Industrial Product Price Indexes (IPPI)

Statistical Data Documentation System
Reference Number 2318

Statistics Canada Statistique Canada

Canada

TABLE OF CONTENTS

INDUSTRIAL PRODUCT PRICE INDEXES

1. INDUSTRIAL PRODUCT PRICE INDEXES

1.0 Introduction

This paper reviews the main features of the updating of the Industrial Product Price Indexes (IPPI) to the base year of 1992. This chapter's next section outlines the main features of the revision. The second and third chapters provide respectively an economic and a statistical perspective. The fourth chapter outlines the relationship of commodities and industries to the industrial price indexes. The fifth chapter describes how elemental indexes are designed. The sixth chapter looks at how Statistics Canada disseminates information on industrial product prices. The last chapter provides general notes for users.

1.1 Major Features of the 1992 Revision

The most recent revision:

a) introduced 1992 as the time reference base from the 1986,
b) updated the weights for the composite indexes from 1986 to 1992
c) saw the introduction of a few new composite indexes to describe price changes for important groups of transactions in the economy and
d) the move by Statistics Canada to create a concordance between the categories of the input-output tables and the Harmonized Commodity Description and Coding System (HS) and the move from the Industrial Commodity Classification (ICC) codes to the Standard Classification of Goods (SCG) codes as of 1988 implied that there is now a somewhat closer relationship between the structure of the IPPI and the HS than existed previously.

The main function of these indexes -- providing deflators to the System of National Accounts -- has not changed. The main principle on which the price indexes are built, that of aggregating individual time series of price observations collected from manufacturers for the same or equivalent products, has not changed either**.**

2. ECONOMIC CONTEXT

2.0 Introduction

The industrial product price indexes support the System of National Accounts (SNA). These indexes also have a number of other uses. They can be of value in studies of price formation, in econometrics, as measures of inflation in the manufacturing sector and in assisting the process of contract escalation.

2.1 The Framework of the National Accounts

The system of national accounts requires price indexes most extensively in the creation of the constant dollar input-output tables.[1]

The input-output tables are a set of tables or matrices that record transactions in the economy. They detail the sources of supply of commodities and their disposition among industries and final consumers as well as the composition of the output of industries and their complete costs of production. The output matrix shows the value of production of commodities by each industry; the input matrix shows the value of the intermediate inputs to each industry, and the final demand matrix shows the final disposition of commodities to the various categories - consumer and government current expenditure, and capital formation. The final demand matrix also records inventory change and imports and exports.

These tables together show a balanced account for any industry or commodity. Constant dollar input-output tables require price indexes that can be aggregated across industries and across commodities. The scope of the IPPI matches the output matrix.

Resources and the need to limit response burden do not permit the independent estimate of a price index for each commodity produced by each industry. As a consequence, following the assumption that the variation in price movement between different industries making the same commodity was less significant than the variation in price movement of different commodities produced by the same industry, the production matrix was partitioned by commodity into a set of non-overlapping commodity groupings. These cover the whole of manufacturing.

However, in a few cases, indexes have either geographical subdivisions and/or market subdivisions. The former may be done in cases where the item is typically produced and sold locally as is the case for ready-mix concrete. The latter is most commonly done where prices are different for the domestic market and for the export market, as in the case of softwood lumber.

A separately designed price index, called an elemental price index, was constructed for each member of this partitioned production matrix. Most of the important indexes are estimated by conducting a survey of prices using a sampling frame based on all industries producing that commodity and the result is applied to all industries producing that commodity. For example, although about 98.1% of lumber is produced by sawmill, planing and shingle mills, it is also produced in eight other manufacturing industries, including the veneer and plywood industry and the newsprint industry. The sampling frame would include producers in the latter two industries and the lumber price index would be applied in all nine manufacturing industries.

As well, if an estimate from a survey could not be made for a given commodity, a proxy is estimated so that there is an explicit price index covering every value in the output matrix. For example, tents (PCGA- 3715) are not sampled directly but are proxied from another series called

[1] 15-201-XPB ***System of national accounts: the input-output structure of the Canadian economy***

Tarpaulins (PCGA-3717).

Since every entry in the output matrix has an associated price index, a composite index can be calculated by industry.

The availability of a complete set of commodity estimates consistent with the input/output tables has several advantages. Composite indexes covering the outputs of industries can be derived from it. Obviously composite indexes covering groups of similar commodities can also be calculated. Furthermore, since the same commodities that appear in the output matrix also appear in the input and final demand matrices, it may be possible to produce indexes, which apply to certain groups of transactions at those levels. For example, the IPPI are feeder indexes for the domestic production portion of the Machinery and Equipment Price Indexes (MEPI)[2] which cover machinery and equipment capital formation. Furthermore price indexes by stage of processing (defined in glossary of terms) can be created, depending on the analysis of information from the input and final demand matrices which show the disposition of the commodities identified in the output matrix.

Although this framework of indexes has been designed with the System of National Accounts primarily in mind, there are some advantages for other users. As most studies of price formation depend on the input/output tables to combine production and international trade statistics at a detailed level, it is obviously advantageous to have price indexes fitted into the same framework. Contract escalation users, when selecting suitable escalators in new contracts should note that the selection of the appropriate index for escalation purposes is the responsibility of the parties to the contract, although Statistics Canada personnel are glad to provide advice on the nature of the indexes available. Probably, for most contracts, the most appropriate indexes will be found from among the commodity indexes rather than the industry indexes, but this is up to the judgement of the user. The option may also be sometimes between a general index, which may behave in a more stable manner, and a more specific index, which may be subject to more arbitrary or sudden changes as it is based on a smaller sample.

Users of any indexes in contractual agreements should be clear about the correct identification of the series. An index should be identified by its title and by its reference on CANSIM (i.e. the "P" number code). In all cases, the time base reference period is part of the required identification (for example 1992=100), implicitly on CANSIM, as indexes for different time periods are on different matrices, or explicitly as part of the title. The table number in a publication, or even the name or catalogue number of the publication, should not be used to identify a series contractually, as any of these may change.

2.2 National Accounting Conventions and Price Indexes

In the System of National Accounts the measurement of gross domestic product by industry is commonly done at factor cost[3]. This has extensive consequences for defining which transactions are to be included in the price indexes and for determining the part of the transaction value to be reckoned as the price received by the manufacturer.

The IPPI covers goods that are the output of domestic manufacturers. It includes products made by labour in Canada and from domestic and imported materials. It covers both exports and all domestic sales to other businesses, individuals and governments. It does not cover manufactured goods that are imported.

Of the various conventions concerning price, the one closest to *industrial output at factor*

[2] 62-007-XPB ***Construction price statistics***
[3] 15-001-XPB ***Gross domestic product by industry***

cost, where factor cost is defined to be the payments made for the services and physical goods that enter into production, is *"free on board" (f.o.b.) "establishment". F.o.b. means the purchaser will take possession of the goods at a* designated point and that the purchase price does not include any freight costs or insurance beyond that point. "Establishment", in Statistics Canada's usage, refers to the smallest unit of an organization that can provide the basic data required for industry statistics, most commonly an individual plant or factory. F.o.b. establishment thus corresponds, in the case of industrial prices, to f.o.b. factory gate.

