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Mini Presentation on Turnover/Output

Turnover and Output Measurement
for Freight Transport by Road
in Canada

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1. Definition of the service being collected

Under the North American Industry Classification System (NAICS) 2002, this industry (NAICS group 484) comprises establishments primarily engaged in the truck transportation of goods, either general freight or specialized freight. Specialized freight is defined as goods that, because of size, weight, shape or other inherent characteristics, require specialized equipment for transportation. Establishments may operate locally, that is within a metropolitan area and its hinterland, or over long distances, that is between metropolitan areas.

There are three types of trucking unit, or “carrier”, which provide trucking services. A **for-hire carrier** is any carrier that undertakes the transport of goods for compensation, while **owner-operators** own or lease one or more power units and provide hauling services under contract to for-hire or private carriers. A **private carrier** is a company whose principal occupation is not trucking, but which maintains its own fleet of vehicles (owned or leased) for transporting its own freight. Private trucking activity is currently not measured by any of the motor carrier of freight (MCF) surveys

Specifically, the type of service measured is *for-hire*. For-hire motor carriers offer either truckload (TL) or less-than-truckload (LTL) services, or a mix of the two. These carriers are further categorized according to the types of freight they carry, such as general freight, household goods, liquid and dry bulk, forest products, and specialized freight. In some cases they subcontract owner-operators for the haulage of the goods.

2. Unit of measure to be collected – units, tons, dollar value, margin, etc.

Turnover data is collected through several surveys administered by the Transportation Division at Statistics Canada. The *Annual Motor Carriers of Freight Survey (AMCF)* collects mostly information on assets, liabilities, owner's equity and other financial indicators (i.e. mostly balance sheet data). The *Quarterly Motor Carriers of Freight Survey (QMCF)* collects detailed information on turnover activity — operating revenues and expenses, equipment used and distances, etc., (i.e. mostly income statement data).

The financial performance, size and structure of the Canadian trucking industry are measured through the QMCF, the AMCF and with an additional survey, the *Survey of Small For-Hire Carriers and Owner Operators (SFHOO)*. The coverage of these surveys in terms of revenue thresholds and carrier type is summarized in the Table 1.



Table 1: Survey Coverage

Annual revenue (GBF*)	For-hire carriers		Owner operators
\$25 million +	QMCF-top	AMCF	SFHOO
\$1 million to < \$25 million	QMCF-mediumsized		
\$30,000 to < \$1 million	SFHOO		

(* GBI = Gross Business Income)

The *Trucking Commodity Origin and Destination Survey (TCOD)* is an annual survey which measures the commodity movements and the outputs of the Canadian trucking industry.¹ The results of these surveys are cross-referenced and ultimately benchmarked to arrive at consistent estimates for the industry. Each survey (except for SFHOO) is presented in more detail below.

2.1. The AMCF Survey

The Annual Motor Carriers of Freight survey is a sample survey of trucking companies in Canada with annual revenue of \$1 million or more.² The AMCF is a supplement to round out the financial information provided by the quarterly survey (QMCF, see below). The objective of this survey is to measure the size and composition of the trucking industry and to provide financial indicators as well as equipment characteristics. The information collected includes:

- Balance sheet and income statement detail
- Equipment (Trailers by type and length)
- Information is available by region, by activity, for local versus long distance carriers and by revenue size

The results from this survey are used to provide key financial indicators on the profitability, leverage and solvency of carriers in this industry. The indicators are broken down by revenue size, region and type of freight hauled, i.e. general freight versus specialized freight.

2.2. The QMCF survey

The QMCF survey is a sample survey of trucking companies in Canada with annual revenue of \$1 million or more. The objective of this survey is to measure the size and composition of the trucking industry and to provide financial indicators data for these carriers. The information collected includes:

¹ Originally a quarterly survey, the TCOD survey has undergone a major re-design and is set to publish 2004 data in late 2006.

