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**Methodological guide for developing producer price
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Methodological guide for developing producer price indices for services

Draft

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Methodological guide for developing producer price indices for services

Foreword

In OECD countries, services account for the main part of GDP. Yet, statistical systems are still disproportionately centred around goods and goods production. This is in particular true for producer price indices where price indices for goods by far outnumber available price indices for services. There are several reasons for the asymmetric coverage of price indices. One is simply that goods historically used to play a more important role than services and this has shaped statistical systems. Another important reason is that developing service price indices is a difficult and expensive task. Service output is often hard to identify even on purely theoretical grounds, and even more difficult to measure reliably. For example, services may be unique and have to be treated like new products (e.g. various consultancy services) or they can be tailored or bundled in different ways for different users. All this implies high costs for price measurement.

Producer price indices are intended to trace price movements that reflect the supply and demand conditions in the service markets, with a view to facilitating the analysis of macro economic conditions as in monitoring inflationary pressures. They also have an important role as a deflator to convert the value of service output into volume measures¹. Volume measures of service output of various periodicities are essential for economic analysis. Producer price indices are also useful for the business community to evaluate particular markets.

The aim of this guide is to aid countries to develop producer price indices for 'business services', i.e., those services that are mainly aimed at uses other than household consumption. Services predominantly for household consumption are expected to be covered by the consumer price index (CPI) and are outside the scope of this guide. The guide is intended to complement the PPI Manual,² which discusses index theory and provides general guidelines to be applied in different steps in the compilation of price indices but does not include extensive discussion on producer price indices for particular industries or products³. In addition, many business

¹ Producer price indices are the preferred measure for deflation in Eurostat's Handbook of Price and Volume Measures in National Accounts. In some market sectors (e.g. banking, insurance) and most non-market services (e.g. education) the calculation of producer price indices is very difficult or impossible due to the lack of observable prices. Calculations of volumes therefore often have to rely on second best methods which are described in the handbook.

² Producer Price Index Manual: Theory and Practice. Website: <http://www.imf.org/external/np/sta/teppi/index.htm>

³ Some examples on the compilation of PPIs for services can be found in Chapter 10 of the PPI Manual.

services differ from “typical” products and require individual discussion. Also, the methods used to achieve constant quality pricing are often complex and dependent on the particular service industry and product. It was for all these reasons that a separate guide to measuring services producer price indices (SPPI) has been developed.

The present guide has been prepared by a joint OECD-Eurostat Task Force set up in 2002. The Task Force’s basic objective has been to enhance the development of producer price indices for services and, in particular, to provide input to a common European methodology on service prices. The development of methodology *as such* has not been an aim of the Task Force. The think was rather to rely on material already produced by the Voorburg Group on Service Statistics⁴ and on the international PPI Manual. The Task Force started by selecting those service industries where the development of price indices was considered most urgent. Selection criteria were the size of industries and the speed of technical change that is likely to affect price measurement. Inevitably, this guide has to devote some space to concepts and methodology but its main purpose is to propose practical solutions for the development of SPPIs for countries where such development is still at an initial stage.

The guide is based on the premise that services of a particular industry are relatively similar in different countries and, therefore, practices adopted in one country may be applicable in others. Consequently, the guide draws heavily on the experience of countries already producing SPPIs. It tries to identify best practices across a wide range of countries. Ideally, this information will lead to similar approaches towards SPPIs across countries and increase the comparability of the resulting price series. When such SPPIs are used for deflation in the national accounts, this should also result in greater comparability of volume changes of service production.

Chapter 1 of this guide discusses general aspects in the compilation of SPPIs such as their scope, price concept, timing of prices used in an index and the collection of prices and weights. Chapter 2 discusses the main pricing methods underlying SPPIs. Chapter 3 addresses practical aspects to be taken into account in the price collection. The focus in these chapters is on issues that are typical for services. Index theory or general aspects of index compilation are not discussed at all or only at the margin and the reader is referred to the international PPI Manual.

Chapter 4 is based on country practice and reports on feasible solutions for a set of service industries. The presentations explain first the contents of services and classification issues and then discuss methodological aspects in the compilation of SPPIs for the services concerned. The list of service industries covered in Chapter 4 and the structure of the presentations are shown in section 4.1.

⁴ The Voorburg Group has been the leading international forum for establishing an internationally recognised methodology for developing producer price indices for service industries since the late 1990’s.

1. General aspects of SPPI compilation

1.1 Definition and scope of SPPI

1.1.1 Coverage of SPPIs

An SPPI is defined here as an output price index for the service production of resident producers. Further, the index relates to the production of those services that may constitute the principal or secondary activity of an industry. The index covers services provided for all uses, intermediate and final consumption, and for exports although the use in intermediate consumption dominates because this guide restricts itself to discussing only those services that are mainly aimed at business use.

Imported services, i.e., services provided by units that have residence in some other country, are not within the scope of SPPIs as defined for the guide at hand.

Whether or not service production belongs within the scope of SPPI depends on the residency of the service provider. While the separation of resident and foreign producers (and consumers) sounds straightforward, it is not always easy to define. The SNA/ESA provides general principles for the recording of a unit by referring to its “centre of economic interest”. This is explained in the SNA (par. 14.13) as follows:

In most cases, it is reasonable to assume that an institutional unit has a centre of economic interest in a country if it has already engaged in economic activities and transactions on a significant scale in the country for one year or more, or it intends to do so. The conduct of economic activities and transactions over a period of one year normally implies a centre of interest, but the choice of any specific period of time is somewhat arbitrary and it must be emphasised that one year is suggested only as a guideline and not as an inflexible rule.

The Balance of Payment Manual is fully in line with the SNA/ESA but provides more guidance. Paragraph 78 explains that a unit located abroad is recorded in production of a host country (and is thus **outside** the scope of SPPI) if the following conditions are met:

...In addition, the enterprise must, among other considerations, maintain a complete and separate set of accounts of local activities (i.e., income statement, balance sheet, transactions with the parent enterprise), pay income taxes to the host country, have a substantive physical presence, receive funds for enterprise work for the enterprise account, etc. If these conditions are not present, the activity should be classified as an export of services by a resident enterprise....

These guidelines remain difficult to interpret in certain practical situations. For example, a borderline case exists when there are subsidiaries or separate units that an enterprise has established abroad to be closer to customers. These units might provide services for the host country and possibly also for the parent enterprise. On the other hand, a domestic enterprise may provide services to these units, in which case the question arises of whether these services should be recorded in domestic use or in exports.

The question of residence of production units is encountered also in other statistics, particularly in national accounts, which are aimed at covering exhaustively all economic activities in a country, and in balance of payments statistics. Close co-

ordination in the compilation of statistics is important to ensure that the treatment of borderline cases of residence is consistent across different statistics.

The coverage of *all* output means that SPPIs comprise prices in the provision of services to all institutional sectors, financial and non-financial corporations, government units, non-profit institutions (NPISHs), households and the rest of the world. However, services provided for different markets are not necessarily the same, and their price development can be different. Sub-division of an SPPI by destination of output can therefore be desirable and would enhance its use, particularly for purposes of deflation in national accounts.

It is noteworthy that the scope of SPPIs as defined by the Task Force is wider than the provision of goods and services from business to business. The scope chosen by the Task Force constitutes a more general approach consistent with the International PPI Manual and national accounts.

1.1.2 Goals of SPPIs

There are two main goals of SPPIs. One goal is to provide a short-term indicator of the business cycle. For this goal, the SPPI has to reflect changes in prices as fast as possible. The other main goal is to provide a suitable deflator for value developments, mainly for national accounts. For this second goal, the SPPI should represent all output as defined in national accounts and follow, as closely as possible, the accrual principle in recording prices.⁵ There is normally no conflict between these goals and if any they can often be reconciled in the SPPI development. However, in exceptional cases, it is important to explicitly assess how well an SPPI is fit for the goals mentioned above. Two examples illustrate this issue.

1. In air transport, a quick indicator of price change can be based on price quotes for tickets that are bought long before the travel date. For instance, if prices of summer vacation airfares are largely known by April, this information could enter a business cycle index before the summer. But for deflation of production, these prices have to be reflected in the SPPIs concerning the summer months, which are typically only available after the summer.
2. An extreme case is provided by operational car lease. Prices stay fixed for several years. The correct deflator reflects all production, which is mainly composed of the old lease contracts that are still running. As a short-term indicator for business cycle analysis, the development of the price level at which new contracts are concluded, is however more pertinent. In the Netherlands, two different indices for the respective goals are published⁶.

⁵ In accrual recording, service output in national accounts and associated prices are recorded to the date when services are provided. Accrual principle is discussed in section 1.6.

⁶ On the two different PPI's for operational car lease, see the Voorburg Group website, conference 2004. <http://www4.statcan.ca/english/voorburg/2004%20ottawa/papers/ppi-ducth-opercarlease.pdf>

In this guide, preference is given to the use of SPPIs as deflators in the national accounts. This means that an SPPI should reflect market situation at the time of service provision and be representative for all service output as defined in the national accounts.

1.2 Statistical units

1.2.1 General principles

The PPI Manual recommends that the scope of PPIs should be defined by the principles that apply to the definition of output in the national accounts. There, output measures are based on the production of establishments or local kind of activity units (LKAUs) as they are called in the ESA. Establishments/LKAUs are defined as production units that have a single location and whose production is homogeneous (subject to the limitations of obtaining production account data). Thus, enterprises might be partitioned into smaller and more homogeneous units if they are engaged in different kinds of activities or are situated in different locations, and services provided by these units should be registered separately. Weights and sampling for an index should in principle be established accordingly.

In practice, the use of establishments/LKAUs as the basis for weighting and sampling is not always possible because information is limited. Particularly in the case of services, information on turnover by enterprise is typically used as a basis for index compilation. There are also large differences among service industries in this respect. This is shown in Chapter 4 where data sources and compilation practices are described as they are currently applied in various countries and various service industries.

1.2.2 Output of statistical units in special cases

A consequence of the definition of output is also that, for consistency, **sub-contracts** of services should be treated in an index in the same way as any other services, without taking into account whether a service to be priced contain sub-contracts or whether a service itself is a sub-contract. This is self-evident if the contractor and sub-contractor belong to different categories in the product or activity classification – producers can use any goods and services as intermediate consumption when providing services – but in principle this concerns also cases where the contractor and sub-contractor belong to the same category in a classification. SPPIs are not aimed at measuring price development for net output of services. However, in the case of sub-contracting also a net index can be considered acceptable for practical reasons. In national accounts, separate indices for all contracts and sub-contracts are in principle needed for deflation purposes, but only one kind of index is normally produced. In this situation, a net index might be seen

as preferable. The reason is that the main interest in the national accounts is to measure value added rather than output for the industry concerned, and an index where sub-contracts are excluded better serves this purpose than an index that covers main contracts and sub-contracts. Such an index is also more appropriate for deflating the use of services because those services (outside the industry concerned) are exclusively made up of main contracts.

Output covers also services that an establishment/LKAU provides to other units of the same enterprise.⁷ These **intra-enterprise services** might be valued at nominal values in the enterprise's bookkeeping rather than at market values. The PPI Manual notes that one of the primary goals of the PPI is to help determine the magnitude and direction of price movement on both a macro- and microeconomic level and for such a use, any index containing non-market prices not paralleling market price movement is of dubious value.⁸ Nor is such an index appropriate for deflation in the national accounts, where the valuation of services for own-consumption might vary: the SNA recommends using current basic values for these services and avoiding artificial transfer prices but acknowledges that this is not always possible in practice.⁹ Often, similar services cannot be found in the market to implement the recommendation.

