

27th Voorburg Group Meeting on Services Statistics

**Warsaw, Poland
October 1-5, 2012**

Sector Paper: ISIC 4520, Maintenance and repair of motor vehicles

Mark Wallace
John Murphy
U.S. Census Bureau

The views expressed in this paper are those of the authors alone and do not necessarily represent the position of the U.S. Census Bureau or any other organizations with whom the authors may be affiliated.

1.0 Introduction

Maintenance and repair of motor vehicles presents some interesting challenges for the measurement of output and the pricing of that output. There are different practices for vehicle inspections and maintenance present throughout the world ranging from “fix it when it breaks” to legislated inspections and required maintenance. Establishments outside of the *Maintenance and repair of motor vehicles* industry often provide substantial quantities of these repair services.

This sector paper provides a summary of the experiences of Canada, Japan, Mexico and the UK as presented at the 26th Meeting of the Voorburg Group in Newport, Wales in September 2011. Topics addressed include the classifications being used, a summary of the different classification approaches in use, measurement of output, pricing of output, and recommendations of best practices when developing or revising statistics for maintenance and repair of motor vehicle services. These recommendations rely on the practical experiences of the presenting nations and are subject to constraints such as the availability of resources in a national statistical office; market conditions and prevailing practices in the country; and the availability of survey, census, or third party data.

This paper focuses on classifications in Section 2, turnover statistics in Section 3, Services Producer Price Indices (SPPI) in Section 4, and provides a detailed table of international progress in the appendixes based on the results of the detailed status report compiled in advance of the 26th meeting.

2.0 Classification

Maintenance and repair of motor vehicles includes a wide range of services provided to both business customers and individuals. The services can range from relatively simple, routine maintenance such as washing, tire rotation, and oil changes through highly complicated (and expensive) mechanical and electrical repairs. *Maintenance and repair of motor vehicles* also includes collision repair, bodywork, painting, and even motor vehicle upholstery. The scope of the services included results in heterogeneous outputs.

The services are provided by general repair facilities or specialized repair facilities and are often provided jointly with other services, such as the sale of vehicles or the sale of motor fuels.

2.1 Industry Classification

Four industry classifications were considered in the mini-presentations: 1) the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 4) from the UN, 2) the Standard Classification of Economic Activities in the European Community (NACE Rev. 2), the North American Industry Classification System (NAICS), and 4) the Japan Standard Industrial Classification (JSIC).

While the content of the industries in the above classifications is very similar, the location of the industry within the hierarchies is different. ISIC and NACE include the industry within Section G – Wholesale and retail trade; repair of motor vehicles and motorcycles. NAICS and JSIC classify motor vehicle maintenance and repair services with other repair services within their classification hierarchies. This does not create comparability problems unless data is presented at an aggregated level without the associated detail.

The second difference in the industry classifications is the level of detail presented for motor vehicle repair and maintenance. ISIC and NACE present a single class (ISIC 4520). JSIC identifies separate classes for general automobile repair services and miscellaneous repair services. NAICS (Canada, 2007) has seven separate classes addressing a variety of specialized repair and maintenance services. A full detailed list of the industry classifications is included in Appendix 2.

2.2 Product Classification

Product detail was provided based on the Central Product Classification (CPC Ver. 2), the Classification of Products by Activity (CPA 2008), and the North American Product Classification System (NAPCS - Canada).

The CPC includes product subclasses to separately identify repair of motor vehicles, motorcycles, and trailers. The CPA provides eight detailed subclasses that break out specific types of repair services ranging from ordinary repairs to more specialized repairs such as body work or electrical work. NAPCS detail is closer to that of the CPA but NAPCS (Canada) also includes product breakouts for automobiles and light trucks separately from heavy trucks and busses. A complete list of these product classifications is included in Appendix 2.

3.0 Turnover Statistics

3.1 Data Availability

There is very good turnover data availability based on country responses to the detailed summary report compiled by the Voorburg Group. In fact, all twenty-three countries that responded to the survey indicated that turnover data was available for repair and maintenance of motor vehicles. Establishments classified to *Maintenance and repair of motor vehicles* tend to be numerous and small. In Japan, over 90% of the 59,000 establishments in the industry had 10 or less employees. Canada also noted that the industry is dominated by a large number of very small businesses.