² Unless specifically indicate otherwise, all figures are expressed in Canadian dollars.

- Revenues by activity
- Expense detail
- Operating ratios
- Employment
- Equipment (Power units – Tractors and Straight Trucks)
- Information is available by region, for general vs. specialized freight carriers and for domestic vs. international movements

The QMCF survey provides quarterly financial indicators on performance of the trucking industry, such as operating ratios by size of carrier and average expenses by type of expense. The expense categories are designed to measure the economic performance of this industry as a whole as well as by segment – general freight versus specialized freight. Results for the largest carriers, those with more than \$25 million in annual revenue, are also provided separately on a timelier basis as a leading indicator of industry trends.

2.3. The TCOD Survey

The TCOD is a sample survey of establishments with annual trucking revenue of \$1 million or more. The objective of the survey is to measure the origin and destination of commodity shipments, both local and long distance, done by trucking establishments. The data elements collected include:

- Commodity
- Origin and destination
- Revenue
- Weight
- Distance
- Tonne-kilometres
- Information is available by province and territory, for local versus long distance carriers, for domestic versus international movements and for census metropolitan areas (CMA).

The TCOD survey provides information on the trucking industry's growth and contribution to the economy as well as measuring the volume of goods transported within and outside of Canada. Planning boards and trucking companies use the information to gauge market sizes and routing demand.

3. Market conditions and constraints³

During the late 1980's and early 90's, deregulation and the advent of trade liberalization in North America impacted significantly on the trucking industry in Canada. Deregulation was initiated under the Motor Vehicle Transport Act (MVTA) introduced in 1987, which lowered the barriers to entry for incumbent firms. The Canada – US Free Trade Agreement (FTA), signed in 1989, signified the beginning of a new era of free trade between these two countries. This trading arrangement was expanded in 1992 to include Mexico under the North American Free Trade Agreement (NAFTA). The intent of these policy changes was clear. In the case of deregulation, the goal was to make the trucking industry more efficient and self-reliant by opening this sector to more direct competition, which has led to an industry that is more productive and less reliant on government regulation. The impetus behind the free trade agreements between Canada, the United States and Mexico was to remove the tariff wall between these countries and establish one of the largest free trade zones in the world.

The trucking industry plays an important role in the Canadian economy and for Canadians in general. In 2004, trucking contributed \$14.8 billion to the economy, a little less than one third of the total output generated from the transportation sector. Trucking is the dominant mode, in terms of revenue, for transporting goods between Canada and the United States. About 53% of exports to the United States and 78% of imports from the United States were moved by truck.

Industry activity has been strong. The estimated number of carriers rose 10% from 2000 to 2004, to a current level of 3,114.⁴ Since 2000, operating revenues have been growing at an average quarterly rate of 1.6% (seasonally adjusted). Profitability in the industry has been healthy (return on assets has been over 5% from 2000-04), while the proportion of owned versus leased equipment has been steady (about 80% owned).

The growing importance of cross-border trucking between Canada, the United States and Mexico is evident. Revenues from international freight movements were up 18% from 2003. At a more detailed level, freight movements out of Canada increased by 15%, while movements into Canada rose by 21%. Over the last 10 years, the proportion of revenues from international cross-border movements has been increasing in comparison to domestic movements, jumping from 22% of total revenues in 1994 to 36% in 2004.

³ Source: *Statistics Canada, Trucking in Canada, Catalogue no. 53-222-XIE (various years including 2004)*.

⁴ The reference to 3,114 is only for carriers with revenues of \$1million or more.

However, the steady growth of the industry, coupled with an aging work force and a decline in the popularity of this occupation (i.e. 'driving truck'), means the industry is currently facing an urgent need for qualified truckers. One study, conducted by the Canadian Trucking Human Resources Council (CTHRC), indicates that the trucking industry needs some 37,000 new drivers annually to offset changes of occupation, the growth of the industry and attrition (CTHRC, 2003).