There are also borderline cases such as the provision of services by **temporary employment agencies**. The ESA (paragraph 11.13) recommends that persons employed by temporary employment agencies are to be included in the industry of the agency which employs them, and not in the industry of the enterprise for which they actually work. As a consequence of this recommendation, the value of services produced by the agencies amounts to all payments (including compensation of temporary employees) and not only "net fees" received by the agency. On the other hand, the ESA notes in the same paragraph that the treatment on a net basis might be more suitable for purposes of input-output analysis – that is temporary workers are to be reclassified in this case into the enterprise where they actually work and only net fees are recorded as value of services purchased from the agency. Any decision about the gross or net treatment of prices underlying SPPI should be made in line with national accounts practice and may thus vary between countries.¹⁰

⁷ See SNA, par. 6.87/ESA, par. 3.14. Note also that intra-enterprise services should not be mixed up with production of services for own consumption by an establishment (e.g. transportation, storage and maintenance services). These are produced by so-called ancillary units and are not separately identified or recorded either under the output or the intermediate consumption of the establishment/LKAU or the enterprise to which it belongs. Services provided by ancillary units are outside the scope of SPPIs.

⁸ See PPI Manual, par. 3.35.

⁹ See SNA, par. 6.82.

¹⁰ No problems arise, of course, if the temporary worker is not on the payroll of the employment agency. Discussion of when a person is interpreted as an employee can be found in the SNA par. 7.23-7.30 and in the ESA par. 11.13.

1.3 Product and industry SPPIs

The PPI Manual introduces three options for the classification basis of PPIs. They can be based on industries, products or both. In industry PPIs, the compilation of an index is based on all output of units classified to the industry concerned and the resulting index thus covers principal products of that industry as well as secondary ones that are principal for some other industry. Product PPIs are compiled solely on the basis of products, without paying attention, to which industry the producer unit belongs. The choice of the basis for developing PPIs depends on the priorities of individual countries.

This guide assumes that the main use of SPPIs is deflation in national accounts, and therefore suggests that SPPIs be product-based rather than industry-based. Following recommendations of the SNA/ESA, the GDP compilation in countries is increasingly based on the framework of supply and use tables, which means that data on output of industries are available by product groups and are not shown only as a sum of various types of products. In this situation, it is preferable to deflate output by product groups and to separate primary from secondary production rather than use a single deflator for the total output of an industry. In this way changes in the composition of output will be taken currently into account.¹¹ Consequently, having product SPPIs available for deflation purposes in the national accounts is more practical rather than establishing an industry-based price index, which would require frequent re-weighting to match with the industry output in national accounts.

Like product SPPIs, CPIs and other price indices too are based on grouping by products. This provides greater scope for combining various price index data at an aggregate level for use in balancing supply and use in national accounts, and in macroeconomic analysis. On the other hand, product SPPIs are more data-demanding. They require detailed data on outputs in order to establish a sample frame and weights and to update an index but such data are not necessarily available in all countries.

At the same time, the choice between industry and product SPPIs may be less important in the case of services than in the case of goods, because the share of secondary production tends to be smaller in the former. Exceptions exist though with significant secondary production such as management consultancy and computer services.

In practice, most countries establish individual SPPIs at the 4-digit industry level. Price movements for products primary to the industry are surveyed within

¹¹ Note that it is sounder to assume that prices of outputs follow prices of similar products wherever produced (as principal or secondary production) rather than prices of other outputs in the producing industry.

businesses and aggregated to form these 4 digit industry level indexes. This is discussed further in section 3.7.2 “Weights and aggregation of an index”.

1.4 Price concept

The PPI Manual recommends that PPIs should measure actual transaction prices reflecting the revenue received by the producer for products actually sold to customers. They should take into account any applicable discounts, rebates, surcharges, etc. that may apply to the customers. Because the price reflects revenue received by the producer, taxes on products should be excluded from prices whereas subsidies on products received by the producer, if there are any, should be added. In other words, the recommendation is to apply a concept of basic prices to the measurement of SPPIs. This is also recommended by the SNA/ESA for the valuation of output in the national accounts.

Valuation and scope of the index are closely linked and cannot be chosen independently of each other. Valuation of output at basic values is preferred because taxes or subsidies might depend on users, and it would be an undesirable characteristic for an output price index to vary simply because the composition of purchasers changes, all other things being equal. However, it should be noted that product-based taxes and subsidies play a relatively smaller role for services than for goods¹².

1.5 Identification of service products

1.5.1 General guidelines

The identification of service products is a fundamental task in SPPI compilation. It involves identifying those service characteristics that are price-relevant and distinguishing between apparently similar services. This task tends to be more complex for services than for goods, and – among services – more complex for those that are mainly sold to enterprises than for pure household services.

Factors to be taken into account in the determination of products are discussed at a general level in the SNA/ESA.¹³ These guidelines are valid for both goods and services and help to identify different products at a given point in time; they also give guidance for the index treatment of goods and services, whose

¹² One area where the impact is likely to be greater is transportation services where taxes as well as subsidies often exist.

¹³ Discussion can be found in Chapter 16 of the SNA and in Chapter 10 of the ESA.

characteristics change over time. The principles are laid out in par. 16.110 of the SNA as follows:¹⁴

In general, therefore, it is necessary to pay attention to differences in the situation, or conditions, in which goods and services are supplied, as prima facie these may all be expected to introduce qualitative differences into the goods or services supplied. In economic theory it is generally assumed that whenever a difference in price is found between two goods and services which appear to be physically identical there must be some other factor, such as location, timing, conditions of sale, etc., which is introducing a difference in quality. Otherwise, it can be argued that the difference could not persist, as rational purchasers would always buy lower priced items and no sales would take place at higher prices. In most cases, therefore, differences in prices at the same moment of time must be taken as prima facie evidence that the goods or services concerned represent different qualities of the same general kind of good or service..... this implies that if there is a switch towards higher priced - i.e., higher quality - goods or services, this will be recorded as an increase in volume and not price.

The SNA suggests that price differences between similar service products imply quality differences between these products, but only on the condition that “full” information is available.

For services provided to enterprises, the condition of full information is often not met because services are typically based on unique contracts between service providers and clients. As a result, prices paid by different clients might vary significantly but this information is not freely available. More guidance should be found for this kind of situation. The ESA summarises the general rules to be applied in cases where apparently similar products are transacted at different prices as follows.¹⁵

The existence of observed unit value differences is not to be considered as an indicator of differences in quality when the following circumstances apply, namely lack of information, price discrimination reflecting limitations in freedom of choice and the existence of parallel markets. In these cases, the unit value differences are considered as differences in price.

The quotation suggests that in most cases differences in prices should, at least in principle, be interpreted as price differences rather than quality differences. Specifically, the provision of services to different markets or clients does not constitute a case of different qualities of service products.

Implementing the recommendation is still not easy particularly because price discrimination is difficult to prove. Data are often not available to distinguish price discrimination from situations where service products can be regarded as intrinsically different. This is acknowledged also in the SNA, which recommends in paragraph 16.117 that “If there is doubt as to whether the price differences constitute price discrimination, it seems preferable to assume that they reflect quality differences...”¹⁶

¹⁴ The PPI Manual, Chapter 8 (section D.3.1.2) discusses evolutionary and revolutionary products that differ in terms of size of changes in products. Evolutionary products can be replaced in an index without changing the weight structure whereas revolutionary products are additions to the index and require changes in weights.

¹⁵ See ESA par. 10.19.

¹⁶ See also discussion on price discrimination in the PPI Manual (par. 6.92-98). The discussion refers only to goods but its recommendation to investigate reasons for price differences is equally valid for service products.

Notice also that the SNA/ESA rules identify **location** as a product determining factor. Conceptually, therefore, prices of “same” services provided by an enterprise in two locations should not be averaged but treated as different services. This requirement is met if establishments/LKAUs are used as elementary units in an SPPI. How closely this requirement can be followed, will depend on the type of service and specific conditions in a country.

1.5.2 Duration of service-provision as a service-determining factor

A major difference between goods and services is that the delivery of services often coincides with their production. Consequently, the **duration** of production is of direct importance for the purchaser of services and may constitute an important price determining factor. This is not normally the case for goods where the link between production and sale is less direct, but it concerns many services such as passenger transport, where the preference of faster transportation over slower transportation means that the duration of the production of transport services impacts on their price.¹⁷

Addressing the question of duration is particularly relevant when applying pricing methods where service products are not directly specified but are based on working time, such as charge-out-rates. There, the duration of service production is potentially important and the inability to measure it can result in bias in an SPPI. These issues are discussed more closely in Chapter 2.

There are other services where production and consumption do not necessarily coincide (e.g. accounting services) and where duration has less importance as a price-determining characteristic. For these services it is normally sufficient to ensure that the resulting service is well specified. Longer or shorter duration of production is an expression of lower or higher productivity¹⁸ but is not relevant for the quality of the service product. Put differently, no consumer will be willing to pay a higher price just because the productivity of producing such a service has fallen.

¹⁷ Not all individual services belong to this category. For example, duration of many personal services may vary but they can be treated as the same services when clients are not willing to pay a higher price for a more rapidly delivered service.

¹⁸ Productivity is understood here as a change in the working time needed to provide the same service product in two periods. Change in productivity may be a result of improved labour or capital productivity or of the switch in the use of labour and capital.

1.6 Timing of price collection

1.6.1 Accrual principle

SPPIs that are used for deflation should be based on the accrual principle. One of the reasons is that this principle underlies the national accounts and not following it would result in biased volume measures of output when SPPIs are used for deflation.

Accrual accounting is defined in the SNA par. 3.94 as follows:¹⁹

“Accrual accounting records flows at the time economic value is created, transformed, exchanged, transferred or extinguished. This means that flows which imply a change of ownership are entered when ownership passes, services are recorded when provided, output at the time products are created and intermediate consumption when materials and supplies are being used.”

What accrual recording means in the case of services, is explained in the SNA par. 3.98:

“Services are recorded in the System when they are provided. Some services are special in the sense that they are characteristically supplied on a continuous basis. Examples are operating leasing, insurance and housing services (including those of owner-occupied dwellings). These services are recorded as provided continuously over the whole period the contract lasts or the dwelling is available.”

There are no major problems in implementing the accrual principle in price indices, providing the provision of services coincides closely with the time when the contract is signed or the payment made. However, particularly for services provided to enterprises there can be differences between these periods. An example is air transportation where non-refundable tickets are bought at lower prices even months in advance.

There is no perfect procedure available for treating cases where prices depend on the time-distance to production. Evidently, these services belong to different quality categories and have to be treated as different services. The accrual principle suggests that they should be dated to the time of service provision.

A special problem in services like air transportation is that prices might also be very volatile and change even daily. In this case, the use of unit prices could be considered as long as this method is applied at the most detailed category of tariffs.

Another problematic case for application of the accrual principle arises when there are long-term contracts with up-front payments rather than payments on an ongoing basis. Services are provided continuously and, accordingly, prices should be allocated to the whole period but, because of the up-front payment and the long-term contract, there is no immediate possibility to say whether the price for the delivery of the service is the same throughout the period or whether it varies. All that is known is the average price over the entire period. However, prices of contracts should reflect supply and demand conditions at the time when services are actually provided.

¹⁹ In the ESA, discussion on recording on an accrual basis can be found in par. 1.57.

There is no simple solution to this situation. One possibility to be considered is to emulate prices over the contract period on the basis of cost development. Such a procedure is typically applied in the estimation of price development for shipbuilding industry.²⁰ While this method might be reasonable in individual contracts it does not capture the evolution of market conditions (or captures only supply conditions). It seems that there is no ideal way necessarily available to use prices of long-term contracts for an SPPI.

The examples above show that the accrual principle is very important for services even if it might be difficult to implement. In many cases, not all efforts are made to fully match prices and the time when services are provided. Simple solutions can sometimes be useful if they are easily understandable by users and bearing in mind that the accrual principle is anyway not always rigorously implemented in the national accountants. Thus, while accrual accounting should in principle be respected, it has to be applied with flexibility in practice.

1.6.2 Frequency of price collection

The frequency of price collection can be monthly or quarterly. For the moment in the EU Member States, it has been agreed to collect prices for SPPI quarterly. When collecting prices for a particular period, there are two basic choices:

- A. Period prices are an estimate of the average price throughout the period. A period price should take account of price changes that occurred during the period.²¹
- B. Point-in-time prices relate to the price on a particular date or sub-period. For example, it might be the nearest trading day to the mid point of the period or the middle week of the quarter or month.