As a result, the prices covered by the IPPI refer not to what a purchaser pays but to what the producer receives. They therefore exclude all indirect taxes, such as sales taxes, as this money does not go to the factors of production. They also exclude any transportation service performed by a common carrier beyond the factory gate and any distribution services performed by the retail or wholesale trade industries.

As indirect taxes, such as sales taxes, are not included in the producer's price, a change in the tax rate or in the taxable status of a commodity has no direct impact on what the producer receives. It, therefore, is not reflected by the corresponding industrial product price index. However, such changes do alter the conditions of the transaction between seller and buyer and a tax change will have an indirect effect.

Three possible situations may arise with a change in sales taxes. In the first case, a seller just passes along the tax change. The customer pays the amount he would have paid before the tax change, plus the change in the sales tax, but the IPPI will show no change because the producer receives the same amount as he did before the tax change.

In the second case, the seller absorbs the tax change. For example, if the tax has been increased by 5%, the seller reduces his price by about 5%, thereby effectively absorbing the tax change. The customer pays the same amount as before the tax change, the seller receives about 5% less he did before, and the IPPI will go down by about 5%.

In the third case, the seller uses the tax change as an opportunity to make a price change of his own. The customer pays the new amount, plus the corresponding tax. The IPPI reflects the change made by seller, but the change due to the change in the sales tax is not shown.

A change in an ad valorem sales tax will have a one-time impact on the overall price level that is not captured by the IPPI. Thereafter, though, the relative effect of further commodity price changes will be captured by the IPPI. In addition, it should be noted that not all transportation or distribution costs are necessarily excluded from the IPPI though they generally are. In few instances, a manufacturing establishment may supply some of such services in a way that these services cannot be excluded from the price. For example, transportation charges are usually inherent in the price for ready-mix concrete.

IPPI users, who are concerned with the retail or wholesale price of a commodity, must recognize that changes to a sales tax, or to transportation costs, or to the distribution margin will change the final price but will not appear in the corresponding IPPI index.

Separate provincial or regional price indexes are not computed for most commodities. The geographic distribution of Canadian manufacturers, and the number of producers in different locals for many goods, does not provide in most cases a strong enough database to allow for separate regional or provincial producer price indexes. In general, the few commodities for which provincial or regional indexes are constructed are those for goods that are manufactured across Canada and sold, for technological or cost reasons, mainly within the area where they are produced. One example is concrete. An example of regional indexes being prepared in other circumstances is lumber where the bulk of production is exported.

Applying the factor cost valuation also determines the treatment of quality change. The details of how this is handled in practice are described in Section 5.4 (a). The general approach, though, assuming the same technological equilibrium, is to regard an increase in the amount of economic activity embodied in a good as a quality increase, and a decrease in economic activity as a quality decrease, irrespective of how it may be valued in the market.

3. GENERAL DESCRIPTION OF THE PRICE INDEX NUMBER COMPUTATION

The price index for a set of items is an attempt to summarise, in one number, the price changes of all the items that make up the set. Any index number is a convention. Some formulae, though, are more appealing than are others because they reflect more plausible assumptions or because they are reasonably practical to compute.

The formula which has been adopted here for the main aggregations of the IPPI is a well-known and popular one: a fixed weighted average of price movements of individual components, in which the weights of each component are proportional to their value in the base period (in this case 1992). The following general formula represents this:

$$P_{t/0}^{(agg)} = \sum_i \frac{w^i}{\sum w^i} \bullet P_{t/0}^i \qquad (A),$$

$P_{t/0}^{(agg)}$ is the movement of the composite of weights and prices between the base period, time 0, and the subsequent time period, time t. It is, in effect, a Laspeyres price index.

w^i is the transaction value of the element i in the base period;

$P_{t/0}^i$ is the price change for element i from the base period, that was 0, to time t;

$\sum_i$ indicates summation over all elements i in the defined aggregate.

This formula holds for all composite indexes derived from the elemental indexes described in Section 2.1. In the most straightforward case, where the composite index describes the price change for the output of a group of commodities, the w^i are the values of output of each commodity. If the composite index described the price change for the output of an industry, the w^i would be the values of output of each commodity produced by that industry.

In all cases the w^i are values observable from the output matrix of the input/output table, or are derivable from it.

In Chapter 2 it was described how elements were defined by partitioning the matrix into commodities. It was implied that an element was identical to one commodity. Following this assumption, let us assume further that the transaction value of this commodity can be split into a measure of quantity q and a measure of price, p. Then $w^i = q_0^i \bullet p_0^i$ in the base period for each commodity.

If we are dealing with one single homogeneous commodity, then $p_{t/0}^i = p_t^i / p_0^i$ where p_t^i is the price in period t and p_0^i the average price in period O, and the formula can be rewritten:

$$P_{t/0}^{(agg)} = \sum_i \frac{q_0^i p_0^i}{\sum_i q_0^i p_0^i} \bullet \frac{p_t^i}{p_0^i} = \frac{\sum_i q_0^i p_t^i}{\sum_i q_0^i p_0^i} \quad \text{(B)}$$

which can be interpreted as the ratio of the value of the base year aggregate to its value in time t for exactly the same quantities. If we are concerned with various groupings of output, for example, the indexes measure the price change in the overall return to the producers if the quantities in production were to remain the same as in the base period (i.e. 1992 for the IPPI).

When an index is described as a fixed weighted index, it can be understood in two ways. In the formula (B), the price index is shown to measure price change for a fixed basket. The quantities q^i remain constant in the comparison of prices between any two time periods. For example, the index will show between July 1994 and July 1995, the change in price for the quantities of goods produced in 1992. In the equivalent formula (A), the observable weights w^i are also fixed, in the sense that these are the ones to use in compiling price movements from 1992 to July 1994, or to July 1995, or to any other period. However, when price change is measured with respect to any period other than 1992, the observable weights w^i (i.e. the transaction values from 1992) do not apply in combining price movements of particular commodities. In fact, the values used as weights for such aggregations, explicitly or implicitly, are expressed at the price levels that existed in the period with respect to which the aggregate price change is measured. For example, when price movements between July 1994 and July 1995 are to be combined using the fixed 1992 quantities, the quantities are valued at July 1994 prices.

In fact, the elemental indexes do not describe the price movement of a single homogeneous entity. Some of them are groups of commodities, but even the simplest commodities come in a range of varieties, with the potential for price movements to vary individually. The simple measure $p_{t/0}^i$ is a composite index itself.

However, if a saample can be designed which is consistent with the behaviour of $p_{t/0}^i$, as if it were a single homogeneous entity, this would be satisfactory for the validity of the indexes for larger aggregates. The following paragraphs describe the design of this estimate.

It is impossible to implement the previous stated index number formulation at this level of detail. The elemental index would have to be expressed as a fixed-weighted average of a set of price ratios, over what is planned to be about a five year span. It is not possible to operate a survey that can approach what is implied in that formula. Over that time span, product lines disappear and new ones are created; manufacturing companies go out of production and new manufacturers appear. Within the context of food production, for example, the value of canned drinks may change gradually. However, within the context of canned drinks, the various varieties of the canned drinks and the mix of their manufacturers can change much more swiftly. These changes must be reflected more quickly than at the end of the approximate five-year span.