Table 1: Availability of turnover information, 2011

| ISIC 4 | Annual | Monthly/Quarterly | Product |
|---|--------|-------------------|---------|
| 4520 Maintenance and Repair of Motor Vehicles | 18 | 19 | 5 |

Source: Voorburg Group Detailed Status Report Summary, 2011. There were 23 country responses to this survey.

As Table 1 indicates, there is also broad availability turnover data at both annual and sub-annual periodicity. Within the EU, reporting is required under the SBS and STS legislation. It is important to note that all reporting countries not covered by the EU regulations also produced data for these services.

3.2 Collection of data

Turnover data came from a variety of sources according to the presenters and the respondents to the detailed status report. Reported data sources included censuses, tax records, sample surveys, and input/output estimates.

Annual data are generally collected using questionnaires that collect the turnover but also additional variables such as employment, expenses, revenues from other services, fixed assets, cost of purchased goods and services, etc. Annual surveys are a mixture of census and sample based collections. Sub-annual data are almost universally produced on a sample basis.

3.3 Data Issues

Industry data often includes data for other services that are produced by establishments in the industry. This is not a major problem for repair and maintenance establishments because the establishments classified to this industry tend to be specialized. Product turnover data however can present particular problems if only collected from repair industry establishments. The presenters noted that a large portion of motor vehicle repair services are provided by establishments classified to other industries. Examples of industries that provide substantial amounts of motor vehicle repair and maintenance included car dealers, auto parts retailers, gasoline stations, and inspection stations. In Canada, establishments classified to repair services accounted for only about 10% of the total product. Other retailers accounted for about 15% of the total and the largest portion of service products, approximately 75%, was the output of motor vehicle dealers.

Turnover data for motor vehicle repair and maintenance also includes data for both parts and labor. Turnover statisticians noted during the discussion that separation of parts and labor is desirable for input/output and other applications but agreed that the separation can be problematic in application. Class of customer is also important for determining intermediate and final demand. Product distinctions for automobiles and light trucks separate from heavy trucks might provide a useful intermediate/final demand proxy although care must be taken because intermediate consumption of automobiles and light trucks is not limited to households.

Finally, the market for repair and maintenance services can be heavily influenced by regulations that require inspections and periodic maintenance services. There is also anecdotal evidence that revenues in the repair and maintenance industry are counter cyclical to some extent. When sales of new motor vehicles are down, revenues for repair and maintenance are level or increasing.

3.4 Recommended Approaches

Table 2.0: Options for Developing Turnover Statistics – Maintenance and Repair of Motor Vehicles Services

| Category | Data Source | Level of Detail Collected | Frequency | Cost | Comments |
|----------|--|---|--|---|---|
| Best | Survey/Census | Industry turnover <u>and</u> product turnover detail; | Sub-annual collection (monthly or quarterly) | <ul style="list-style-type: none"> - Most expensive - Largest response burden | <ul style="list-style-type: none"> - Due to the nature of service delivery, cross industry product collection will provide the most comprehensive service product coverage. - Collect parts and labor separately if possible - Consider class of customer or additional product breakdowns for heavy trucks - Timely data |
| Good | Survey/Census | Industry detail <u>only</u> | Sub-annual | <ul style="list-style-type: none"> - Expensive - High response burden | <ul style="list-style-type: none"> - Industry detail may not be sufficient to delineate sources of revenue. - No total product data - Timely data |
| Minimum | Administrative (tax data, industry association data etc.,) | Industry detail <u>only</u> | Annual | <ul style="list-style-type: none"> - Least expensive - Little or no respondent burden | <ul style="list-style-type: none"> - Income and production definitions can differ adding imprecision to estimates - Least timely |

4.0 SPPI

4.1 Data Availability

Although data availability for turnover was high, only two of the twenty-three countries that completed the detailed status report survey indicated the availability of SPPIs for *Maintenance and repair of motor vehicles*. Conclusions and recommendations are based on an extremely small set of experiences but are useful to consider.

4.2 Source of SPPI data

Both presentations on prices discussed the use of the consumer price index as a proxy or retail price index data reweighted to SPPI weights as a reasonable alternative to a separate SPPI for Maintenance and repair of motor vehicles. One program did use a private source for price data based on a survey of franchised automobile dealers but stopped that practice when data quality concerns developed.