Point-in-time prices can be considered for use only if they are expected to be representative over the entire reference period (i.e. month or quarter). They should be used with great prudence if the price-collection frequency is greater than one month. Note that the distinction 'period price' versus 'point in time price' does not address the issue of when the services are provided to which the prices belong. For instance, both period prices and point-in-time prices can be surveyed for air transport tickets either long before the actual transport, or in the same period as the transport takes place.

²⁰ See the PPI Manual, par. 10.123-124.

²¹ A more detailed description of these two methods can be found in the PPI Manual, Chapter 6.

1.7 Treatment of quality change

Assessing the quality of products and adjusting price observations for quality changes are important tasks that price statisticians encounter each time when an old sample price is replaced by a new one. An indication of the importance of the task is the PPI Manual where three chapters are devoted to issues related to quality changes (Chapters 7, 8 and 21).

The PPI Manual provides a list of methods (par. 7.75) that can be used for dealing with quality changes of products:

Implicit methods:

- Overlap
- Overall mean/targeted mean imputation
- Class mean imputation
- Comparable replacement
- Linked to show no price change
- Carryforward

Explicit methods:

- Expert judgment
- Quantity adjustment
- Differences in production/option costs
- Hedonic approach

The same quality adjustments methods can in principle be used for goods and services. In practice, however, fewer options are available for services. For example, the hedonic approach can rarely be used, because the quality of services is often made up of intangible factors that are difficult to identify and to measure in quantity terms. Moreover, even though quality factors of service products were possible to be identified, it is often hard to find suitable data to capture gradual changes in the quality of services.

Quality adjustment methods that are feasible particularly for services are discussed in section 3.6 of this guide.

1.8 Classifications

Classification systems provide an organizing structure and choosing one constitutes the first step in surveying prices. Once the sub-aggregates within the classification system are selected, an appropriate frame can be identified from which representative establishments and service products can be selected for inclusion in the index. The classification system also determines the structure of the index and defines the weighting system.

International classifications for activities are:

- International Standard Industrial Classification of all Economic Activities (ISIC)
- The General Industrial Classification of Economic Activities within the European Communities (NACE)
- The North American Industrial Classification System (NAICS)
- Australian and New Zealand Standard Industrial Classification (ANZSIC)

International classifications for products are:

- Central Product Classification (CPC)
- Eurostat Classification of Products by Activity (CPA)
- North American Product Classification System (NAPCS)

Classifications are discussed at a general level in the PPI Manual and the discussion needs not be repeated here.²² Classification aspects relating particularly to services are discussed in Chapter 4 where SPPIs for a set of service industries are introduced. It should be noted that the product classifications provided above are generally only useful as a guide and cannot be used to form components of a weighting structure for an index. This usually has to be done by accessing information from structural statistics or as part of the process for establishing a price index at the 4-digit industry level. More information on these processes is provided in Chapter 3.

1.9 Sample frame and weights

SPPIs can be established on the basis of industries, service products or both (see above). The required sample frame depends on this choice. The use of industry as the basis is in most cases easier because more information is normally available by industry than by product.

Depending which one of the approaches is chosen, the weighting, interpretation and the usability of the indices are somewhat different. If an index is

²² Further information on the classifications and links between them can be found in the following websites:
- UN classification register: <http://unstats.un.org/unsd/class/family/default.htm>
- Eurostat's Classification Server: <http://europa.eu.int/comm/eurostat/ramon/>
- North American industry and product classification system: <http://www.census.gov/epcd/www/naics.html>
- Australian and New Zealand industry classification: <http://www.abs.gov.au/>

based on industries, a sample frame is built up of establishments/LKAUs. This means that any secondary activities (that are principal activities for some other industries) of the establishment/LKAU will be included in the sample. On the other hand, in a service-based index only services in question are considered without taking into account in which industry the service provider belongs in the classification of establishments/LKAUs. Consequently, an industry-based index is valid for deflation of total outputs of industries and service-based indices for deflation of the part of services in industry outputs.

For **industry SPPIs**²³, the PPI Manual recommends stratifying the sample frame by 4-digit ISIC (or NACE) heading and then by size. Two stage PPS sampling²⁴ is recommended to select establishments/LKAUs within each heading and then transactions from each unit. Depending on the circumstances, other probability sampling methods may be considered as well and a minimum size criterion be used in sample selection ('cut-off sampling').

For **product SPPIs**, it is recommended that the sample frame be stratified by service product codes. When feasible, two stage PPS sampling should be employed to select establishments/LKAUs within each code and then transactions from each unit.

For **industry and product SPPIs**, the recommendation for the sample frame is a stratification by 4-digit ISIC headings and then by size. Further, two stage sampling should be employed to select establishments/LKAUs within each heading and then transactions from each unit. Transactions within each establishment/LKAU should be stratified by product code.

For services, it is often more difficult to establish product SPPIs than industry SPPIs because statistics on industry outputs by service products might not be available. Establishing industry SPPIs is easier because data by industry are commonly available via business registers and other sources. However, the situation might be gradually improving because many countries have launched development projects to establish statistics on service outputs similar to statistics in goods industries.

As a general rule, weights have to be revised at least every five years. However, in some industries the contents and structure of service output changes rapidly year on year. These changes are due to the emergence of new products as well as changes in the pricing system. For these services it is recommended that weights as well as service items included in an index should be revised more often.

More information on this topic can be found in the PPI Manual.

²³ The optimum stratification level may be different in small countries.

²⁴ PPS = Probability proportional to size. Description of the method can be found in the PPI Manual, Chapter 5.

1.10 Relationship of the SPPI to other major price indices

The SNA/ESA recommends that GDP at current and constant prices should be estimated in the framework of supply and use of goods and services. In principle, price indices should be available for various parts of the supply-use framework. The PPI Manual uses this national accounts framework to illustrate the relationships between different price indices.²⁵

Services make up a sub-set of all products produced and consumed in an economy. Their supply and use, and associated price indices comprise the following sub-areas:

- Domestic output of services; SPPI
- Consumption of services by households; CPI
- Other domestic uses of services
- Exports of services
- Imports of services

In this framework, the SPPI is crucial not only for measuring output of services but also for estimating price development of the use of services in areas where independent price indices are not available. This concerns, particularly, the use of services in intermediate consumption and exports of services.²⁶ Services used by households are covered by CPIs.

The present guide has adopted as a principle that the scope of SPPIs should cover all types of users, even though the empirical focus is on those SPPIs where deliveries to businesses play an important role. Nonetheless, there is an overlap between SPPIs and CPIs when it comes to the pricing of services delivered to households.

There is no general rule for how the compilation of SPPIs vis-à-vis CPIs is best organised. The situation varies between service products, and data sources may also differ between countries. It may be possible to use CPI information to obtain prices for household end users, and in this case the data collection for the SPPIs would be reduced to business-to-business and export if significant. Note, however, that the price concept underlying the CPI is not the same as the concept underlying the SPPIs. There may be other cases, where the service output and its prices for different end-users are very similar or cannot be separated in practice (e.g., economy-

²⁵ See PPI Manual, Chapter 14.

²⁶ In national accounts based on the supply and use framework, an advantage of using SPPI data on the use side is that consistency of prices in service balances can be ensured.

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fare air travel), in which case it may be easier to cover service output prices to all end users in a single estimation.

Statistics by end use, like supply and use tables, are the appropriate tool to identify the relative importance of groups of purchasers (export, intermediate consumption, households) of the output of an industry.

2. Main pricing methods for SPPIs

2.1 Introduction

The compilation of price indices should be based on clearly specified, representative products whose prices are followed over time with due attention to quality change. For services, this principle is often difficult to follow:

- Because services are typically produced and delivered in direct contact with the customer, there is a more frequent occurrence of **unique service products** than in the case of goods. A unique service product is one that is only provided once to the specifications of an individual customer, and prices cannot be observed over multiple periods. Various consultancy services fall into this category, making price measurement a daunting task. Explicit or implicit assumptions on quality changes have to be made (typically, constant quality is assumed) that are mostly based on convention rather than reflecting “reality”.
- Charging arrangements or mechanisms for the sale of services are often such that it is **difficult for the statistician to observe prices** for a repeated service transaction. Complex and changing bundles of telecommunication services that are on offer are a case in point. Invoicing systems applied by service providers can be very different depending on the industries concerned and may also vary between different service providers within the same industry. Moreover, the same service provider might change the invoicing basis from one period to another.
- Even for simple services with readily available observations on transactions and prices, **controlling for quality change** is particularly difficult in the services area and can give rise to fundamental issues such as whether a more rapid delivery of the same service constitutes a quality change or not.

Because of the frequent occurrence of unique products, standard price measurement methods designed for repeated products, cannot generally apply for services. Nor is it possible to provide strict guidelines on how SPPIs for particular services should be compiled. Decisions on pricing methods depend largely on circumstances, for which flexible solutions should be found to capture the development of prices. It is also obvious that new methods evolve as more experience is gained on the compilation of prices indices for existing and new services.

This chapter discusses pricing methods with an emphasis on unique services, and on prices and transactions that are ill-specified and difficult to observe. Before doing so, three observations are made for clarity of exposition.

First, *pricing mechanisms* are charging arrangements put in place by economic operators, and they have to be distinguished from *pricing methods* employed by statisticians. In the simplest case of a repeated, well-identified service with observable transactions, the pricing mechanisms and pricing methods largely coincide. Observed prices can be directly used in an index and a statistician will encounter only “normal” compilation problems such as controlling the quality and representativeness of service products entering in an index. For unique service products, however, this coincidence does not hold and the statistician has to decide how best to use information from pricing mechanisms to devise a pricing method. Sometimes proper price data might be found in the market but are inappropriate for use due to rapid changes in the market; sometimes equal service products are not transacted in consecutive periods and therefore prices are not available.

Three examples further clarify both concepts and their difference:

- Car rental. The pricing mechanism is that a commercial (market) list price is charged by the producer. The pricing method is, for instance, the survey of some of these list prices. For this standard service, the mechanism and method “coincide”.
- For some legal services, the pricing mechanism is a percentage fee of the assets that the service pertains to. The pricing method is, for instance, a unit value of (realised) hourly rates, dividing total income by worked hours.
- In a regulated market for postal services, the pricing mechanism is a government regulation specifying prices. The pricing method could then consist of accessing the legal documents with the regulated tariff information.

Pricing methods are methods that apply to the process before (elementary) index compilation; they are solely concerned with data that are used as prices in an index. Put differently, pricing methods are procedures applied to make price data (that are mostly based on price mechanisms) eligible to be entered in an index. The index formulae and aggregation methods needed to bring together these basic elements are not discussed in this section, and reference is made to section 3.7 and the International PPI Manual.

Second, pricing mechanisms and pricing methods have to be distinguished from the *nature of services*. Services can be unique by their nature like legal advice. For unique services, transaction prices of comparable service products are not available, and a host of pricing methods are therefore used to circumvent this problem. Other aspects of the nature of a service are the length of provision with its implication for pricing methods. Notice that often there is a direct link between the

type of service, the pricing mechanism, and the pricing method. The nature of a service determines (restricts) what price mechanisms and methods are possible and a price mechanism determines (restricts) what price methods are possible.

2.2 Specification of service output

A fundamental principle underlying price indices is to follow prices of products with comparable quality in consecutive periods. This requires that products, whose prices are used in an index be well specified. In the case of identical, repeated services the requirement means that price-determining factors of services are identified. For unique services the situation is different, because price-determining factors cannot be expected to be known and the characteristics of service products have to be identified instead. A proper specification is also a precondition for the ability to track changes in the quality of products over time. As already explained, this requirement is particularly difficult to meet for service products.

Pricing methods are processes applied to price data – possibly based on various pricing mechanisms – to make them suitable for use in an index. Price observations that refer directly to specified service outputs are an important ingredient in developing conceptually satisfactory SPPIs. On the other hand, if, due to uniqueness of services, specified service outputs cannot be priced in successive periods, this gives rise to time-based pricing methods. These methods are based on the time used for the provision of the service rather than on the service itself. While such pricing methods are common in the service area, they imply that the impact of labour productivity change on price changes is disregarded. This is a serious deficiency because only prices that are compatible with services finally provided may result in an SPPI that is closely comparable with PPIs for goods, and in comparable volumes for goods and services when used for deflation.