Consequently, the elemental price indexes, which are the basic building blocks for indexes for all aggregations, are chains of linked indexes, each of them being a fixed weighted average of price movements. The monthly series are expressed as a general formula:

$$p_{t/0}^i = p_{t/br}^i \bullet p_{br/br-1}^i \bullet \ldots\ldots p_{b2/b1}^i$$

and within a link period

$$p^{i}_{t/br} = \sum_{j} \frac{w^{j}_{br}}{\sum w^{j}_{br}} \bullet \frac{p^{j}_{t}}{p^{j}_{br}}$$

where b1(=0), b2, ..., br are the time bases for successive links in the chain, and w^{j}_{br}, is the weight for price quote j in the link with time base br.

There are r links in the chain. The weights w^{i} are not the values of transactions in the base period for each link in this case; they are values derived from a sampling method that gives each price observation an appropriate relative weight. However, the data which provides them, and the sampling frame for the selected quotes, is dated two or three years before the time reference period due to delays in the information becoming available. The sampling methodology is described in Section 5.2.

The price movements combined in any of the linked indexes are indeed price ratios - that is, the ratio of reported prices for exactly the same product under the same terms of sale. If the price becomes unobtainable during the period of a link it is estimated using a variety of methods described in Section 5.4.

Each elemental chain index is composed of links independently of the other indexes. At present, linking is only done at the end of a year, so each past link is a whole number of years long. How frequently linking is done depends on the individual situation. In some cases where there is relative stability of production and limited change in the product or mix of varieties, several years could elapse without it being necessary to change the sample. In other cases it might be desirable to design a new link every year.

An index is likely to be chained if the economic situation surrounding the product is changing. This might be because of rapid technological change with new products being introduced, but could also be because of organisational changes in an industry, with new companies coming into the industry, or ceasing production or merging. These are likely to show themselves as operational problems as well. The commodity officers may also encounter other warnings of problems, such as not getting timely responses or other sampling difficulties. These would also tend to lead to a more frequent chaining.

4. ELEMENTAL INDEXES AND THEIR AGGREGATION

4.1 Definition of and Selection of Principal Commodities

The major system used for identifying elemental indexes is the so-called Principal Commodity Group Aggregations (PCGAs) Classification. This was originally based upon the classification system for the Annual Survey of Manufactures and the classification system used for the import and export trade statistics. It is now based upon the Harmonized Commodity Description and Coding System (HS) which covers both the Annual Survey of Manufactures and the international trade system.

The system used for classifying individual price quotations and classes of price observations at a level of detail finer than the elemental index has changed to the Standard Classification of Goods (SCG) from the Industrial Commodity Classification (ICC).

The SCG is the Canadian version of the commodity classification based on the *HS*. It covers both the commodities involved in international trade statistics for imports and exports and the commodities produced by the firms covered by the Annual Survey of Manufactures. The SCG was adopted for the statistics relating to 1988 and subsequent years. It is normally updated for each new year's statistics.

Formerly, the ICC was used in the Annual Survey of Manufactures and for that period formed the basis for identifying exactly the particular products for which price observations were collected. However, it was only a classification of production statistics and did not apply in international trade statistics. This made it difficult to analyse price movements for exports and for activities such as capital formation for which import prices need to be estimated. Its very detail, and the fact that it changed from year to year, made it difficult to assimilate for general public use and it was therefore not chosen to identify elemental commodity indexes. Its problems of extreme detail and frequent revisions continue to apply in the case of the SCG.

The PCGA classification was selected for economic, statistical and practical reasons.

The economic reason arises from the requirement that the indexes be applicable to a variety of groups of transactions. These indexes feed the domestically produced portion of the Machinery and Equipment Price Indexes (MEPI), and may be required in analysis involving statistics on international trade. The PCGA is the most detailed system available that can be applied to both production and trade statistics.

The second reason is statistical. In Chapter 3, a distinction was made between calculating indexes for individual commodities from price observations, and calculating composite indexes from these individual commodity indexes. A classification system is required which defines commodities at this level of detail. The PCGA system meets this requirement quite well. While the total output of manufacturing is covered by approximately 980 different PCGA code numbers, about 700 of them account for about 90% of the value of total output. The commodities covered by these 700 include many for which individual commodity indexes have been produced since 1956 or 1961, commodities which are usually regarded as homogeneous entities whatever classification system is used. Generally, the level of definition appears to be detailed enough to preserve a reasonable homogeneity of price movement within indexes, while distinguishing different price movements between different commodities.

The major exceptions are the two catch-alls of miscellaneous products and those commodities whose value is so great that a further detailed breakdown is required. There were about 50 cases that fall into the second category. In many of these cases, the PCGA commodity was divided into more finely detailed commodity classes. Sometimes, however, the split was made to distinguish categories of price movement that the PCGA classification does not

recognize. These were of two kinds: in a few cases, for commodities mainly sold in local markets, the region of production was identified; also, where there is a significant domestic and export market, and the potential for different price movements, separate indexes were identified for the two markets. In a few cases more than one type of split was created for the same PCGA. In total, some 50 or so PCGAs were defined in finer detail, being split into a total of some 250.

The third reason for using the PCGA is practical. Most sampling resources are allocated to the 90 per cent of total output covered by the largest 700 or so PCGAs. Each of these is represented by one or more elemental indexes, with some of the PCGs being sub-divided geographically or in some other way. These elemental indexes are covered by a total sample of about 9,000 individual price observations. This gives an average of some 10 or more price observations per index (though the number of observations per index varies considerably). From a sample of this size a reasonably stable index can be computed and published continuously without its availability threatened unduly by the loss of one respondent.

The set of PCGAs, including splits, forms the base of elemental indexes from which all aggregations were built. Section 4.2 describes the composite indexes that have been defined. The remainder of this section deals with three issues concerning the set of elemental indexes.

Not all of the elemental indexes are publishable. To comply with the Statistics Act, an index is not published if it is possible to identify an individual response to the survey, except in a few cases where all respondents concerned have given permission for it to be published. Where such permission has not been given, the confidential index has been combined with one or more indexes for other commodities to produce an index that is not confidential. The set of elemental indexes amended in this way should be regarded as the most detailed set of price indexes for manufacturing available in the public domain.

In addition to the basic set of elemental indexes, there are instances where additional detail is desired. In these cases, special indexes, referred to as quasi-elemental indexes, are created. From the set of price observations already collected, a subset is selected that covers the desired characteristics concerning geographic location, commodity detail or market. Quasi-elemental indexes are not derived from an explicitly designed sample and they are not used as building blocks for regular aggregations. From the PCGA for softwood lumber, for example, quite a few quasi-elemental indexes have been created to meet a variety of needs. These include an index for softwood lumber produced in Ontario, an index for lumber made from Douglas fir, and an index referred as exported softwood lumber.