The mini-presentations noted the shortcomings of using retail prices to households in place of an SPPI. CPI/RPI are prices paid by consumers (including taxes, subsidies, etc.) rather than basic prices. CPI data exclude the business-to-business component. Discounts for large volume business customers are not captured. Still, despite these shortcomings, it appears that CPI is meeting the needs of national accountants.

4.3 Target Coverage

Maintenance and repair of motor vehicles includes passenger cars, light trucks, heavy trucks and buses, and has a wide range of business and household customers. To the extent that business clients have access to volume discounts, coverage of those clients is necessary for complete coverage.

Several types of transactions are common in the industry. Routine maintenance services often result in a single price that includes both parts and labor. Examples of this type of repeatable service are oil changes, tune-ups, tire replacement, battery replacement, brake pad replacement, and exhaust replacement.

Other services require pricing on a time and materials basis. A good example of this is collision repair services.

As noted previously, establishments classified to a variety of industries perform repair services. Of particular importance are motor vehicle dealers and technical testing establishments (motor vehicle safety inspections). Industry coverage may result in considerable secondary production while product coverage requires a multi-industry initiative.

4.4 Pricing Method Used

Tracking prices for repeatable services is the recommended pricing method when those services are available. For more complex or “custom” repair services, a time and materials pricing method for specified repair service is appropriate. There is little evidence that pricing differs for business or household customers with the possible exception of volume discounts available to large business customers. There was no discussion of pricing for commercial vehicle repairs and maintenance in the mini-presentations but additional research should be conducted to determine the impact of excluding those services by using source data from consumers.

4.5 Weights

All responding countries to the Voorburg Group status survey indicated that turnover data is available. Weights for SPPIs should therefore be readily available in most cases. Care must be taken to apply appropriate weights for the industry rather than the products. Canada noted that a minority of repair services were produced by the repair industry. Canada also noted that consumer consumption of repair services is not reflective of all consumption of repair services and appropriate weighting must be used if converting consumer price data for an SPPI.

4.6 Main Issues in Price Measurement

One area of considerable discussion (and some disagreement) is the practice of separating prices for repair services (primarily labor) and parts. From a practical standpoint, it is hard to have respondents separate parts and labor. However, the separation is necessary to avoid double counting and for proper allocation of parts to intermediate consumption or capital investment for businesses and final consumption for households. The consumption of a new or rebuilt engine could be a capital investment for a business but final consumption for a household. There are also concerns about value measurement for installed parts – should parts be measured as goods at gross values or as a margin? The classification of repair services in the same area as wholesale and retail trade of vehicles and parts in ISIC implies that margins should be collected for installed parts in repair services.

Price programs should be alert to quality changes that are often disguised as “free” add-ons. When a “free” service is added, for example a free brake inspection when purchasing an oil change, there is a quality change that must be addressed. Similar issues arise when the sale of a motor vehicle includes three years of standard required maintenance. In that case, there is the purchase of the vehicle but also the advanced purchase of maintenance services included in the transaction. Although not mentioned in the session, warranty reimbursements from manufacturers to authorized dealers and repair facilities may have different pricing trends. These warranty reimbursements are not reflected in consumer price survey data because the customer does not pay for the warranty service.

While it is apparent that consumer prices are being used to proxy SPPIs in many cases, there are shortcomings that must be evaluated. If prices are reweighted and converted to basic prices, this is a A method. If there are significantly different pricing practices for business-to-business transactions, they will be missed with consumer prices.

4.7 Recommended Approaches

Table 3.0 Options for SPPI methods and practices

| Category | Pricing method | Data type in the survey and frequency | Quality and Accuracy | Cost |
|----------|--|--|---|---|
| Best | Observed transaction prices. Prices of repeated services | Data are based on real transaction prices | <p>Advantages:</p> <p>Real transaction prices give an accurate price index that is representative for the industry</p> <p>Disadvantages:</p> <p>Repeatable services can only be tracked in for some repair services</p> | Relatively high. Much work is needed to maintain constant quality. |
| Good | Model Pricing | Expert estimate. The data are fictitious prices estimated by the respondent | <p>Advantages:</p> <p>The quality of the service is held constant</p> <p>Disadvantages:</p> <p>Time consuming for the respondent</p> | High. A good knowledge about the industry is essential. May be necessary for segments such as collision repair when billing is based on time/materials. |
| Minimum | CPI as proxy | Care should be taken to convert to basic prices and find appropriate proxy for business component if pricing does not follow consumer trends | <p>Advantages:</p> <p>Low cost</p> <p>Disadvantages:</p> <p>Potential partial coverage.</p> | Low. |