4. Standard classification structure and product detail/levels.

4.1. Output

4.1.1. Main variables

The main variables used to measure the turnover and activity for this service industry are:

- **Operating revenues.** Operating revenues include revenues pertaining to the motor carriers of freight operations only. These correspond to the total amount billed by the carrier and exclude revenues earned by other carriers in the case of interline shipments.
- **Operating expenses.** Operating expenses include expenses incurred in carrying motor carrier freight operations only. These generally exclude non-operating expenses such as capital loss, interest paid, etc.
- The **operating ratio** is the share of total operating revenues absorbed by total operating expenses (excluding interest charges). It is calculated by dividing operating expenses by operating revenues. A drop in the ratio indicates an improvement in financial performance. A ratio greater than 1.00 represents an operating loss.
- **Tonne-kilometre.** An expression of weight (mass) multiplied by distance from origin to destination for each shipment. This is the standard output measure of the trucking industry.

4.2. Main Classifications

There are two dimensions for classifying and producing estimates of truck transport activity in Canada, namely commodity and industry.

4.2.1. Commodity Classification

In the case of goods that are transported by truck and other modes, commodity data is collected and published using the Standard Classification of Transported Goods (SCTG). Essentially,

“The Standard Classification of Transported Goods (SCTG) consists of a blend of transportation characteristics, commodity similarities, and industry-of-origin considerations, designed to create statistically significant categories. It is a structured list that is defined at its less-detailed levels according to the Harmonized Commodity Description and Coding System (HS), and at more-detailed levels, according to patterns of industrial activity. Other factors in the definition of categories were transportation considerations such as volume, revenue, value, origin, and destination.” (Source: STC internal website)

The SCTG structure (two-digit level) is presented in Table 2.

Table 2: SCTG Structure

SCTG	Category
01	Live animals and live fish
02	Cereal grains
03	Agricultural products except live animals, cereal grains, and forage products
04	Animal feed and feed ingredients, cereal straw, and eggs and other products of animal origin n.e.c.
05	Meat, fish, seafood, and preparations
06	Milled grain products and preparations, and bakery products
07	Prepared foodstuffs n.e.c. and fats and oils
08	Alcoholic beverages
09	Tobacco products
10	Monumental or building stone
11	Natural sands
12	Gravel and crushed stone
13	Non-metallic minerals n.e.c.
14	Metallic ores
15	Coal
16	Crude petroleum
17	Gasoline and aviation turbine fuel
18	Fuel oils
19	Products of petroleum refining n.e.c. and coal products
20	Basic chemicals
21	Pharmaceutical products
22	Fertilizers and fertilizer materials
23	Chemical products and preparations n.e.c.



24	Plastics and rubber
25	Logs and other wood in the rough
26	Wood products
27	Pulp, newsprint, paper, and paperboard
28	Paper or paperboard articles
29	Printed products
30	Textiles, leather, and articles
31	Non-metallic mineral products
32	Base metal in primary or semi-finished forms and in finished basic shapes
33	Articles of base metal
34	Machinery
35	Electronic and other electrical equipment and components, and office equipment
36	Vehicles
37	Transportation equipment n.e.c.
38	Precision instruments and apparatus
39	Furniture, mattresses and mattress supports, lamps, lighting fittings, and illuminated signs
40	Miscellaneous manufactured products
41	Waste and scrap
42	Miscellaneous transported products

4.2.2 Industry Classification

According to the current NAICS definition, the trucking industry can be broken down into several sub-industries or sub-sectors up to 6-digit levels (see Table 3).