4.2 Derivation of Weights and Design of Index Aggregations

The composite indexes are weighted averages of the elemental indexes. For the industrial product price index, commodity and industry weights are taken from the output matrix of the 1992 input-output table which, in turn, is derived from 1992 values reported for the Annual Survey of Manufactures and edited to conform to the 1980 Standard Industrial Classification (1980 SIC). However, each December, company/product weights within a commodity index can be changed in order to reflect important changes in production patterns.

Chained series of fixed-weighted price indexes are calculated by a linking procedure whereby more recent varieties and changes to establishments are introduced systematically, as required, in December of each year. Weights from the commodity level through higher levels of aggregation are held constant.

For the raw materials price index, weights based on the values of commodities purchased as intermediate inputs at purchasers' prices were derived from the 1992 input-output tables. Within individual commodity indexes, the prices are weighted according to their market share in a recent

year. In a few instances, where data are not available, the price quotations are equally weighted. Indexes for aggregates of individual raw materials are also a chained series of fixed-weighted price indexes.

Three sets of price indexes for industrial products are produced.

The first set of indexes is grouped by commodities, weighted by their value of production in 1992, and arranged according to the medium-level commodity groupings from the input-output tables.

The second set of indexes is for the total commodity output of individual industries. These reflect the values of the output of the commodities produced in each industry in 1992. The industry indexes are derived from the 1980 SIC, aggregated to the level required for the input-output tables and the measurement of Gross Domestic Product by Industry. In our set of indexes, though, some of the manufacturing industries of the 1980 SIC are combined.

The third set of indexes is grouped by their stage of processing. Commodities are combined according to where they fit into the stages of processing, who purchases them, and why they were purchased.

In the stages of processing system, goods are initially divided into those used mainly as inputs (called “intermediate goods”) and those that tend to enter directly into final demand (called “finished goods”).

The intermediate goods group is further sub-divided into those that are used in basic industries which are called “first-stage intermediate goods”, and those that are used in other industries, which are called “second-stage intermediate goods”. Basic industries for our purposes are defined as those producing wood products, paper-related products, primary metal products, non-metallic mineral products and basic chemical products. This division is done because prices for "first-stage goods" tend to move in a similar way to the prices for their related raw materials while prices for "second stage goods" tend to behave otherwise.

The finished goods group is sub-divided into finished food and feed items, capital equipment, and other finished goods. These three groups represent consumer spending on food; business and government spending on investment goods; and other final demand spending on goods.

Some other goods, which are important inputs for manufacturers, have so little processing that they are instead placed in the Raw Materials Price Index. Despite its different method of valuing prices, the Raw Materials Price Index might be used in conjunction with indexes by stage of processing.

The input and final demand matrices, together with the output matrix, from the input-output tables were used to assign commodities to their appropriate class for the stage of processing grouping.

4.3 Index Quality

The Industrial Product Price Index (IPPI) and the Raw Materials Price Index [4] (RMPI) both attempt to express, in a single number, price changes that involve a range of commodities. There

[4] The Raw Materials Price Index reflects the prices paid by Canadian manufacturers for key raw materials. Many of these prices are set in a world market. Also, unlike the Industrial Products price Index, the RMPI includes goods that are not manufactured in Canada.

is no obvious way, let alone absolute way, of perceiving what a composite price movement really is. For the IPPI, the fixed quantities of the commodities are proportional to the sales made by Canadian manufacturing establishments in the basket reference period, 1992. For the RMPI, the fixed quantities of the commodities are proportional to purchases of particular raw materials made by Canadian manufacturing establishments in the basket reference period, 1992. Consequently considerations about the IPPI's and RMPI's accuracy relate to these concepts of composite price movements.

The statistical accuracy of these two sets of indexes depends on price and shipment value data. Price data is principally obtained from a sample survey. Shipment value data also mainly rests on other sample surveys, such as the Annual Survey of Manufactures and the input-output tables. Both kinds of input data are subject therefore to their own errors.

Readers concerned with the accuracy of the underlying input/output tables for 1992 and the annual surveys of manufacturing are invited to contact the appropriate Statistics Canada divisions, the Input-Output Division and the Manufacturing, Construction and Energy Division.

The accuracy of the monthly commodity price quotations is maintained through the expertise of the commodity officers. The commodity officers develop a thorough industry knowledge, which is supplemented by outside personal contacts for particular industries. Much time and effort is devoted to detecting and following up unusual fluctuations in the monthly pricing patterns of commodities.

The industrial product price index and the raw materials price index are frequently used both at their higher levels and at their lower levels of aggregation. Both these levels of aggregations have their own strengths.

For the higher levels of aggregation, the risk that sampling errors will affect the index becomes less when more price quotes are used in their calculation. This implies, for example, that producer price indexes are likely to be more reliable for high level aggregations than for lower level aggregations, and for annual price changes than for monthly price changes.

On the other hand, the accuracy of an index also depends on the homogeneity of the given commodity group. Generally speaking, the lower levels of commodity aggregations are more homogenous in nature and, consequently, the monthly price quotes tend to show less variation amongst themselves in price movement than the higher levels. This is the natural tendency of price quotes in the short term for a particular low level index to show movements of relatively similar magnitude in their price change. For example if the overall movement is 10 percent, the range might be between 8 and 12 percent for the individual quotes in the sample over the same 3-month period. Such indexes may thus be well represented by even a relatively limited number of price quotations. The variation in the movement of the index, as distinct from the movement of the underlying prices, tends to decrease as the level of the aggregation rises.

In addition to sampling errors, producer price indexes are also subject to errors in price collection and editing. This is particularly true when quality change occurs in the sample with regard to the estimation of pure price change. To estimate pure price change over time, the prices to be directly compared through time ought to refer to identical commodities sold by identical establishments under identical conditions of sale. When this is not practical, prices must undergo adjustments for quality differences, which can prove to be a complicated process to implement [see Section 5.4(a)]. Amongst the thousands of prices that are compared every month to those of the preceding month, some may not fully satisfy these requirements. The total distortion from this source of error is not thought to be as significant at higher levels of IPPI aggregation.

In choosing an index for escalation purposes, it is frequently best to choose the index that most closely relates to the commodity whose price it is desired to track. However, this can mean

that there is more variation in the movements of the index than is desired. In this case, it may be better to use a higher aggregate or a longer time period than a single month. Another alternative is to use smoothing techniques, such as moving averages. It should also be noted that the IPPI and RMPI indexes are subject to a six-month revision policy. Other concerns related to escalation clauses may be dealt with by contacting the Goods Section in Prices Division.

It is a basic premise in the industrial product price indexes that information obtained from the manufacturers applying directly to the subject under study is more reliable than any proxy indication. Consequently the approximate percentage value of an index that is covered by direct survey is shown in Tables 2 and 3 of the monthly publication **Industry price indexes** (62-011-XPB). Elemental indexes are described as either 100 per cent or zero per cent sampled, but the proportion for aggregative indexes varies. For manufacturing as a whole, 89 cent of the value is directly surveyed. At the two digit SIC 1980 level for commodities, the percentage varies from 100 per cent, as, for example, in the case of Beverages to 52 per cent for Printing and Publishing. It is difficult to assess these variations on any kind of relative scale, and they should be interpreted cautiously, but it is suggested that indexes for which a low percentage of their value is directly surveyed should be used with more caution than those with a high percentage so covered.