Generally, a rise in productivity means that a larger volume of services can be produced with a given input. The change in volume may be a consequence of a change in quantity or quality of the services. (Alternatively, a rise in productivity means that output prices fall even though input prices remain unchanged.) When the item is clearly specified finalised service and when prices can be matched exactly over time, there is no need to bring in productivity or more generally, to inquire about the reasons for price changes. The delivery of a letter could be an example of such a well-specified and observable service. If the price of sending the same letter under the same conditions falls, this is all the price statistician has to know in order to measure a price change. It is irrelevant whether the fall in prices reflects productivity gains or some other cost change.

When pricing is not based on prices of final services and time-based pricing methods are applied, the implicit assumption is made that the time that a service provider of a given qualification and experience spends with a client is the best approximation for the unobserved service flow. Possible change in productivity, that

is a larger volume of services per hour might have been delivered, is disregarded because only hours are observed.

The pricing methods discussed in this guide are briefly introduced in section 2.3. In light of the above discussion, the aim is to distinguish pricing methods that result in prices of final services from those that result in time-based prices.

2.3 Classification of pricing methods

There is *no unique classification* of pricing methods. There are many criteria along which pricing methods can be defined and contrasted with each other. Any classification system that tries to bring together all pricing methods is almost certainly deficient because methods are difficult to classify into mutually exclusive categories. The approach adopted here starts out by using as a criterion the *result* of pricing methods and looks at the extent to which a price finally entering an index is based on specified final services or is time-based. Secondly, pricing methods are subdivided based on *techniques* employed by statisticians in pricing.

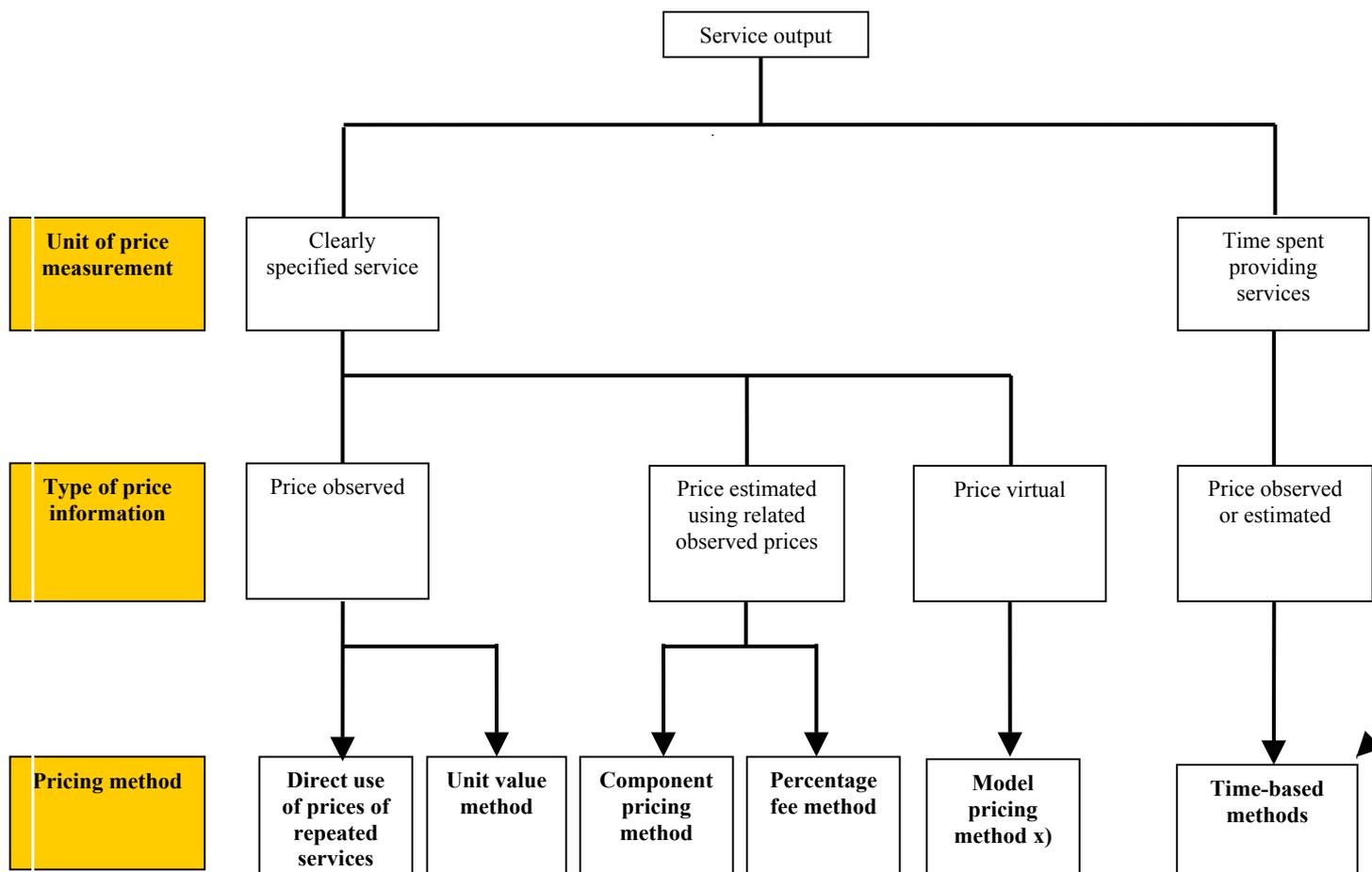
Obviously, if techniques had chosen as the main criterion in the classification, different definition of methods would have resulted. For instance, unit values are used not only in the unit value method (section 2.5) but also in pricing based on working time (section 2.9). Limiting the unit value method to pricing of well-specified services highlights the fundamental difference between the two types of pricing methods. In the former, the principle of tracking the development of output prices of equal products is at least attempted whereas in the latter the target measure is price development of working hours (by categories of employees) rather than price development of service products themselves.

The reason for putting so much emphasis on results rather than on technical compilation procedures is that ensuring the international comparability of SPPIs is an important long-term aim of this guide. This might not be achieved in near future, but still classification based on results is important in monitoring country practices and in using the information for analysing price and volume developments in countries. Focusing primarily on compilation techniques does not ensure that these aims are met because technically similar compilation procedures may give very different results depending on whether prices underlying SPPIs are prices of actual service outputs or prices of working time in provision of services.

Figure 1 shows the pricing methods as defined in this guide in the framework of methods based on final services and time-based methods. The left-hand column describes an ideal situation where service output is specified in terms of final services although not necessarily perfectly. The right-hand column illustrates the other extreme, where a service is specified in terms of contents of service provision rather than in terms of service ultimately provided. Measurement unit in the former is the service provided and in the latter time spent in service provision. When price indices based on these two types of methods are used in deflation, results have different interpretation. In the first case, volume of output is in principle correctly

measured (although the result depends how well price determining factors are specified) whereas in the time-based method resulting volume measures time spent in the service provision. How valid prices based on working time are to be used in an SPPI depends on the services concerned.

Figure 1: Main pricing methods



x) Note that the model pricing is classified entirely to the group of clearly specified services. Pricing where, as a part of price estimation, the number of required working hours is straight away assumed to remain the same as in the previous period, belongs to time-based methods.

The first of the methods, the **direct use of prices of repeated services**, represents the ideal of using real transaction prices of the same service products in successive survey periods. A special case, contract pricing, is the use of prices in long-term contracts for the repeated delivery of the same or a very similar service in many survey periods. The method is discussed in section 2.4.

In the **unit value method**, prices entering an index are estimated via aggregate value and quantity figures. Resulting unit values are hardly ever based on homogeneous groupings of service products, and the method can therefore be

regarded as an imperfect (albeit sometimes the best) option.. Note that the unit value method as defined here is limited to cases where price observations refer directly to service output. Cases where unit values are applied in the estimation of hourly rates are covered in the method ‘pricing based on working time’, and in the component pricing method, pricing of some sub-components might be based on unit values. The unit value method is discussed in section 2.5.

The **component pricing method** is characterised by the use of a number of independent observed prices of output components. The price to be entered into a price index is the sum (weighted or unweighted) of prices of the components. The method is discussed in section 2.6.

Pricing based on **percentage fees** is only applicable if the pricing mechanism bases the price on a percentage of asset value (or price of some other goods or services) that the service is concerned with. This method follows the development of both the percentage rate and the price of the associated item. The method is discussed in section 2.7.

The main characteristic of **model pricing** is that the survey asks for an expert estimate of a price. The data for index calculation are compiled solely for the survey. Any existing enterprise data are used in the estimation but the resulting price itself is fully fictitious. In principle, a basic requirement of the method is that service products are specified and, thus, changes in productivity are expected to be taken into account. This means that efforts are made to estimate changes in required working time rather than assuming it straight away the same as in the previous period. The method is discussed in section 2.8.

Pricing based on working time is often applied for business services where hourly rates are typically used as a pricing mechanism. The resulting measure in this method is the price development of working time spent in service provision rather than the price development of the service itself. Pricing may come in different forms. For instance, the pricing mechanism can be based on charge-out rates by type of staff that are used as such in pricing or prices may be built up from costs of service provision. The method is introduced in section 2.9.1 and discussed in detail in section 2.9.2.

2.4 Direct use of prices of non-unique, repeated services

2.4.1 Standard case

This method concerns the standard case of well-specified, repeated services. These services can be either simple services or packages of services. Pricing of repeated services is standard CPI and manufacturing PPI practice. Producers are asked to select some of their products that are representative of their total output. The prices of these services are followed over time, as are their characteristics in order to control for quality changes.

Prices are ideally actual transaction prices extracted from enterprise records but it may also be possible they are not directly available but have to be estimated by the respondent. Sometimes list prices are used, which relate to standard price lists established by an establishment for the service products they sell. List prices either directly match the required service specification or have to be approximated using list prices that are closest to the required specification. In an SPPI, list prices should only be used, if there are good reasons to believe that they reflect the evolution of actual transaction prices. This is not the case when discounts vary over time in response to changing market conditions.

While the pricing of simple services is often straightforward, pricing of service packages is not when the structure of service packages changes or when customers switch their purchases towards more favourable packages. For example, in the telecommunication sector a package might consist of fixed amount of talk time and SMS (short message service) with a fixed fee. Either part of the package might change resulting in a specification problem when the service product is priced. On the other hand, if an old package remains in the market when a new package is introduced, pricing of the old package might result in bias if its representativeness declines significantly. Replacing the non-representative service package in an index by another, more representative package might be difficult in practice and could lead away from the standard case to a situation of unique services that have to be compared.

2.4.2 Contract pricing

Contract pricing is a particular case of the direct use of well-specified, repeated services. It is only applicable to a certain type of service and if a certain pricing mechanism is used in the market.

The only **type of service** that this method applies to, are services for which an (almost) exact repetition occurs by the same producer for the same client. Examples of such services are the daily cleaning of an office building, a security service like guarding a building, and weekly road haulage between a factory and a warehouse.

Another restriction for the applicability of this method is that it requires a particular **pricing mechanism**. The mechanism has to be that the producer and the client establish one contract that covers the repeated delivery of the service during a long period, be it a predefined period, for instance one year, or an open ended period. It is necessary for this pricing method that the contract lasts over a sufficiently long survey period, and that service delivery is repeated at least once per survey period. The price stated in the contract often changes without a change of the output stated in the contract. Prices can change by different mechanisms, for instance by yearly

renegotiation, by escalation with an index like the CPI²⁷, or by a clause that states that the producer is allowed to pass on certain costs changes. Payments are typically periodical, e.g. every week or month the same sum is paid.

In short, this method can only be applied (1) if the (chosen unit of) service²⁸ is repeatedly provided under one and the same contract over many survey periods and at least once per survey period and (2) if the surveyed prices reflect the same service each survey period. If these conditions are not met, contract pricing is not possible as the pricing method. Long lasting contracts for unique services, like a three year engineering project, cannot be surveyed by this pricing method. Also, framework agreements under which different amounts of service or different services are delivered each period, are not suitable for contract pricing.