Table 3: NAICS Aggregation for Trucking Industry

NAICS	Category
484	Truck Transportation
4841	General Freight Trucking
48411	General Freight Trucking, Local
48412	General Freight Trucking, Long Distance
484121	General Freight Trucking, Long Distance, Truck-Load ^{US}
484122	General Freight Trucking, Long Distance, Less Than Truck-Load ^{US}
4842	Specialized Freight Trucking
48421	Used Household and Office Goods Moving
484210	Used Household and Office Goods Moving



48422	Specialized Freight (except Used Goods) Trucking, Local
484221	Bulk Liquids Trucking, Local ^{CAN}
484222	Dry Bulk Materials Trucking, Local ^{CAN}
484223	Forest Products Trucking, Local ^{CAN}
484229	Other Specialized Freight (except Used Goods) Trucking, Local ^{CAN}
48423	Specialized Freight (except Used Goods) Trucking, Long Distance
484231	Bulk Liquids Trucking, Long Distance ^{CAN}
484232	Dry Bulk Materials Trucking, Long Distance ^{CAN}
484233	Forest Products Trucking, Long Distance ^{CAN}
484239	Other Specialized Freight (except Used Goods) Trucking, Long Distance ^{CAN}

CAN= NAICS applicable to Canada, US= NAICS applicable to the United States.

Truck Transportation (NAICS 484)

This NAICS sub-sector comprises establishments primarily engaged in the truck transportation of goods. These establishments may carry general freight or specialized freight. Specialized freight comprises goods that, because of size, weight, shape or other inherent characteristics, require specialized equipment for transportation. Establishments may operate locally, that is within a metropolitan area and its hinterland, or over long distances, that is between metropolitan areas.

General Freight Trucking (NAICS 4841)

This industry group comprises establishments primarily engaged in the local or long distance trucking of general freight. General freight trucking does not require the use of specialized equipment. The trucks used can handle a wide variety of commodities. Freight is generally palletized, and generally carried in a box, container or van trailer.

Specialized Freight Trucking (NAICS 4842)

This industry group comprises establishments primarily engaged in specialized freight trucking. These establishments transport articles that, because of size, weight, shape or other inherent characteristics, require specialized equipment for transportation. Some important types of specialized equipment are bulk tankers, dump trucks and trailers, refrigerated vans, and motor vehicle haulers. Establishments that transport used household and office goods are included. **Exclusion(s):** Establishments primarily engaged in: local hauling of garbage (56211, Waste Collection)



5. Evaluation of standard definition and market conditions

5.1. Output –Commodity basis

The SCTG is employed and represents a good classification measure for the types of commodities transported and meshes well with how the data are used by the SNA. As the Canadian statistical system (both the SNA and business survey fields) moves to implement NAPCS, a historical linkage will be carried out.

At this point, switching commodity classifications from the current SCTG to the new *North American Product Classification System (NAPCS)*—a joint project of the national statistical agencies of Canada, Mexico and the United States—is under review. With import/export data remaining on a Harmonized System basis though, changing to NAPCS is less attractive, but is still up for consideration.

At the SCTG two-digit level, there are 42 commodity categories. Of these, the top 10 commodities account for 65.4% of the all commodities moved by truck. Table 4 presents more details on their contribution by SCTG.

Table 4: Contribution to Domestic Revenue by SCTG

SCTG	Category	%
42	Miscellaneous transported products	26.3
26	Wood products	6.3
36	Vehicles	5.7
34	Machinery	5.4
33	Articles of base metal	5.1
13	Non-metallic minerals n.e.c.	3.9
7	Prepared foodstuffs n.e.c. and fats and oils	3.6
5	Meat, fish, seafood, and preparations	3.3
32	Base metal in primary or semi-finished forms and in finished basic shapes	2.9
23	Chemical products and preparations n.e.c.	2.9
		65.4
	All other commodities	34.6
	Total - Domestic for-hire carriers revenue	100.00

Source: Statistics Canada, *Trucking in Canada 2003*

5.2. Output –Industry basis

On a NAICS basis, Table 5 provides a summary of activity by the two main subgroups—General Freight Trucking (NAICS 4841) and Specialized Freight Trucking (NAICS 4842)—for the years 2001-2003. From the data, general freight carriers dominate the industry, accounting for 60% or slightly more of industry revenue. The remainder is earned by specialized freight, a more splintered category.