5. SAMPLING AND PRICING PROCEDURES

5.0 Introduction

The preferred method of designing and estimating the elemental indexes is to design a sample of respondents and to identify with these respondents specific products to be priced continuously. Each of these strings of observations is then converted to a time series of price ratios and the weighted average of these series is the elemental index. In a few cases, principally petroleum products, data are collected in a different form that provides better indexes than could be obtained from a sample survey [see section 5.5]. In addition, some indexes are estimated by simpler methods, the Globe and Mail for instance publishes commodity cash prices for raw rubber**,** and in a few cases indirect methods are used, such as pricing Corn from the Livestock Feedboard of Canada.

About 700 of the 980 major commodity groups making up the industrial product price indexes are directly surveyed and priced. These represent about 90% of the value of manufacturing output in 1992. The remainder, about 280 PCGAs, is covered indirectly. These represent the remaining 10% of manufacturing output in 1992.

For the raw materials price index, about 34% of the data are collected by survey from about 50 manufacturing companies selected from the Annual Survey of Manufactures. Some 60% are collected from about 10 different administrative sources. The remaining 6% are covered from proxy imputation. Where data for unprocessed materials is not available, prices for similar commodities at the next stage of processing are used to provide estimates of price change. The most appropriate method of measuring price change for each item is determined on an item by item basis.

5.1 Legislation Governing the Collection of Data

The legal basis upon which data is collected is The Statistics Act. 1970-71-72, c. 15, s.1.. In particular, information on prices is collected under Section 3 (a) of the Act.

The Statistics Act contains statutory prohibitions against the disclosure of any confidential information obtained under the Statistics Act that can be specifically related to any identifiable person, business or organization. These confidentiality provisions have not been affected by the Access to Information legislation. Section 24 of the Access to Information legislation provides that a government institution shall refuse to release any information whose disclosure is restricted by statutory prohibition in certain other Acts, the Statistics Act being such an Act.

5.2 The Sampling Methodology

When designing a sample to estimate an elemental index, the total number of required price observations must be decided. This is done using a formula reflecting the number of firms producing the commodity, the sizes of the firms, the average number of classes of the commodity produced by a firm and the number of observations needed for an adequate confidence level in the circumstances.

The sampling frame is based on the most recent available Annual Survey of Manufactures. For example, in June 1998, depending on the industry being resampled, the most recent Annual Survey of Manufactures could be that for 1993, or 1994, etc. depending on the industry.

For each elemental index, the values of all establishments reporting shipments of any product included in the coverage of the elemental index are listed by the Standard Classification of Goods (SCG code). Firstly, establishments within the same enterprise that follow one pricing policy are grouped together as a primary sampling unit (PSU). Secondly, the percentage of total value accounted for by each PSU is calculated. The smallest PSUs, which together account for less than ten percent of the total are excluded. This eliminates most of the smallest companies, reducing the response burden and helping to ensure that in the estimation process no single observation carries a weight disproportionate to the importance of its product. Thirdly, the product lines listed by SCG are grouped into subsets of the elemental index. However, depending on the establishment, it may be necessary to combine product lines or to estimate a breakdown into finer detail. For relatively homogeneous elemental indexes there may be no subsets, but for other elemental indexes that embrace a wider variety of products there may be several subsets, for example, Hardwood lumber has subsets of indexes, such as Hardwood lumber-maple and Hardwood lumber-birch.

Once the sample frame is decided upon, a sample of potential respondents is drawn.

As a first step, any PSUs that must be included are identified. These will represent only themselves and are therefore weighted by the value of their own shipments. This group is sometimes referred to as "the take-all" group. A firm may be placed in this group for a number of different reasons. It may be because the firm is relatively large. It may be because it is essential to ensure that a particular subset of products is represented. It may be because the firm is already a respondent and it is necessary to prevent the turnover of respondents being too large.

From the remaining list of PSUs, sometimes referred to as the "take-some" group, the rest of the required number of respondents is drawn by simple random sampling. These are weighted among themselves in proportion to their value of shipments. However, as they represent the value of all the PSUs not identified as being in the "take-all" group, their weights are increased accordingly. The firm's shipment weight is multiplied by the ratio of the value of shipments of all potential drawn respondents in the take-some group to the value of those actually drawn from that group.

The total sample size required is then divided among the selected PSUs. Typically 2 to 4 price observations are allocated to each PSU depending on its size and the range of products that it makes. The price observations for each respondent are distributed among the different sub-elemental product groupings it reported in the Annual Survey of Manufactures. These are allocated approximately proportionally to the value of shipments of its different product groupings.

As a check on the sampling procedure for each elemental index, the weights assigned for each target price observation are summed. This distribution across the sub-elemental product groups is compared with the distribution of reported shipments to ensure the two distributions are reasonably close. If they are not, it may be changed slightly or even completely redesigned.

The same methodology is followed for resampling, except, in the selection process for PSUs, those representing only themselves are identified in the same way. The remaining PSUs are spilt between those that were in the current sample and those that were not. Random selection will be made within each group with those in the existing sample providing relatively more PSUs. If there has been a large turnover in respondents, so that the current sample has far less respondents than desired, all the existing respondents may be kept.

The entire survey sample is usually reviewed in total once every 5 years. In the interim, resampling occurs primarily for commodity groups subject to relatively rapid development in firm structure or product development.

5.3 The Collection and Editing of Individual Price Observations

Commodity specialists obtain from each of the sampled respondents price observations for each of the products selected. To do this, they discuss with each respondent personally the different varieties of product that they sell, and the different terms of sale under which they sell them. They then draw up a detailed description of the physical variety sold. The terms of sale that apply may also be specified for each price quotation. In most cases, the specific quotation chosen pertains to the sale of a major product line to a major type of customer. However, if the same manufacturer is being asked for more than one quotation on the same product line, a procedure is followed which gives some chance of secondary lines or secondary markets being included.

During this preliminary contact with respondents, it is stressed that prices for actual transactions are required. If a company posts regular list prices from which discounts are typically applied, then the prices collected should reflect these discounts, whether they vary continuously with each sale or whether there are standard rates of discount depending on the class of customer, size of order or so on. In the subsequent validation of the regularly supplied price quotations, one of the most important concerns is that the prices quoted are what actually prevail in the market. For this reason the commodity specialists try to ensure that their contact in each manufacturing company is someone who can supply that information.

Once there is agreement on which price information is to be supplied, the price quotations are collected by means of a printed form. This is sent to each respondent who gives the price in effect on the 15th of each month, or the last previous business day. Most price collection is done monthly. However, to reduce respondent burden, in those cases where price changes are normally done at other intervals, this is taken into consideration and prices are collected accordingly (for example, quarterly).

The series of price observations in the current period is converted into a series of ratios, by dividing the current price by the base period price. The resulting series are aggregated using the formulae described in Chapter 3.

