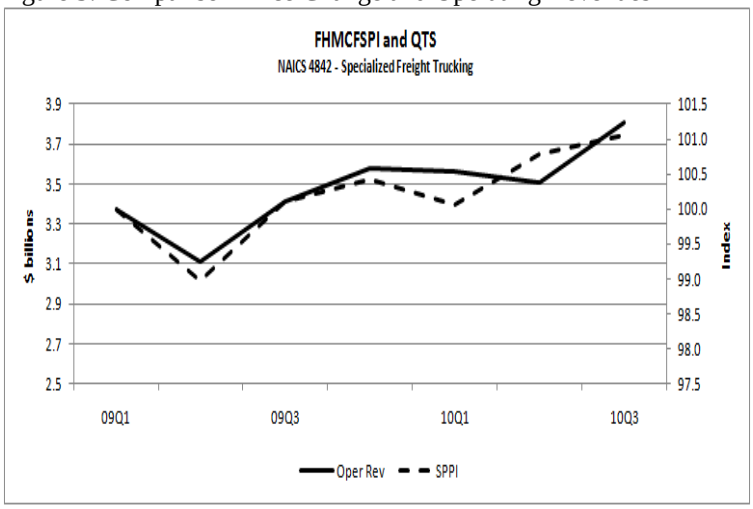
Extending the comparison to the 4-dicigit NAICS level we see that the same relationship exists for NAICS 4841 – General Freight Trucking (see Figure 4), as well as NAICS 4842 – Specialized Freight Trucking (see Figure 5).

Figure 4: Comparison Price Change and Operating Revenues



Source: Statistics Canada, Table 332-0004 and Transportation Division.

Figure 5: Comparison Price Change and Operating Revenues



Source: Statistics Canada, Table 332-0004 and Transportation Division.

Summary

These two new data series represent improvements to the STC portfolio of economic information on the for-hire trucking industry. The new FHMCFSPI fills a longstanding data need for a direct measure of price change, while the QTS is a significant enhancement to the measure of economic activity, trading off detail for better quality and expanded coverage. More SPPI series are planned and in development for the various transportation modes in order to provide better deflators for the Canadian System of National Accounts.

Acknowledgements
The authors would like to acknowledge the efforts of the following people who contributed significantly to this paper: Andrew Chojnicki and Azadeh Mosavat of Producer Prices Division, Statistics Canada; Ed Hamilton of Transportation Division, Statistics Canada.

Endnotes

[1] Other recently published SPPIs include: Retail Services Price Index, Wholesale Services Price Index, Commercial Rents Services Price Index, and Commercial and Industrial Machinery and Equipment Rental and Leasing Services Price Index.
[2] This is the most common reason indicated by respondents for price change in the survey.
[3] Data up to and including the third quarter of 2010 was available at the time of this publication.
[4] Manufacturing sales (shipments) increased 15%.7 over this same period. Note that for consistency of comparison, *none* of the series mentioned in this paper are seasonally adjusted.