It should also be noted that contract pricing is not recommended in cases where services are the same in each period but payments are made less frequently for example in the case of large up-front payments. There is no self-evident way to allocate these payments over the contract period to determine prices for each sub-period and to apply the accrual principle. In these kinds of contracts it is recommended to apply other pricing methods e.g. model pricing.

The contract pricing method works basically as follows:

- A number of contracts are selected in a dialogue with each respondent. The product description identifies the client explicitly²⁹. The nature and quantity of the service that the price belongs to, is also stated clearly, e.g. the total weekly or monthly service (coinciding with payment), or the price per unit of service delivery, like one transportation trip, one days' cleaning or an hour of guarding.
- The price of this product is surveyed every period although respondents in some industries have stated that prices change so rarely that the survey frequency should be lower than the periodicity of SPPI calculation. In these cases, a surveyed price is valid for a number of periods.
- If there is any change in the actual service, a quality correction has to be made for which standard methods can be applied. For instance, an office cleaning

²⁷ There are anecdotes where contract prices are escalated in year t by the change of a PPI from year $t-2$ onto $t-1$, and this change being surveyed again for PPI compilation. This is awkward, but not wrong from a survey point of view.

²⁸ It does not matter what the unit of 'a service' is; either 'all cleaning under one contract' can be regarded as one service, or a unit of service delivery can be chosen as e.g. one trip, one days' cleaning or a week of guarding. Another option, and easiest for practical purposes, is to adhere to what the surveyed price reflects: a price per trip, or per day, or the total price of the monthly or quarterly payment. In the last case, the unit of service can be 'a quarter of twice-a-week road transport'.

²⁹ The client description can be limited to some client identifier like a number, if the respondent desires this for confidentiality reasons

contract changes to only three instead of five times cleaning per week or the weight of the load of a road haulage trip goes up from 10 to 14 tonnes.

The difference with the standard case described above is that contract pricing is based on a single transaction, whereas the standard case is based on multiple transactions, possibly for different clients. Unlike the standard case, a contract and its price are usually unique for a particular client. But as product and price are not unique for one survey period, the ‘unique product problem’ does not apply here.

Box 1. Examples of contract pricing in the Dutch road haulage SPPI									
Prices are taken from the contracts in nine subsequent periods. Surveying takes place every quarter, also for the prices that stay the same for a long time. Most contracts include a clause that allows a diesel surcharge if the diesel price rises above a certain level. Examples are only modified to make the identification impossible.									
Description	2003				2004				2005
	I	II	III	IV	I	II	III	IV	I
Tank transport in bulk. 30,000 liters. From Amsterdam to Arnhem (104 kilometer). Including loading, unloading (both three hours). Price on the invoice, for client nr. 6347. Contract price: 1 year fixed and diesel surcharge. Price per trip.	325	345	366	366	370	370	377	388	375
Truck and trailer 25 tonnes. From Assen to Mayer (Germany), 217 km, ± 6.5 hours. Advance notice of 3 days. Excluding return cargo, including loading, unloading and reimbursement for waiting. Including German toll (start in 2005). Contract price for a fixed client nr. 10502. Price per ton.	18.92	18.92	18.92	18.92	18.92	18.92	17,43	17,78	21,39
Distribution of cattle feed (calf milk powder). Transported by silo, 16 tonnes. From Enkhuizen to two unloading addresses in the Netherlands. Including return cargo, loading, unloading and reimbursement for waiting. Contract price for a fixed client: Drankovil. Price per ton	10.89	11.05	11.05	10.73	10.79	10.89	10,75	10,75	10,97

There is anecdotal evidence about ‘new contract bias’. This concerns new contracts that are won by agreeing to a low price, at which no profit or even a loss is made. Once the client is satisfied, prices go up to regular market levels. In strict contract pricing as method, the resulting SPPI is in danger of rising too fast, as it rises with rising prices, but does not include the low start prices, as they are not comparable to a previous price. The best solution seems to keep in close contact with respondents about how prices change *for the client*, even if an other producer had the contract before (new contract entering the index) or an other producer wins the contract (contract disappearing from the index). Alternatively, the model pricing method (see section 2.8) can be a useful addition to contract pricing.

The contract pricing method is easy to apply, and the restriction to use it only in cases where payments are made at an accrual basis means that the prices are fully in line with corresponding service output. Both price and output evolution follow the

same pattern implying that the volume of output is, as expected, flat (that is the same amount of services is provided in each sub-period). However, when applying the contract pricing method, a crucial problem is how well the resulting price index reflects evolution of market situation in the industry concerned. In other words, to what extent individual contract prices agreed at the date of signature for several future periods can be held representative for the whole industry.

In those service industries where the prevailing pricing mechanism is contract pricing, representativeness means that two issues should be considered:

- Contracts to be included in the sample should preferably reflect different volumes of service deliveries because price developments may vary with the size of the customer.
- A relatively large sample is required lest the resulting index becomes too sensitive for the spread of contract periods in the sample. In other words, due attention should be paid to the temporal representativeness of the sample to capture the evolution of the market situation. It is possible that the spread of contract periods is highly seasonal, e.g. contracts are largely signed at the beginning of the year. The index should reflect that but continuous updating of the sample in each survey period is still important.

If there is no significant seasonal pattern in the spread of contract periods over the year and services provided by the industry are relatively homogeneous, the contract pricing method and a representative sample of contracts might result in an index that represents relatively well the whole industry. On the other hand, if the seasonal pattern is strong, it is particularly important to collect also prices that are based on other pricing mechanisms than contract pricing. There is no reason to assume that a seasonal pattern concerns the whole industry. The more prevalent the use of other pricing mechanisms is in the industry the more important it is to enlarge the sample.

2.5 Unit value method

In the unit value method, service output is sub-divided into homogeneous sub-sets for which value and quantity data are available. Prices for an SPPI are then estimated by dividing the value of service outputs by the corresponding output quantities.

In practice, the homogeneity requirement is rarely fully met, and even a very detailed sub-division of output does not ensure that services are homogeneous

enough. There are, however, exceptions such as postal and courier services where unit values can often be considered appropriate.³⁰

In spite of the weaknesses of the method, it sometimes proves to be the best available alternative, even for complex services. An example is telecommunication services where a rapid technological development and frequent changes in invoicing system make the implementation of other alternatives so difficult and costly that a judicious use of the unit value method turns out to be a feasible and cost-effective option.³¹ Homogeneity requirement is, however, not fully met because the size of contracts (which is an important price determining factor) is largely ignored in the method. Detailed sub-division of services is of the utmost importance to hold this deficiency of the method to a minimum.

Box 2. Example of unit prices					
UK Business Telecommunications: local calls					
		Revenues (£m)	Volumes (million minutes)	Unit Values (£ per minute)	Index Value
Year t					
	i	300	14000	0.02143	100.0
	ii	280	13500	0.02074	96.8
	iii	260	13000	0.02000	93.3
	iv	240	12500	0.01920	89.6
Year t+1					
	i	220	12000	0.01833	85.6
	ii	200	11500	0.01739	81.2
	iii	180	11000	0.01636	76.4
	iv	160	10500	0.01524	71.1

³⁰ National accountants often directly use **quantity indicators**, where volume of output is a weighted average of quantity indices based on base year weights. The corresponding price index is the change of output divided by the resulting volume index. The method is used because detailed turnover data might not be currently available to estimate unit prices. To give satisfactory results, a basic requirement in the method is that quantity indicators cover all output exhaustively.

³¹ In addition to the use of unit value method, it might be appropriate to use Fisher formula in the estimation of price indices for industries undergoing rapid technological changes. This would require that quantity and turnover data are collected continuously to update weights for each period. Weights of firms in the sample become quickly outdated when prices change significantly like in mobile phone and internet services.

When using the unit value method, one should be aware that the homogeneity of products underlying unit prices might get lost over time. Then, changes in the composition of services within a category can lead to changes in the unit value index that are wrongly interpreted as price changes. Thus, the sub-division of output needs to be checked frequently and updated if necessary to avoid an index bias.

A problem sometimes encountered with unit values is that the required data are rarely available in time for inclusion in current quarter estimation. This means that unit value indices are often lagged by one quarter (or month) or, alternatively, indices are published preliminarily and revised when final data become available.

2.6 Component pricing

In the component pricing method³², a service product or a base model of the service is agreed upon with the surveyed enterprise. Although the service as a whole may be a fictitious composite service, it comprises several elements for which actual prices can be observed and made up. In each subsequent period, then, the respondent enterprise supplies the price for each individual element of the model. The statistical office then combines this information to compute a price index for the composite service. There are different ways of combining or aggregating across the elements for which prices have been collected. Methods include:

- The use of existing bills or contracts to draw up a user profile. For example, a typical bill of a telecommunications client has as its elements local phone calls, national calls, etc., as well as a distribution of total communication time between these elements. A typical distribution constitutes a user profile and provides the weights to construct a composite index of communication services prices on the basis of the various components from existing bills. Sometimes not all elements of composite prices can be covered. Where this is the case, it

³² The PPI Manual (paragraph 6.83) distinguishes specification pricing from component pricing of which the latter is used in connection of shipbuilding. The term component pricing as used in this guide covers both parts.

has to be assumed that the price of the missing element moves roughly in line with the average of the other elements. Omissions may also be acceptable if the user profile shows a very small weight for the missing element.

- The use of output or consumption weights. Composite prices are then constructed by collating prices of components using the formula for weights provided by the respondent enterprise. This kind of pricing can be considered for use in transportation services, for example.

The component pricing method is not widely used except in telecommunication services. In methodological papers on SPPIs for these services, the method is sometimes called “bill method”. A standard bill is defined where the composition of the bill is based on average number of connections and call minutes in different service categories (such as a given number of peak and off-peak minutes in national and international phone calls). These model bills are repriced every period. Prices in each service category can be monitored separately or they can be summed up by using appropriate weights to form a component price.

Box 3. An example of component pricing

Pricing of local telephone services (called “unit value method”) in the USA’s PPI.³³

Average number per access line (weight) in the base period is obtained by dividing the total number of units for each type of charges by the total number of access lines.

Average revenue per unit in period t is obtained by dividing revenues for each type of charges by the total quantity used of each charge.

Weighted revenue in period t is calculated by multiplying average number per access line by average revenue per unit. The price is the sum of weighted revenues.

Type of charge	Average number per access line (a)	Average revenue per unit (b)	Weighted revenue (a) x (b)
Access line	1.000	26.7530	26.7530
Usage charges based on time:			
Peak minutes	162	0.2589	41.9418
Off-peak minutes	133	0.0824	10.9592

³³ For details, see the following papers; Deuchars G., Moriya K., Kunihiro J. Price index for telecommunications services, 16th Voorburg group meeting, September 2001.

Roaming minutes	10	0.9722	9.7220
Usage charges other than time:			
Landline, per call	2	0.1500	0.3000
Other charges, daily rate	1	1.5000	1.5000
Features/Options and feature packages:			
Custom calling package	0.65	3.4600	2.2490
Call waiting	0.20	4.8500	0.9700
Call forwarding	0.10	5.1500	0.5150
3-way conference	0.05	5.7500	0.2875
No answer transfer	0.10	4.2500	0.4250
Voice messaging	0.20	4.8000	0.9600
Total (Price in period t)			96.5825

The component pricing method differs from the direct use of prices of repeated services insofar as the former involves computing a price from various components and no transactions are necessarily made at this price. Instead, in direct use of prices of well-defined repeated services, prices are used *as such* in the SPPI compilation, whether or not there exist sub-components for which prices are available separately.

In component pricing, prices of sub-components should be based on prices of truly transacted services. In this respect the method differs from model pricing where sub-component prices are largely estimated. Moreover, prices of sub-components should not be hourly rates or other time-based prices. If such kinds of combined prices exist in practice, the pricing method belongs to time-based pricing (see section 2.9) rather than to component pricing. A reason for their exclusion in this class of methods is that otherwise the nature of resulting final price would become blurred. The importance of this principle is particularly apparent in cases where time-based pricing is applied for sub-services that are under strong technological development, and of which weight in the total price is high. For example, due to adoption of more advanced technology, hourly rates might go up and working hours down but still “real” prices and volumes of services might remain stable. A fixed weight structure, even when updated frequently, does not capture these changes but a biased sub-component price ends up to the final price. Therefore, it is recommended to use model pricing in this kind of situation.