In the compilation of these indexes, great emphasis is placed on the examination and evaluation of prices. Commodity specialists watch closely developments in the markets. They review the behaviour of the reported price changes and the periods of no reported change, both to validate them directly and in the context of their representativeness of the product price movement as a whole.

Apart from the regular editing of reported data, there are problems to do with discontinuities in the data and missing data, and these are dealt with in the next section.

5.4 Methods of Handling Data Problems

(a) Quality Change

The design of the index requires the same variety of a given product to be priced continually. There should be no difference in the physical variety or in the terms of sale. It is not always possible to continue with an unchanged specification, but if a close substitute can be found, then the replacement is made. The new specification is not compared directly with the base period price of the old specification but an evaluation is made of the change between the quality embodied in the old variety and that in the new. (Sometimes the substitution is made voluntarily if the variety or terms of sale are becoming obsolete and a ready alternative is available.)

The new variety has to belong to the same product group as the old, and must be provided

by the same respondent, so an evaluation of quality change is only made when there is a reasonable comparability between the old and the new specification. Major changes cannot be evaluated directly, and are treated as a termination of a price quotation of one product, to be followed perhaps by a initialisation of a price quotation for a new one (see next sub-section).

The commodity specialist makes an evaluation of the quality change in conjunction with the respondent. If the change in value is small in relation to the price of the product, a satisfactory estimate may be obtained over the phone, or by a simple question on the price report. For products undergoing substantial changes, or which change their specifications frequently, more detailed information is required. Automobiles, because they undergo major changes each model year, are one example where detailed information is obtained and closely analyzed.

The adjustment for quality change is an attempt to estimate the ratio of the value of economic activity embodied in the old and new specification. This may be done directly or indirectly. The indirect approach may be used when both specified products have been on the market simultaneously, and the required estimate may be taken as the ratio of the prices. This may only be assumed if there are stable market conditions. If one variety is gradually replacing the other, it is quite likely that the old variety is being discounted to clear the stock. Alternatively it is quite possible that the new variety is being discounted to win user acceptance. The choice of the time period for making the change is important, and it must be recognized that the occasions when there is a stable relationship between the varieties is the best time to use this method.

Most quality change adjustments are necessary for products that change without notice. In these situations it is not possible to observe prices for an overlap period, although price histories may be found retroactively. In these cases, the manufacturer is asked directly for an estimate of the costs of producing the new variety and how they compare to the costs of producing the old. This ratio of costs is divided into the ratio of prices reported. If the ratio of prices is higher than the ratio of costs, the adjusted series will show a price increase at the time of substituting the new series. However, if the ratio of prices is lower, the series will show a price decrease, for example, if a $200 filing cabinet is replaced by a $100 filing cabinet and the costs for manufacturing the old filing cabinet was $120 and the cost for manufacturing the replacement cabinet was $50, then a price increase might be taken into consideration for such an example, if all other available information is consistent with this approach.

(b) Termination of price quotations:

When a price quotation can no longer be supplied due to the disappearance of the product and/or the respondent, the quotation is said to have terminated. Under these circumstances a substitute cannot be found which can be compared to it by means of a quality change evaluation, and other methods have to be used, as the estimation of the index must continue. Such changes are one of the grounds for resampling at the end of the year, when either a full new sample will be drawn, or another sample respondent will be drawn. Pending the drawing of a new sample, the standard procedure is to impute the movement of the missing price quotation by the movement of those that are still in the index.

The opposite situation, the initialisation of a new price quotation, is controllable, except where it is a replacement for a price quotation that has died. A new quotation, or a new manufacturer as a respondent, is only brought into the index at a time of resampling. It is important for the commodity specialists to become aware of new developments as quickly as possible. Although new manufacturers report to the Annual Survey of Manufactures, it may be two or three years after they begin production before they appear by this method on a sampling frame. New products can only be detected by close cooperation and exchange of information between the commodity specialists and respondents, so that when developments occur extending the range of existing products or introducing new ones, the index makers are aware of them as soon as

possible. The statistical committees of manufacturers' associations also provide valuable advice in this respect.

The techniques for handling quality change and for dealing with terminations and initialisations of price quotations work in situations where the changes are marginal. The IPPI does not take into account commodities that are so new, or products whose technology is so innovative, that they serve needs that were not previously being reasonably met, for example, Genetically modified food could possibly one day have its own index series.

Initially, a truly new product is introduced to the sample of that commodity to which the existing classification would assign it. From that moment its changes are monitored, but no comparison is made between its quality and that of the previous products in that commodity grouping. It is implicitly assumed that its price movement from the base period to the time it is introduced would have been the same as what is actually shown by the commodity index.

(c) Estimating missing monthly data

In any given pricing period, there will be monthly price reports that are missing, either because they are late reporting or for some other reason. In this situation, an action must be taken. Either the last reported price quotation will be carried forward, or an estimate will be made based on other information. Most commonly, the last reported price would be carried forward in the short term while the commodity officer seeks clarification from the respondent.

Carrying the previous price quotation forward is usually the best guess, as most prices do not change in any given month. However, it is almost certain that some of the missing prices will have changed. For this reason, price indexes remain subject to revision for six months after publication of a given month's data. This is to accommodate late reports, corrections and some price quotations that are supplied quarterly or semi-annually.

There are several alternatives used in order to minimize revisions. The standard approach is for the commodity specialist to contact the respondent and get a verbal report. This is verified when the questionnaire is received. Another advantage of this is that it alerts the commodity specialist to any reporting problems, for example, most terminations of quotations first reveal themselves as missing for a month. Also other changes, such as the person to contact, are usually handled more efficiently on the telephone.

If no verbal estimate can be obtained, the commodity specialist may make a direct estimate of the price quotation. The normal assumption is that that there has been no change, unless there been indications to the contrary. Some commodity prices, though, including certain foods, lumber, and metals, tend to change every month. Others tend to change at certain times of the year. In these cases, an estimate may be made based on the movement of the prices that have been reported for that commodity. It should be realized that this estimate is unlikely to be exactly right, and when the actual price quotation does come in, there will probably be a revision. Most revisions occur in the following one or two months, but sometimes reporting problems can cause long delays, so revisions can be made up to six months after the first publication. There are also a small number of quotations that are only collected quarterly or semi-annually so that revisions may be made to earlier months to record correctly the month in which the price change occurred.

Some price quotations are missing because it is impossible to supply them. Where the commodity is out of season, and no orders normally occur during that period, the last reported price quotation is carried forward until a new quotation is available in the next season, for example, raw tobacco prices are collected seasonally. This procedure tends to dampen index movements when the commodity is out of season, and causes upward or downward shifts in the commodity index when the item is reintroduced. This is less significant at higher levels of

aggregation, and over longer periods of time.

5.5 Estimation of Indexes for Non-sampled Commodities

There are a small number of elemental indexes for which the sampling methodology described in Section 5.2 is not applicable because of how the respondents supply their data. The main indexes in this category are refined petroleum products.

Petroleum refiners supply a body of data each month that gives total revenue, the volume of sales and the average realized unit revenue for detailed commodity classes, by specified markets and by region.