Table 5: For-Hire Carriers Revenue Share by market segment, 2001 – 2003

	NAICS	2001 (%)	2002 (%)	2003 (%)
General freight	4841	60.8	62.1	62.5
Movers	4842	3.0	2.9	2.4
Liquid bulk	4842	7.9	8.6	7.1
Dry bulk	4842	7.0	5.6	7.5
Forest products	4842	4.9	4.6	3.9
Other specialized freight	4842	16.5	16.1	16.6
Total		100.0	100.0	100.0

Note: “other specialized freight” includes motor vehicles, heavy machinery, agriculture, live animals and other commodities carriers.

Revenues include medium and large carriers; carriers with annual operating revenues of \$1 million or more.

Source: Transport Canada, based on Statistics Canada, QMCF Survey

6. National accounts concepts and measurement issues for the area related to GDP measurement

6.1. Output

For the truck transportation industry, the SNA defines the standard unit used for industry measurement as the establishment in which the main activity is truck transportation. It includes all for-hire trucking establishments, common or contract, local or long distance. The bulk of the truck industry output comes from the MCF surveys of establishments with more than \$1 million in operating revenues which transport freight and household goods. Tax data is used to arrive at financial estimates for the segment earning less than \$1 million annually. To conform to the concept of operating revenues, all subsidies are excluded. Operating expenses are also obtained from the MCF surveys.

The SNA produces its estimates of GDP using the value-added approach (i.e. as a sum of value-added by all industries) and by measuring final demand in the I-O (Input-Output) framework. They present two slightly different perspectives of activity that achieve the same result.

From an industry-based point of view, the truck transport industry is treated as a “margin” industry by the SNA perspective. Total operating revenues for this industry are distributed across all commodities based on using the results of the TCOD. In this sense, the transportation charges for a good form part of the eventual purchaser price concept (along with other types of margins such as wholesale and retail).

6.2. Deflation – Current methods

The current deflator is based on unit value indexes of revenue and tonne-kilometres for 76 commodities classified by distance groups from the domestic portion of the TCOD survey. Volume indexes from the same survey are also used to check the results of this deflator.

These unit value indexes have exhibited some volatility and are subject to changes in the quantity/quality mix in adjacent time periods. As a result, the deflator in any given year could be based on all of the above data plus any relevant information available on the trucking industry.

7. Turnover/output data method(s) and criteria for choosing various output methods.

7.1. MCF surveys

As pointed out earlier, turnover/output data is collected several ways in the MCF surveys. For-hire carriers with operating revenues of more than \$1 million annually are surveyed for their financial and operational information under the AMCF/QMCF programs. For carriers under the \$1 million threshold, administrative (tax) data are used to obtain estimates of their financial and operational activity. Administrative data is also used for owner-operators earning over \$30,000 annually (owner-operators below this threshold are excluded).

7.2. TCOD survey

With the re-design of the TCOD survey, all companies on the Business Register with at least one trucking establishment (NAICS: 484) and at least \$1 million in annual revenue are in scope. The Local Trucking sector NAICS (48411, 48422) were added to the previous survey coverage. All shipments made by the companies on the frame are in-scope for the survey. Re-designing the survey has resulted in survey coverage—a 67% increase in the number of companies which translates to a 35% increase in revenues. Although the survey coverage is significantly enhanced, it does not meet all the users’ requirements. The Canadian non-trucking companies, or

“Private Carriers”, as well as the foreign companies that transport goods in Canada could not be included in the new survey population.⁵ The \$1 million threshold was maintained in the redesigned survey in order to reduce the response burden on small companies and to respect the budget constraints⁶.