An advantage of component pricing is its flexibility of use. Care should be taken to ensure its representativeness over time and, therefore, sub-components and weight structures should be updated frequently.

2.7 Percentage fee method

Sometimes, the value of output of a service product consists of a commission fee, which is calculated as a percentage of the value of contracts, assets (e.g. the services of real estate agencies) or other products. In this situation, the price of the service can be estimated by updating the price in the previous period via the following formula:

$$p_t^s = p_{t-1}^s \times \frac{m_t}{m_{t-1}} \times \frac{P_t}{P_{t-1}}$$

where p_t^s is the price of the service output in period t , m_t is the percentage fee in period t that applies to the value P_t of a contract, asset or other product.

The percentage fee method is valid if the underlying goods or services are sufficiently homogeneous over time. Note also that the method is equivalent to estimating a price directly on the basis of fees associated with the same services in consecutive periods. However, capturing the price development by applying the described formula is less data demanding because there is no need for goods or services (i.e. an asset or contract) to be exactly the same in two periods but only for their price development to be known.

Box 4. An example of percentage fee method

In the example, sample prices are calculated by using percentage fees and price indices. For each survey period ($t-1$, t , $t+1$, ...), a price statistician collects data on percentage fees and combines them with price indices for the products concerned.

Service sample price = percentage fee (%) x price index of the product

Sample service	Period	Percentage fee (%) (a)	Price index of personal computer / copying machines (year $t_0 = 100$) (b)	Sample price (a) x (b)
Monthly fee for leasing a personal computer valued at 250,000 yen for 3 year contract	t-1	3.0	86.5	259.5
	t	3.1	83.0	257.3
	Change (%)	+3.3	-4.0	-0.8
Monthly fee for leasing a copying machine valued at 1,000,000 yen for 5 year contract	t-1	2.6	95.0	247.0
	t	2.7	94.0	244.4

	Change (%)	<u>+3.8</u>	<u>-1.1</u>	<u>+2.8</u>
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One notes that percentage fees as such are pricing mechanisms and, by assuming that the changes in service prices follow the price development of the underlying product multiplied by changes in percentage rates, they become a pricing method. A pricing mechanism based on percentage fees does not automatically ensure that the percentage fee method can be used. If, for example, a price index for the underlying asset or contract is not available or if fees are based on *ad valorem* pricing³⁴. Under these circumstances, model pricing or time-based methods might be the only usable option.

2.8 Model pricing

The model pricing approach³⁵ requires the respondent to quote in each period a price for a standard service whose specifications are held constant. A model can either be fully virtual or based on a contract signed in the past. In all cases, the service product is non-observable at the time of data collection. For example, an engineering agency is asked to select a representative contract which they have signed in the past and for each period to quote what their price would be to undertake that project if it was up for contract in that period.

Model pricing is used for unique products for which price estimation, unlike in component pricing, cannot necessarily be based on actual transaction prices of sub-components. It is appropriate particularly in similar situations where time-based methods (see section 2.9) are widely used. Compared to time-based methods, its obvious advantage is that the method is in principle based on clearly specified service products whereas in the time-based methods, like when using hourly charge-out rates, this is not the case. In other words, prices of same services (although virtual ones) are followed over time and, thus, changes in productivity are taken into account in prices. In practice, the difference is not necessarily very significant because data providers might be unable to evaluate how much more or less time a service provision requires compared to the previous period.

Different service industries set different requirements for a model. Whatever type of model is selected it is essential that the model is specified in sufficient detail, so that the respondent reports prices for that defined model and no variation from the model occurs over time without notification to the statistical agency.

³⁴ Ad valorem pricing is a pricing mechanism often used in legal services. It means that fees are either based on a proportion of the value of the claim or they relate to price classes which represent the various values of claims. The fee might also change progressively. See section 4.11. Legal activities.

³⁵ See also PPI Manual paragraph 6.83.

In estimating the price, the following factors should in principle be taken into account:

- a) Labour costs (staff by skill or experience and numbers of hours)
- b) Overheads
- c) Gross profit margin (the representative margin that would apply in the current competitive climate).

For each pricing period the respondent will need to "re-cost" each component. Special attention needs to be paid to ensuring that the model describes an output as transacted price and not a list of input components. It is particularly important that labour input is adequately re-estimated reflecting productivity changes. The respondent must therefore come up with a change in the number of hours needed for the production of the model described in output terms, e.g. it used to need 1000 engineer hours, now it needs only 930. If this does not happen, the model pricing method has the same 'productivity problem' as time-based methods. Models might also have to be modified time to time either because the situation in an enterprise changes or a more economical way to provide a service can be found. Also changes in the model are virtual and it is difficult to evaluate how well they reflect reality. For these reasons, estimating the working time required for provision of the model service is not easy and might become largely subjective.

The profit margin quoted should reflect actual business conditions in the pricing period, and this component is therefore expected to fluctuate with market conditions (i.e. higher in boom periods and lower, sometimes even negative, in recession periods).

In model pricing, models used might be hypothetical and/or based on a real transaction made in the past. Perhaps the most convenient way to implement the method is to rely strongly on actual data from recent past. A model could be, for example, based on a contract that was made in the previous period. Use of recent data has a number of advantages, like:

- Changes in market conditions will be better taken into account.
- Constant quality of service products will most likely be better ensured.
- Representativeness of service products and prices are better ensured.
- It is easier for respondents to estimate prices. Fresh data are available to make appropriate adjustments in cases when some features or characteristics of the service change.

On the whole, quality of results is expected to be better than when using a hypothetical model particularly if respondents have not undertaken any work in the area in the recent past and are not tendering for any such work. A hypothetical nature

of the exercise would increase considerably risks that estimates depend heavily on person who is actually giving the price estimate.

Available base data for pricing might differ depending on the service and service provider. Typically, they include data on charge-out rates applied in service projects and various data on costs. Detailed enterprise data on the on previous period and similar data on the period under survey, provide the best possible framework to capture price development.

The starting point is to select a specific service and describe the details of that service. The respondent is asked to price the same service in t and $t+1$ rather than assuming from the outset that required working hours by staff category determines a service as in the hourly rate method (see section 2.9). That means that although price changes are mostly stemming from changes in hourly rates, overhead and profit, some changes might also originate from changes in the number of working hours and other features. Specifically, if a different number of hours or a different mix of personnel and their hours are required to provide the exact same service or contract in $t+1$, then those factors have to be updated and the resulting changes shown as price changes. Note, however, that if the resulting price changes are large then the respondent needs to be contacted and asked to explain why such a large change in number of hours is required to provide the same service.

Changes might be a result of technology changes or regulation changes which mean that the exact same output is provided with a change in the amount of inputs. In this case recording the difference as a price change is fully justified. On the other hand, if it can be concluded that the change in inputs really does result in a change in the output (or the service being provided), then the change is not a price change. The information can be used in updating the service description but the price change is to be linked out.

Box 5: Example of model pricing

Model pricing applied in Sweden for Sea transport of goods (NACE 61), Freight transport by road (NACE 60.24) and Other transport agencies (NACE 63.400):

Enterprises are asked to choose a representative contract that they had entered into with another enterprise during the previous quarter. They are then asked to imagine that this contract was renegotiated in the current quarter, with the same variables as during the previous quarter.

Because the respondent is being asked to price the same service in period $t-1$ and t , the unit of measurement is actually a price movement. This differs from the normal situation where a respondent is asked to provide only a price for each sampled service product for the current period of reference. Therefore, in using this

method, the reported price movements collected each period for the model should be linked together to measure the evolution of price.

A problem with model pricing is that the workload imposed on the respondent is relatively large even in cases when models are based on service products recently provided by enterprises. However, in many situations there are no replacements available that would better capture price development.³⁶

2.9 Pricing based on working time

2.9.1 General remarks

Pricing based on working time differs from other pricing methods in the sense that the price of the service finally provided is not identified but prices of time spent in service provision are used instead. Services are assumed to correspond directly or predominantly to different types of chargeable hours, actually worked for a client.

At first sight, there is nothing wrong in using prices of chargeable hours in SPPIs. They look like any other prices and are similarly observable by clients and price statisticians. Still hourly rates represent pricing mechanisms rather than prices of real services. The price of a real service is made up of all payments to the service provider and it is the total price rather than hourly rate, of which purchasers of services are finally interested in and which price statisticians should, if possible, collect. How valid prices based on time-based pricing method are for direct use in SPPI depends largely on services concerned.

Characteristics of the method based on prices of working time become apparent when a time-based index is used in deflation. If a price index is assumed to equal the development of hourly rates, the resulting volume measures the time devoted to the service provision (number of working hours) rather than the volume of services themselves. No change in productivity is reflected in these measures except the one stemming from changes in the staff structure – productivity development is slightly positive if the share of higher-paid staff goes up and is negative in reverse case. Within each staff class productivity change is not picked up.

The assumption of unchanged productivity in each staff class is very strong particularly in a situation where the staff structure is under change. Changes in the staff structure often mean that the contents of work change within categories. For example, an increased share of professionals might mean that professionals take over, with help of advanced technology, some tasks that support staff had before. Thus, counter to the principles underlying the method, the volume and contents of

³⁶ On the use of model pricing, see http://www.voorburg.scb.se/Australia_Voorburg01_Legal.pdf. The document includes an example how model pricing is applied for Legal Services in New Zealand.

professionals' work change. An adjustment procedure is needed, because of a quality change of the unit priced, the chargeable hour. It depends on actual situation and data availability how adjustments are made in practice.

Acquisition of office machinery, software and other capital are expected to improve "real" service output and productivity. The time required in the service provision might shorten and the quality of services might change. Thus, SPPIs based solely on time worked for clients, tend to be biased particularly in those service industries where capital is greatly used in production.

Nevertheless, hourly rates represent observable pricing mechanisms and are a natural starting point for the compilation of SPPI. For some services better options than hourly rates are hard to find. In these cases the resulting SPPI might be meaningful in the short-term but in the long-term a risk of bias is imminent depending on the type of service. There are very few market services where no productivity development can be expected.

Note that methods based on working time are sometimes used also when the pricing mechanism is other than time-based as, for example, in the case of an *ad valorem* pricing. An underlying assumption is in this case that variations of fees (including zero fees) are reflected as changes in prices. Consequently, when the price index is used for deflation, the resulting volume of services corresponds to working hours.³⁷

2.9.2 Time-based methods

Several time-based methods can be distinguished that are briefly discussed in this section. In principle, they can be classified into two main categories:

- Methods that measure *directly* prices of working time spent in the provision of services.
- Methods that do not measure directly prices of working time but use *time-based measures as a part of estimation* and, thus, the resulting price is predominantly time-based.

A problem to be encountered is that the method is sensitive to changes in the scope of billable working hours. For example, if support staff is ceased to be charged separately and charge-out rates of professionals increase to account for this, then the resulting price index would increase and in theory the estimate of volume change for the industry would decrease after deflation even though the actual service output is unchanged. Put differently, savings gained by a more efficient use of staff are not reflected in prices but the index becomes upwards biased. A similar example is where charge-out rates for professionals increase due to application of new

³⁷ See section 4.11. Legal activities.

technology, which allows them to complete tasks quicker thus reducing their billable hours whilst providing the same service to clients.

Therefore, when using the time-based methods, a statistical office needs to be vigilant to try and identify if changes in the coverage of billable hours have taken place and to adjust for them as appropriate (i.e. by splicing out any changes in charge-out rates which do not relate to pure price change). This can be achieved by a variety of mechanisms, for example through querying changes in hourly rates by asking specific questions on the form whether the setting of charge-out rates between the previous two periods has been influenced by factors such as changing technology, administrative reorganisation, changes to billing structure etc. Adjustments might improve an SPPI at least by eliminating some volatility in prices. However, to make adjustments properly, service products have to be explicitly or implicitly identified, in which case the method would fall into the category of model pricing rather than belonging to time-based pricing.