The nature of the prices included in these data is the same as that required generally for the industrial product price index: the return to the producers exclusive of indirect taxes and services provided by others. However, the refiners provide most of the transportation services themselves and the prices are for the products delivered to the various distribution facilities. There can thus be a slight month-to-month fluctuation because of the changing mix of the destinations and of the purchasers supplied. On the other hand, this information is excellent in tracking market discounts because it covers all the transactions in a particular market.

Some other indexes are estimated by various other methods. This is frequently done for indexes covering commodities with relatively small value. Where an index only warrants a couple of quotations, it is rarely possible to design a valid sampling procedure for it. It instead will be estimated indirectly.

Four alternative methods are used. These are:

a) a simple combination of price quotations already available,
b) imputing the movement from the movement of one or more sampled elemental indexes,
c) using the movement of some other price index or other statistical indicator from outside the IPPI System and
d) a combination of the above.

The first method is used when there are some prices already being collected which amongst them cover a reasonable proportion of the commodity grouping under consideration. In this case, these price quotations are used as if they were the designed sample and the price index is calculated in the usual way. Such indexes are typically confidential under the Statistics Act. They usually are not of adequate quality to be used individually with confidence, both because the sample was not fully drawn and because the number of price quotes in the estimate is too small, for example, Detonators and Safety Fuses-PCGA-4214.

The second and third methods are described as using a proxy. With some frequency, the movement of a small elemental index is estimated from the movement of indexes for one or more similar commodities that are sampled. For a smaller number, a measure of price change is available from another index system that will provide a reasonable proxy. The Canadian Consumer Price Index and the U.S. Bureau of Labor Statistics indexes are the most common sources.

Finally, in a few cases, typically commodities, which can not practically be sampled, a combination of some of these methods is sometimes used. These particular indexes are also said to use a proxy.

6. DISSEMINATION

6.1 Coverage and timeframe

Within the manufacturing sector, output price indexes are calculated for some 980 Principal Commodity Group Aggregates. Over 140 manufacturing industry indexes are also produced. In addition, a further set of stage of processing price indexes is also created for the economy as a whole and for some 60 of the major manufacturing industries. Also within the manufacturing sector, input price indexes are calculated for some eighty commodities (raw materials) grouped into seven major components.

The indexes become available to the public about four weeks after the end of the reference month. May's indexes, for example, are released towards the end of June. The timing is thus about six weeks from the date of the prices that the indexes reflect.

Most of the price indexes are publicly available. However, a small number are not released for reasons of confidentiality because users could identify firms. A few others are not released because they covered by proxies or other methods of lower reliability than valid sampling. Usually, though, indexes in this second group can be obtained by special request.

As noted, the publicly available indexes can be obtained electronically about 4-weeks after the end of the reference month. Then, about a month later, most of these indexes are available on paper in **Industry price indexes** (Catalogue no. 62-001-XPB).

Material on CANSIM is grouped into collections of information referred to as Matrices. The publicly available producer price index series are placed into nine matrices. These are:

M1870 Major industrial product price indexes and industrial product price indexes, 1992=100, by stage of processing[5]
M1871 Industrial product price indexes, 1992=100, for foods, beverages and tobacco products
M1872 Industrial product price indexes, 1992=100, for rubber, leather and textile products and clothing
M1873 Industrial product price indexes, 1992=100, for wood products, furniture and paper and related products
M1874 Industrial product price indexes, 1992=100, for primary metal and fabricated metal products
M1875 Industrial product price indexes, 1992=100, for machinery and transportation equipment
M1876 Industrial product price indexes, 1992=100, for electrical, communication, non-metallic
mineral and petroleum products
M1877 Industrial product price indexes, 1992=100, for chemicals, miscellaneous manufactured products, and miscellaneous non-manufactured products
M1878 Industrial product price indexes, 1992=100, by industry
Two associated indexes are carried on the following indexes:
M1879 Raw material price indexes, 1992=100
M1880 Electric power selling price indexes, 1992=100

[5] Users are generally advised to use a commodity index rather than one of the stages of processing indexes that are found in Matrix 1870. P2293 -- Textile products should be used rather than P1202 -- Textile products, first stage intermediate goods or P1244 -- Textile products, 2nd stage intermediate goods or P1346 -- Textile products, other finished goods.

6.2 Methods of dissemination

About four weeks after the end of the reference month, articles on the IPPI and the RMPI for that month are presented in ***The Daily*** (Catalogue 11-001), along with the major indexes. Twenty-nine indexes, including the total, appear in the IPPI release in ***The Daily***. Nine indexes, including the total, appear in the RMPI release in The Daily. ***The Daily*** is now normally available only through the Statistics Canada Internet site.

Simultaneously with the release of the articles on the IPPI and the RMPI in ***The Daily***, all publicly available indexes are made available on CANSIM. The appropriate matrices are listed above.

Users may also choose, usually for a fee, to have information sent to them by e-mail, phone, FAX or letters at any time after the indexes become available on CANSIM. On request, Statistics Canada will supply any requested available information in an electronic form, typically on a diskette.

About two months after the end of the reference month, most of the publishable indexes appear in ***Industry price indexes*** (Catalogue no. 62-011-XPB). This publication also contains copies of the articles on the IPPI and the RMPI that appeared previously in ***The Daily***.

The address of Statistics Canada's website is http://www.statcan.ca and all information on this website is available in English and French. The services provided by this website include access to current and past copies of ***The Daily*** and access to the CANSIM database. CANSIM also continues to be available independently of the website.

7. GENERAL NOTES FOR USERS

The Industrial Product Price Index (IPPI) and the Raw Materials Price Index (RMPI) are calculated and published monthly. The most important composite indexes for any month, together with an article reviewing events, appear in ***The Daily*** towards the end of the month following the reference month. Data for May, for example, is first published near the end of June. Simultaneously with the release in ***The Daily***, all publishable indexes become available on CANSIM. Both ***The Daily*** and CANSIM are available on Statistics Canada's website. (http://www.statcan.ca) In addition, several years' price history are shown for most of the publishable indexes in **Industry Price Indexes** (Catalogue No. 62-011-XPB), which appears an additional four weeks later. Furthermore, users may ask Prices Division to routinely provide them with information by electronic or other methods. There is a fee for this service.

The IPPI and RMPI are subject to revision for six months after their initial release. Thus January's index is finalized with the release of June's data in July. Annual figures are computed as simple averages from the published (rounded to one decimal place) monthly figures. For each series, quarterly and annual figures, as well as monthly figures, are available on CANSIM, along with month-to-month and 12-month changes.

A user searching for the most suitable index may check on CANSIM, scan the published indexes in an issue of ***Industry price indexes***, or contact Statistics Canada. It should be noted that if there is a special aggregation of commodities not presently available that is of interest to a user, and if an index can be calculated for it by using elemental indexes, then Prices Division will produce it on request. However, there will be a charge for this type of work.

Some important points for individuals seeking indexes to use for contract escalation are noted below. Users are advised to contact the Goods Section of Prices Division if further assistance is required.