5.0 Summary of Main Conclusions

The best turnover and pricing mechanisms for automobile repair and maintenance are highly dependent on the structure of the market in a given country. The wide variation in regulations, mix of public and private service providers, and other conditions must be considered when preparing for data collection.

Industry data for either turnover or prices will not necessarily result in complete coverage of the activity. A common example identified by the Voorburg Group is automobile dealers, classified in a different industry, perform substantial amounts of automobile repair. In order to provide comprehensive coverage, data from more than one industry may be necessary.

It is not clear that large repair contracts for commercial entities, such as car rental companies or other fleet operators, have the same pricing level or trend as consumer repairs. If the CPI is used to proxy an SPPI, care must be taken to ensure that no major differences exist or that the intended users understand the differences.

When developing price statistics for automobile repair, consider separating out the parts component from the labor component in each transaction. While there was not complete agreement within the Voorburg Group on the need to take this step, if the separation is possible, it should be done rather than have users request the separation after the sampling design and pricing method are implemented. Parts can be measured as a margin while the labor is a service output.

Overall, as is the case with many services industries, production of turnover and price statistics is complicated. Because of the wide range of practices noted with the participants, a clear and complete understanding of the provision of automobile repair and maintenance services in the country being studied is necessary. The Voorburg Group cannot provide a single best course of action but provides examples for consideration and adaptation as appropriate.

Appendix 1 – Overview of international progress

| ISIC 4520 | Survey Categories | # of Countries |
|------------------|---|-----------------------|
| | a. PPI details >= CPC | 1 |
| | b. PPI details >= CPC soon | 0 |
| | c. Turnover details >= CPC | 5 |
| | d. Turnover details >= CPC soon | 0 |
| | e. Industry prices calculated | 3 |
| | f. Industry turnover collected | 23 |
| | | |
| | | |
| | 1. Detailed turnover and prices well aligned | 0 |
| | 2. Detailed turnover and prices well aligned soon | 0 |
| | 3. Industry level turnover and prices aligned | 3 |
| | 4. Industry level turnover and prices aligned soon | 0 |
| | 5. Other - no industry coverage for prices and/or turnover, etc. | 20 |

Source: 2011 Voorburg Group Detailed Status Summary Report

Appendix 2 – Overview of industry classification

ISIC Rev. 4

G : Wholesale and retail trade; repair of motor vehicles and motorcycles
45: Wholesale and retail trade and repair of motor vehicles and motorcycles
452 : Maintenance and repair of motor vehicles
4520 : Maintenance and repair of motor vehicles

JSIC

R: Services nec
89: Automobile maintenance services
891: Automobile maintenance services
8911: General automotive maintenance services
8919: Miscellaneous auto maintenance services

NAICS Canada 2007

81: Other Services
811: Repair and Maintenance Services
8111: Automotive Repair and Maintenance
81111: Automotive Mechanical and Electrical Repair and Maintenance
81112: Automotive Body, Paint, Interior and Glass Repair
81119: All Other Automotive Repair and Maintenance

NAICS United States 2007

81 Other Services
811 Repair and Maintenance
8111 Automotive Repair and Maintenance
81111 Automotive Mechanical and Electrical Repair and Maintenance
811111 General Automotive Repair
811112 Automotive Exhaust System Repair
811113 Automotive Transmission Repair
811118 Other Automotive Mechanical and Electrical Repair and Maintenance
81112 Automotive Body, Paint, Interior, and Glass Repair
811121 Automotive Body, Paint, and Interior Repair and Maintenance
811122 Automotive Glass Replacement Shops
81119 Other Automotive Repair and Maintenance
811191 Automotive Oil Change and Lubrication Shops
811192 Car Washes
811198 All Other Automotive Repair and Maintenance

Appendix 3 – Overview of product classification

CPC Version 2

87141 Maintenance and repair services of motor vehicles 4520
87142 Maintenance and repair services of motorcycles 4540
87143 Maintenance and repair services of trailers, semitrailers
and other motor vehicles n.e.c.