2.9.2.1 Direct measurement of working time

The target measure is directly the price of chargeable working time. Thus, the method is in principle straightforward. Availability of price data varies, however, in practice and therefore the method has several variants.

a) Hourly charge-out rates

The hourly charge-out rate method represents the simplest case where transaction prices are available by labour categories. Respondents provide average hourly rates charged subdivided by type of labour that can be taken directly from ongoing projects or newly concluded contracts, or – more subjectively – they can reflect the respondent’s estimate of the general market situation. The overall price change is a weighted average of changes of charged hourly rates in different labour categories:

$$P_t = \frac{\sum_i h_t^i r_t^i}{\sum_i h_t^i} ; P_{t+1} = \frac{\sum_i h_{t+1}^i r_{t+1}^i}{\sum_i h_{t+1}^i}$$

where P_t = price in period t
 r_t^i = average hourly charge-out rates in staff class i in period t
 h_t^i = hours worked in staff category i in period t

In the method, prices are estimated as weighted averages of hourly rates. Another kind of charge-out rate method is where average hourly rates for staff classes are used as such in an SPPI. These kinds of *unit rates* are called average “realised hourly rates” in the Netherlands and “fee income per grade

of worker” in UK. As with all unit value indices, the homogeneity of the classes is an issue.

$$P_t^i = \frac{R_t^i}{h_t^i} ; P_{t+1}^i = \frac{R_{t+1}^i}{h_{t+1}^i}$$

where P_t^i = price (unit value) in staff category i in period t
 R_t^i = total of revenues in staff category i in period t
 h_t^i = hours worked for clients in staff category i in period t

Box 6. Example of a PPI based on realised hourly rates

The income in Euro's and the number of hours worked are provided in each period via the survey. From these, the realized hourly rate is calculated as their ratio (for instance, in the top line 147 991 / 2 980 = 50 € per hour). After calculating these realized hourly rates for both the base period and the comparison period, an item index is calculated for each item. In the example below, the hourly rate of the experienced drawer in the two periods are 50 and 55 € per hour respectively. The item index for experienced drawer is 55 / 50 = 1.10.

Base period				
	Income (€)	Hours worked	Realized hourly rate (income/hours worked)	
	(a)	(b)	(a) / (b)	
Experienced drawer	147 991	2.980	50	
Consultant-engineer	18 000	226	80	
Designer	163 090	1 624	100	
Senior project manager	47 010	471	100	
Comparison period				
	Income (€)	Hours worked	Realized hourly rate (income/hours worked)	Item index
	(a)	(b)	(a) / (b)	
Experienced drawer	100 200	1 809	55	1.10 (=55/50)
Consultant-engineer	22 456	313	72	0.90
Designer	120 668	1 050	115	1.15
Senior project manager	50 505	533	95	0.95

b) Hourly list rates

Transaction prices of working hours are not always available. However, many companies compile a list of external commercial hourly rates for different staff levels. The classification of labour might vary between enterprises. These base data are easy to use in an index. On the other hand, some enterprises, particularly small ones, may have individual rates per person that are typically drawn up once per year and, moreover, the rates might often serve as a reference rather than as the charging rates actually transacted. If so, adjustments based on the difference between realised and implied revenues are of particular importance:

$$P_t = \frac{R_t}{R_t^*} \times \frac{R_t^*}{\sum_i h_t^i} \quad ; \quad P_{t+1} = \frac{R_{t+1}}{R_{t+1}^*} \times \frac{\sum_i h_t^i r_{t+1}^{i*}}{\sum_i h_t^i}$$

where P_t = price in period t
 r_{t+1}^{i*} = average hourly list rate in staff category i in period t+1
 h_t^i = hours worked in staff category i in period t
 $R_t = \sum_i h_t^i r_t^i$ total of realised revenues in period t
 $R_t^* = \sum_i h_t^i r_t^{i*}$ = estimated total revenues in period t

As in the case of hourly charge-out rates, the method can be applied also separately for individual staff categories (unit rates).

The ratio of realised and implied revenues could be interpreted as an average discount rate, and sometimes it might be simpler to estimate it directly rather than by using total revenues as the basis. As in the case of normal discounts, there is no need for adjustments if discounts are the same in consecutive periods.

Results of the method are closely comparable with the ones of the hourly charge-out rate method. To be exactly the same, adjustment for discounts should be made and, in addition, the relative differences between real and list prices should be the same in all categories of labour.

c) Wage rates

Sometimes no charge-out rate data are available because the invoicing is based on a system other than the direct use of hourly rates. Instead, data on hourly wage rates might be used as a starting point in these cases. Respondents are asked to provide data on wages for a number of classes of professionals and additionally the number of hours worked for clients by each class. A strict precondition is, however, that wage rates are adjusted to correspond to revenues. This means that wage rates have to be multiplied by an estimate on the ratio of revenues and wages.

$$P_t = \left(\frac{R}{W} \right)_t \times \frac{\sum_i h_t^i w_t^i}{\sum_i h_t^i} \quad ; \quad P_{t+1} = \left(\frac{R}{W} \right)_{t+1} \times \frac{\sum_i h_t^i w_{t+1}^i}{\sum_i h_t^i}$$

where P_t = price in period t
 w_t^i = average hourly wage in staff category i in period t
 h_t^i = hours worked in staff category i in period t
 R_t = total of revenues in period t

$$\left(\frac{R}{W}\right)_t = \text{revenue/wage ratio in period } t$$

Like in case of hourly charge-out rates and hourly list rates, the method can be applied also separately for individual staff categories (unit rates).

Box 7. Example of a PPI based on wage rates					
The data in the first two lines are surveyed. If the wages change only twice a year, bi-annual surveying suffices. The revenue/wage ratio (R/W) on the other hand changes faster. The price is the average wage multiplied by the R/W ratio (third line).					
Quarter	1 (base)	2	3	4	5
Wage	40 euro	40 euro	41 euro	41 euro	45 euro
Revenue/wage ratio (R/W)	2.00	1.90	1.85	1.95	1.90
Price (wage * R/W)	80.0 euro	76.0 euro	75.9 euro	80.0 euro	85.5 euro
Price index (quarter 1 = 100)	100.0	95.0	94.8	99.9	106.9

The wage rate method is very sensitive to the estimation of the revenue/wage ratio and, therefore, a strict correspondence between revenues and wages is

essential. Note particularly that revenues should be **net of any sub-contract costs** to provide comparable prices for consecutive periods. With a high quality ratio, results of the wage rate method are closely comparable with results obtained when using the previously described time-based methods. Whether the quality of results is better or worse depends, which one of the scales, wage or charge-out rate scale, reflects better differences in the performance of staff in various categories of labour.

d) Other direct measures of prices of working time

Sometimes data on working time are not available at hourly basis but can be found e.g. in terms of working days. In these cases procedures are in principle the same as in the case of hourly rates. Only the unit used in the estimation is less precise and this may influence the accuracy of results.

2.9.2.2 Methods predominantly based on prices of working time

The category “methods predominantly based on prices of working time” is reserved for practices where a price is not directly time-based but time-based measures are used as building blocks in the price estimation. In other words, the resulting price is not fully measured in terms of a clearly specified service. For example:

- Prices are made up of several sub-components that include, for example, compensation for a fixed number of hours of work to provide a given service. As explained in section 2.6, a risk of bias would be in this case particularly high if time-based prices were used for sub-services that are under strong technological development, and when their weight in the price is high.
- Prices are virtual and, thus, resemble model pricing but the working hours underlying the price are straight away assumed the same as in the previous period rather than based on genuine evaluation.
- Prices are margins that are associated with services of which price index is measured using a time-based method.

As pointed out before, an important aim of the classification of pricing methods is to monitor the characteristics of resulting price indices. Therefore, it is essential to separate time-based methods from those ones where price evolution of identical services is targeted. This category of methods is, however, a mixture of both approaches. To achieve a better transparency of SPPIs, it is desirable that methods belonging to this category are not widely in use.

3. Practical aspects of the development process

3.1 Introduction

All industries have their unique structure and elements that make service price collection a challenging task. The purpose of this chapter is to outline a practical way to start compiling the industry-specific indices. Box 5 shows the main phases that should be accomplished when developing a price index for services industry. After that each of the phases is discussed separately.

Box 8. Main phases of the development process

- A. Drafting an industry description
- B. Internal discussions in NSIs
- C. Meetings with the trade organisations that are working in the field
- D. Methodological aspects (not in chronological order)
 - a. Contacting enterprises
 - b. Forming the sample frame
 - c. Services identification
 - d. Pricing methods to be proposed to enterprises
 - e. Weighting structure
 - f. Index formula
- E. Pilot survey
 - 1. Selecting the pilot enterprises
 - Choosing the sampling method and selecting the sample
 - Investigating the weights structure for all levels
 - 2. Drafting the questionnaires, instructions and selecting the pricing methods
 - 3. Compiling indices
 - 4. Quality assessment
 - 5. Return to trade organisations
- F. Sample design of full scale survey and derivation of index weights
- G. Continuous data collection
- H. Index calculation and quality checks

The process described here is presented in a linear form, even if some phases could be repeated after another. For example, the phases from A to D are deeply linked and could have been presented in a different order. It is clear that the trade organisations have a great impact on the quality of the whole process. In some countries and/or in some industries, information from trade organisations is disseminated more widely than in others. The national statistical institute is sometimes able to have a first, detailed view of the industry before meeting the trade organisations. A feedback from the trade organisations is important at many stages of the process.

The whole process of establishing new indices in an industry is quite long. Generally, the national statistical institutes should not expect less than 2 years from the beginning of the process to the publication of an index. (See also Annex 1 of this chapter).

Further, price compilers must continue to observe and maintain sample prices after development process. Details are in Chapter 3.9.

3.2 Industry description

As the first step in developing a new service industry index³⁸ it is recommended that an industrial analysis be done. This pre-study may have different forms and may be partly industry specific but at a minimum it should include the following information:

- Organisations and trade associations working in this service industry.
- Scope of the service industry. What does this service industry include?
- Brief description of main services under this industry.
- Price determining factors
- Possible sources of the turnover data at service and enterprise level (if additional to Structural Business Statistics).
- Distribution turnover between different services.
- Overview methods used in other countries.

³⁸ Note that “industry” means here that service products are aggregated by 4-digit industrial classification. The index includes service products provided as principal and secondary production.

This pre-study can then be used as the starting point when the actual pricing specifications and pricing methods are considered. It will provide useful information how to divide the services into main groups and how these groups could be weighted to obtain the total aggregate of this service industry.³⁹

3.3 Contacts with trade organisations

It is useful to establish connections with trade organisations and other associations that are working in this industry. First of all, the associations or organisations may be able to help statisticians to get a better understanding of the industry such as overview of the target groups and activity fields and problems faced in the compilation of SPPIs. They may also provide help in drafting service specifications and in forming a more detailed sampling frame. The trade organisations have a good contact surface to enterprises and may assist in finding right contact persons in individual enterprises.

3.4 Methodological aspects

3.4.1 Sampling frame

The situation concerning possible sampling frames may vary a lot from country to country. In many countries the business register or national accounts provide one possible source of sampling frames. Business registers normally have information on turnover, number of employees and the main industry, but they usually lack information about the establishments or turnover information by service categories. Sometimes an additional survey is needed to derive reliable weights for enterprises or the services provided by the enterprises. The trade organisations, regulatory authorities or market studies carried out by third parties may give additional information. In extreme cases the frame might be structured on the basis of additional information obtained from the telephone directory or the internet.



3.4.2 Service identification

For each group of services (for example CPA classification of service or the more detailed service heading that has been identified during the planning) a set of specific representative services need to be fully specified for pricing. These services should be typical of the price movements of the range of individual services within

³⁹ Examples of the industrial description can be found in the website of statistics Sweden: http://www.scb.se/templates/Standard_29560.asp

the service group under consideration. These service specifications are different for each individual service product.

The purpose of a good service specification is to ensure that a consistent price is collected from period to period, relating to a consistent service with the same terms of sale in each period. The following table lists some of the criteria that could affect the price of a service and could form part of a specification. Obviously the list is not comprehensive and may include additional criteria in different service industries or enterprises⁴⁰.