The selection of the appropriate index for escalation purposes is the responsibility of the parties to the contract, although Statistics Canada personnel are glad to provide advice on the nature of the indexes available. Probably, for most contracts, the most appropriate indexes will be found from among the commodity indexes rather than the industry indexes, but this is up to the judgement of the user. The option may also be sometimes between a general index, which may behave in a more stable manner, and a more specific index, which may be subject to more arbitrary or sudden changes as it is based on a smaller sample.

Users of any indexes in contractual agreements should be clear about the correct identification of the series. An index should be identified by its title and by its reference on CANSIM (i.e. the "P" number code). In all cases, the time base reference period is part of the required identification (for example 1992=100), implicitly on CANSIM, as indexes for different time periods are on different matrices, or explicitly as part of the title. The table number in a publication, or even the name or catalogue number of the publication, should not be used to identify a series contractually, as any of these may change.

There are generally no statistics available for average prices of commodities. As described in Section 5.3, the specification for each price quotation is drawn up independently with the respondent so that the characteristics associated with each price vary.

The methodology of the IPPI and composition of the main sets of composite indexes are expected to remain unchanged till the next major revision, which is not planned for several years. However, some aspects of the indexes, for example those related to data quality, are subject to review on an ongoing basis, and it is expected that other composite indexes may be added over time. Any major changes will be announced both through ***The Daily*** and through the monthly

publication, **Industry Price Indexes** (Catalogue No .62-011-XPB).

GLOSSARY OF TERMS

The glossary defines key terms that may add to the user's understanding of the industrial product price indexes. Most of these terms are technical. Some terms of a more general character are also defined, when they are used with a specific meaning.

- Base period of a price index: The period chosen as the basis to which to compare given-period prices, typically referred to as 100 relative to the level in other time periods.

- Chaining, chain index: Chaining is the estimation of price movement for a given time interval by *linking* together price indexes for particular sub-intervals into which the given time interval is divided. A chain index is an index so computed.

- Commodity: An output of manufacturing, normally intended for sale on the market.

- Composite index: An index for a commodity aggregate, computed as a weighted average of two or more *elemental indexes*.

- Contract escalation: The adjustment of terms in a legal contract, usually those specifying the price at which one party to the contract is supplying a good or service to the other, by the movement of some published statistics, usually price indexes.

- Coverage: The coverage of a price index is the set of *transactions* to which it applies. In the case of an *elemental index,* the coverage is indivisible, so that the index is taken to apply to any part of the set of transactions equally. However, for a *composite index* the coverage can be divided into that of each elemental index from which the composite index is derived.

- Direct survey: The estimation of a price index by obtaining price quotations from the producers of the commodities.

- Elemental commodity group: The most finely detailed grouping of outputs for which separate price movement measures are defined. In most cases an elemental commodity group corresponds to a *Principal Commodity Group Aggregation* in the input-output classification, but in some cases the outputs have been further divided. The elemental commodity groups are also a set of building blocks for assembling aggregates of *transactions* for which price indexes may also be constructed.

- Elemental index: A price index for an *elemental commodity group*.

- Establishment: The smallest unit that is a separate operating entity capable of reporting all elements of basic industrial statistics relating to input and output. It is typically a factory, assembly plant or similar unit, and in most cases it is a separate company.

- Factor cost: Payments to the factors of production are payments made for the services and physical goods that enter into production, including payments for materials and fuels, wages, rents, interest and profits. It excludes items such as indirect business taxes (e.g., sales tax, excise tax).

- Fixed-weighted index: An index computed for a given time interval as an arithmetic average of price movement measures using a set of weights which is the same for the measurement of price change between the base period and any other point in the given time interval.

- F.O.B.: Free on board. A term used in pricing to indicate that the sale price includes delivery of the goods to a designated point. F.O.B. establishment means delivered at the establishment

boundary, and does not cover freight and insurance to the purchaser's location.

- Homogeneous: Having the constituent elements similar throughout. In this context it is sufficient that the constituent *transactions* are similar enough that their price movements will be similar throughout.

- ICC: Industrial Commodity Classification. A classification of commodities, used particularly to classify the outputs of manufacturing in detail.

- Industry: A grouping of *establishments* engaged in the same or similar activity. Because establishments do not typically restrict themselves to a sole activity, their assignment to one industry or another is sometimes somewhat arbitrary.

- Linking: A procedure for connecting, in a certain link period, two price index series that relate to different fixed quantities; indexes of a new series with the link period as the time base are multiplied by the corresponding index of the old series for the link period. In this paper linking is used in two contexts: one, in the estimation of *elemental indexes* and two, in computing continuous series beyond August 1997 on a 1986 base, or before 1992 on a 1992 base.

- Link factor: The amount by which to multiply the second of two index series that are linked, to obtain a series expressed with reference to the base of the first series.

- Output matrix: A synonym for the *production matrix*.

- PCGA: Principal Commodity Group Aggregation. An element in the classification of commodities into approximately 980 groupings for use in the creation of the input-output tables. The classification was originally done by cross-referencing the codes from the classification systems used for production (the *ICC*) and for foreign trade. It now uses the *SCG* system.

- Production matrix: A table setting out the production of each *commodity* by each *industry*. It is also called the output matrix.

- PSU: Primary sampling unit. The basic unit in the sampling frame from which the sample is drawn for estimating an *elemental index*. In most cases it is one establishment but when several establishments within the same company follow a common pricing policy they may be grouped together to form a PSU.

- Purchaser's prices: The cost of goods and services in the market at the point of delivery to the purchaser.

- Producer's prices: The selling price at the boundary of the producing *establishment* excluding sales and excise taxes levied after the final stage of processing.

- Proxy: A substitute. In the context of the IPPI, a substitute price index or other information which is used in place of an unavailable price index.

- Quality change: The difference in value between the specifications associated with two price quotations, one of which is to replace the other in the price index.

- Specification: A description of the *variety* that a price is being quoted for, and the terms of sale which apply to the price.

- Stage of processing: A distinction of processing according to whether it results in producing finished goods or intermediate goods used primarily by manufacturers for further processing.

- SCG: Standard Classification of Goods. The Canadian classification system for commodities based on the International Harmonized System. It is used for both international trade statistics and the Annual Survey of Manufactures for the years from 1988 on.

- SIC: Standard Industrial Classification. A classification of *establishments* to *industries* according to their primary activity. Presently the version of SIC applied is based on 1980.

- Time base or time reference: A synonym for base period.

- Transaction: The selling and buying of a commodity under specified conditions. These include the detailed description of the *variety* and the associated terms of sale, and also the seller, the buyer, the time and location.

- Variety: An output of manufacturing described in sufficient detail to distinguish it physically from any other variety. *Commodity*, product, and variety define output in progressively more detail. For example, if softwood lumber were the commodity, Douglas fir may be the product, and 2x4s in eight foot lengths may correspond to the variety.

- Weight: The value assigned to each price change measure that is to be combined with others into an average. The interpretation of the average depends to a large extent on how these values are assigned. Consequently, considerable attention is given to these at each stage where averages will be computed (See Sections 4.2 and 5.2).