CPA 2008

45.20 Maintenance and Repair of Motor Vehicles

45.20.1 Maintenance and Repair of cars and light goods motor vehicles

45.20.11 Ordinary maintenance and repair services (except electrical system, tyre and body repair) of cars and light motor vehicles

45.20.12 Electrical system repair services of cars and light goods motor vehicles

45.20.13 Tyre repair services, including wheel adjustment and balancing of cars and light goods vehicles

45.20.14 Body repair and similar services (door, lock, window, repainting, collision repair) of cars and light motor vehicles

45.20.2 Maintenance and repairs of other motor vehicles

45.20.21 Ordinary maintenance and repair services (except electrical system, tyre and body repair) of other motor vehicles

45.20.22 Electrical system repair services of other motor vehicles

45.20.23 Body repair and similar services (door, lock, window, repainting, collision repair) of other motor vehicles

45.20.3 Car-washing, polishing and other similar services

45.20.30 Car-washing, polishing and other similar services

NAPCS Canada (Provisional)

811001 - Maintenance and repair services for automobiles, trucks and other road transportation vehicles, and motor homes, travel trailers and campers

811001.1.1 - Maintenance and repair services for automobiles and light trucks

811001.1.1.1 - Maintenance and repair services for automobiles and light trucks, except cleaning and washing, and regulatory safety and emissions inspections

811001.1.1.2 - Washing and cleaning services for automobiles and light trucks

811001.1.1.3 - Regulatory safety and emissions inspection services for automobiles and light trucks

811001.1.2 - Maintenance and repair services for motor homes, travel trailers and campers

811001.1.3 - Maintenance and repair services for heavy trucks and buses

811001.3.1.1 - Maintenance and repair services for heavy trucks and buses, except cleaning and washing, and regulatory safety and emissions inspections

811001.3.1.2 - Washing and cleaning services for heavy trucks and buses

811001.3.1.3 - Regulatory safety and emissions inspection services for heavy trucks and buses

References:

UN International Standard Industrial Classification Rev.4

<http://unstats.un.org/unsd/cr/registry/isic-4.asp>

Japanese Standard Industry Classification, Revision 12. November 2007, accessed at:

<http://www.stat.go.jp/english/index/seido/sangyo/index07.htm>

NACE Revision 2 accessed at:

http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-RA-07-015

North American Industry Classification (NAICS) 2007 accessed at:

<http://www.census.gov/epcd/naics07/>

Central Product Classification (CPC) Version 2.0 accessed at:

<http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=25&Lg=1>

Classification of Products by Activity (CPA) 2008, Eurostat, accessed at:

<http://circa.europa.eu/irc/dsis/nacecpacon/info/data/en/cpa%202008%20structure.pdf>

North American Product Classification (NAPCS) accessed at:

<http://www.census.gov/eos/www/napcs/index.html>

Mini-presentations

Turnover for Maintenance and Repair of Motor Vehicles In Japan, Mayumi Fujita, Statistics Bureau of Japan accessed at:

<http://www.voorburggroup.org/Documents/2011%20Newport/Papers/2011%20-%2053.pdf>

8111, Repair and maintenance of automobiles and trucks – turnover/output, basic statistics, INEGI, Mexico accessed at:

<http://www.voorburggroup.org/Documents/2011%20Newport/Papers/2011%20-%2052.pdf>

Maintenance and Repair of Motor Vehicles, Greg Peterson, Statistics Canada, accessed at:

<http://www.voorburggroup.org/Documents/2011%20Newport/Papers/2011%20-%2056.pdf>

UK SPPI for Maintenance and Repair of Motor Vehicles, ISIC, 4520, Christopher Jenkins, ONS, accessed at: <http://www.voorburggroup.org/Documents/2011%20Newport/Papers/2011%20-%2055.pdf>

Using the CPI as a proxy for an SPPI for Repair and Maintenance of Motor Vehicles, André Loranger, Statistics Canada, accessed at:

<http://www.voorburggroup.org/Documents/2011%20Newport/Papers/2011%20-%2054.pdf>