The TCOD survey uses the three collection methods: (1) electronic data reporting; (2) profiles, but via computer-assisted telephone interviews (CATI); and (3) on-site visits. EDR reporting is significant with the new TCOD, a small number of large companies are expected to provide 100% their shipment data electronically (compared to 10% previously). The goal is to significantly increase the number of trucking companies that report in an electronic format so that it becomes, in the long term, the primary collection method for the redesigned survey. The new CATI application is used to derive company profiles and is expected to significantly reduce the cost of data collection for those companies whose activities can be described through profiles. On-site visits are employed when neither of the other methods (Profiles or EDR) can be used for a given company. Interviewers visit each company selected in the sample, select a systematic sample of shipping documents, then select a sample of shipments on each shipping document selected and finally transcribe the data from the documents onto laptop computers. The variables collected for each shipment include: the origin and the destination of the shipment, the description of the commodity transported, the weight and the revenue generated by the shipment.

8. Evaluation of comparability of turnover/output data with price indexes.

Quarterly turnover data has been collected since the late 1980's.⁷ Commodity detail continues to be a high priority for the SNA and other major users. As a result, the TCOD survey is the more important of the MCF surveys in this regard. With the re-design the TCOD has moved from producing quarterly to annual estimates of activity and greatly increasing their sample coverage of trucking units and shipments.

However, there is no current ‘official’ price index that is produced. As mentioned earlier, unit values are assessed and compared with analytical series produced by another federal

⁵ Private carriers and US trucks coming to Canada are excluded largely on practical grounds. Devising a workable methodology for measuring these activities is difficult. In the case of private carriers, the main challenge lies in establishing a representative frame. For US trucks coming to Canada, a border intercept survey is one option for measuring commodity movements of US carriers coming to Canada, but can be very costly.

⁶ It is worthy of noting that the exclusion of owner-operators is principally to avoid double counting of loads, since most owner-operators work for for-hire carriers, and therefore STC would already have a record of the shipment.

⁷ Annual financial data collection began in 1941 and has continued since then with a brief hiatus from 1970 to 1973. Quarterly financial data collection began in 1988. Annual commodity origin and destination data have been collected since 1970.

department, Transport Canada. The SNA then produces its estimates by analyzing these various data.

Under the SPPI development program currently underway at Statistics Canada, a price index for truck transport is being developed and tested. In designing the index, much consideration has been given as to whether the index should focus primarily on the commodity (SCTG) or the industry (NAICS) dimension. While indexes are likely to be produced for both dimensions, the priority is developing a commodity-based index in order to better deflate transportation margins on a commodity basis. The goal is to produce price indexes for the majority if not all of the 42 SCTG classes. In terms of rolling up to industry indexes, this will depend on the sample size and coverage, with the most feasible NAICS aggregation categories being at the 4-digit level, namely *General Freight Trucking (NAICS 4841)* and *Specialized Freight Trucking (NAICS 4842)* as well as an overall index (i.e. NAICS 484).

The current index methodology relies on drawing a sub-sample of the TCOD survey frame to arrive at the SPPI sample. In addition, the micro-data results are a valuable source for constructing company profiles of shipment activity. TCOD micro-data will be used to identify the top revenue-grossing commodities being shipped, the typical shipping distance and the typical weight of shipment. Having this type of information available during data collection will expedite the survey process and reduce response burden.

The service price is the price charged by a trucking company for transporting a certain type of good of specific weight and a specific distance under certain terms. At this point in the development, a monthly index is envisioned, with data collected quarterly to reduce cost and response burden.

9. Summary

In Canada, the role of truck transportation is integral to economic prosperity. The importance of this industry is not lost on the central statistical agency. Statistics Canada measures and monitors the activity of this sector closely using a variety of means.

Recently, changes to various surveys measuring turnover/output have been targeted at improving their quality and accuracy. The TCOD in particular has experienced a substantial re-design in an effort to greatly increase its coverage. In the area of prices, development and testing is nearly complete for an SPPI for truck transportation, which relies heavily the turnover surveys as a sample source for both enterprises and the commodities they transport. Once this last component is successfully put in place, a comprehensive and robust program measuring the key aspects of industry activity will be realized.