Box 9. Service specification	
<i>Specification</i>	<i>Short explanation</i>
Name of service	Enterprise's name for the service within the specific service group. For example day-to-day bookkeeping.
ID number	If the enterprise has the ID number for the specific service, that can be used. In most cases it is very likely not available.
Description / Coverage of the service	The enterprise should specify what the service includes in as much detail as possible. For example list of individual tasks included. In bookkeeping for instance. The day-to-day bookkeeping includes at most 50 entries a month.
Unit of sale	Units used in describing the service (for example minutes, hours, entries, documents or tasks)
Customer	Pricing structure might depend on customer (or the size category of the customer). A reference number can be used to maintain customer confidentiality.
Discounts	All applicable discounts should be described
Location	The price of the service may depend on the place where it's supplied
Payment terms	The different payment or credit terms may have different prices.

⁴⁰ Examples of the product specifications that have been used in different industries can be found in Chapter 4. See also the PPI manual, Chapter 10, where compilation of SPPIs for some services is discussed.

3.5 Pilot survey

The pilot survey is the vital part of the development process. Different pricing methods can be tested in practice and then the most suitable selected. The test survey can also provide additional information about the price variability between the enterprises and so provide valuable information on the sample size. During the test survey the product identification and the questionnaire should be improved in co-operation with the enterprises. After the pilot survey has been carried out successfully and it is confirmed that the questionnaires and the pricing methods are plausible then the survey can be extended.

Ideally the sampling unit is the establishment/KAU, but in practice an enterprise is often used. The selection of enterprises into the pilot survey should be done using the same method planned for the production survey. It is common that service price indices are developed industry by industry. This allows a different sampling strategy to be used in different industries.

Due to information restrictions, it can be hard to obtain the sample size using statistical procedures. Sample size may be determined by using some fixed, expected coverage rate or by taking the decision on the basis of the resources available for the survey. The sample size in the pilot study is normally smaller than in the production phase. A more detailed description of different sampling methods and stratification criteria can be found in the PPI Manual, Chapter 5.

The questionnaire and instructions should be drafted before contacting enterprises. In many cases the international service classifications are not detailed enough to specify a unique service that can be repriced from period to period. These international classifications (for example CPA) are mainly referring to certain families of services that belong to this wider group because they have common end-use or are considered to be close substitutes. Information from industrial descriptions and trade organisations can be used to complete the classification information to form more detailed service headings that all belong to the same family of services.

Depending on resources the enterprises may first be contacted by personal visits, or by phone or mail (post or e-mail). When the right contact person has been found inside the enterprise it is very important to have detailed discussion with her/him on the purpose of the index. The services that are going to be priced and their detailed specifications are decided in co-operation with the enterprises⁴¹.

⁴¹ Ideally, the selection of services would be undertaken from a complete census of the relevant transactions. Obviously, in most cases this information is not available.

3.6 Treatment of quality change

3.6.1 Preparatory work for handling quality changes in service products

During the developing process, it is important to discuss with price collectors about procedures how to handle quality changes in service products. Preferably, guidelines on this can be provided at the same time as sample price specifications are discussed.

Needs for price replacements are encountered continuously in the index compilation. Therefore, preparedness for changes in the market and service products should be enhanced and maintained as far as possible. Particularly the following subjects need to be addressed in discussions with the price collectors and enterprises:

1. expected changes in the representativeness of services,
2. expected changes in the quality of services,
3. quality adjustment methods to be considered, and
4. data availability for implementing quality adjustments.

Possibilities to predict all changes are, of course, quite limited in practice but still efforts should be made. Advance preparations would better ensure that price replacements and the quality adjustments can be carried out quickly when necessary.

3.6.2 Examples of quality adjustment methods

In principle, the same quality adjustment methods can be used for services as for goods. In practice, fewer possibilities are available for services and also the usability of various methods differs between goods and services. This is illustrated in Box 7 that compares the use of quality adjustment methods for goods vis-à-vis services in Japan. The table shows that only for one third of services a quality adjustment method could be found whereas for more than half of goods an adjustment could be made.

Box 10: Use of various quality adjustment methods in corporate price indices in Japan, 2003

	Services		Goods	
	number of cases	(%)	number of cases	(%)
Production cost	65	9.1	269	17.3
Overlap	30	4.2	49	3.2
Hedonic regression	2	0.3	52	3.4
Direct comparison	125	17.5	428	27.6
Unit price Comparison	0	0.0	20	1.3
Impossible to compare	489	68.5	727	46.8
Others	3	0.4	7	0.5
Total	714	100	1 552	100

This section describes examples on the use of quality adjustment methods for services. The examples are based on experiences in Japan⁴² where methods used for SPPIs are:

- Overlap method
- Comparable replacement
- Quantity adjustment
- Differences in production and option costs
- Hedonic approach

Each method has both advantages and disadvantages. The choice between various methods depends on service characteristics and data availability.

Overlap method

The overlap method can be used when old and new products are transacted simultaneously during a certain period of time and, thus, making possible to link prices by using observations in the overlapping period as a link. An implicit assumption in the method is that the price difference between the old and new products reflects entirely differences in quality.

A major problem in the method might be that the old product is at the end of its lifespan and the new one is entering the market and, consequently, the market is not necessarily in equilibrium. This situation is encountered particularly if the service

⁴²See the following papers; Moriya K., Utsunomiya K., Quality adjustment in practice: Case studies in the Corporate Service Price Index (CSPI), the 18th Voorburg Group Meeting, Japan, October 2003; Hirakata N., Kouju A., Utsunomiya K., Quality adjustment method in prepackaged software in Japan's 2000 base Corporate Service Price Index, the 19th Voorburg Group Meeting, Canada, October 2004; Ugai H., Quality adjustment of service prices, November 2001, Bank of Japan.

products concerned are under strong technological development and, as a result, old services rapidly lose their attraction while new ones gain ground. Also in the case of slower progressing service products, a similar instability of the market might be a result if aggressive price competition is used as course of action to penetrate the market. Correspondence between the differences in prices and qualities does not hold in these cases.

Box 11: Outdoor advertising

For “outdoor advertising”, an advertisement is specified based on size and location. If one of advertisement contracts expires, the sample price is replaced for another. In this case the overlap method is often used providing that the new sample price has coexisted with the old one and the price difference between them has been relatively stable in the past.

Comparable replacement

When no quality difference exists between old and new service products, the direct comparison method – which incorporates the prices of new service products into the index by comparing them directly with those of old services – can be used. A typical example of these cases is when the name of a service product has changed but not the service itself, or cases in which the reporting enterprise has changed due to affiliations but transacted services and transaction conditions have remained the same.

Box 12: Domestic air passenger transportation

Air tickets might be sold during a limited time (e.g. in the holiday season) at discount or by different names. If the quality of services, cancellation rights and terms of payments etc. are largely unchanged, comparable replacement is a sound method to be applied in these cases.

Quantity adjustment

Quantity adjustments are used in cases where the specification of service products is based on a given standard that slightly changes from the previous period. In these cases prices can sometimes be expressed as unit prices which makes it possible to establish price comparison between periods. Examples of these kinds of services are taxi transportation and newspaper advertising where prices are set up based on given standards. The method should, however, be applied with caution and only if changes in standards are relatively modest.

Box 13: Newspaper advertising

In newspaper advertising, the size of standard advertisement is increased from 36.85 to 44.28 square centimeters (from 5.5 x 6.7 to 5.4 x 8.2 centimeters), and the price increases from 903.2 yen for the old sample to 1 085.5 yen for the new sample. No price change is shown, because the unit price remains unchanged (24.51 yen per square centimeter).

Differences in production and option costs

The production/option cost method is typically used in a situation where an old service product is replaced by a new one and there is no overlapping period where a representative set of prices are available for both services at the same time. In the method, the quality difference between the old and new products is measured based on the assumption that changes in production costs reflect directly the quality difference between service products. An advantage of the method is that as long as data can be obtained from surveyed enterprises, the information can be incorporated easily. The index compiler has to constantly exchange information with enterprises to judge to what extent changes in production costs really correspond to changes in quality.

The method is applicable for services that undergo simple changes rather than change in terms of contents. It is particularly convenient in a situation where only the specified amount of service changes. Thus, the method is often used in situations where also the quantity method might be applicable. For example, it could be considered for cleaning services in cases when the area to be cleaned and/or the frequency of cleaning change.

Box 14: Building cleaning service

Frequency of cleaning is increased from six to eight times a month. Correspondingly, actual prices change from 1 000 euro in the old sample to 1 100 euro in the new one. The enterprise reports that the price of the additional cleaning is 130 euro.

Two alternatives could be considered to measure the price change:

$$\text{Alternative 1:} \quad 100 \times \frac{1100 - 130}{1000} = 97$$

$$\text{Alternative 2:} \quad 100 \times \frac{1100}{\left(1 + \frac{130}{1100}\right) \times 1000} = 98$$

Hedonic approach

The hedonic approach is used for products that are under rapid development and where sufficiently representative and robust prices cannot be found to cover overlapping periods. Instead of relying directly on prices of new and old products, a price comparison is established on the basis of the characteristics of products.

In market equilibrium and perfect competition, prices are supposed to reflect the importance of various characteristics of products. This makes possible to use actual data for identifying price determining factors and for establishing a regression model. The model can then be used for estimating an overall quality change of products whose characteristics change over time.

For services, price determining factors are difficult to identify or to measure. However, the hedonic approach is often used for those services that are related to goods undergoing strong technological development. An example is the rental of machinery like computers, whose price index might be based on a hedonic regression model.

Box 15: Computer rental

The rental of a notebook computer for six months costs 26 700 yen and increases to 38 900 yen. In the old sample, the memory size of the computer was 374MB and the clock frequency 1.0GHZ while in the new sample these characteristics changed to 768MB and 1.6GHZ. A hedonic regression model showed that the quality of the computer improved by 48.7 per cent.

The old sample price is adjusted to make it comparable with the new sample price: $1.487 \times 26\,700 \text{ yen} = 39\,703 \text{ yen}$. Thus, the price decreased by 2 per cent (change of prices from 39 703 yen to 38 900 yen).

3.7 Index calculation and quality assessment

3.7.1 Index formula

The index formula chosen for the elementary aggregates⁴³ can vary as a function of the sampling method, information available, specific nature of industry and resource restrictions. A more extensive description of widely used elementary aggregate formulas and their justification can be found in the PPI Manual, Chapter 20. When aggregating sample price relatives⁴⁴ within elementary aggregates, in many cases the geometric average may be recommended as the best micro index formula particularly when information on weights is not available. An advantage of

⁴³ An elementary aggregate is generally the lowest level within an index structure (i.e. family tree) for which reliable weights exist for the population of interest (e.g. relatively homogeneous group of service products), generally obtained from some source not directly related to the collection of prices (e.g. independent survey). Samples of prices are collected within each elementary aggregate.

⁴⁴ Sampled price relatives are the micro indexes of sampled prices contributing to the elementary aggregate

using geometric averaging is also that outliers have less influence on results. However weights may often be required for price relatives due to the sampling methodology used (see 3.7.2)

The index number formula used in the aggregation of elementary aggregates should be selected as a function of the indicator's purpose. Individual countries may have different priorities and the formulas may therefore differ from country to country. It is recommended that the EU member states should use a Laspeyres-type index formula that is in line with the EU STS regulation.

3.7.2 Weights and aggregation of an index

As discussed in sections 1.3 and 1.9, there are two common methods for aggregating data collected from enterprises to form a particular SPPI, usually at the 4-digit industry level. In the product SPPIs the aggregation is based on service products provided by any industry either as principal or secondary production, and in the industry SPPIs establishments/LKAUs (in practice often enterprises) are used first to compile a price index for the unit which are then aggregated to cover the whole service industry. Note that in both these cases the weights given to particular production units (i.e. establishments/LKAUs, enterprises) should reflect the inverse of their probability of selection, or at least be such that the weight of a selected production unit takes into account other similar production units it represents in the index. These weights are generally regarded as first stage weights. Second stage weights refer to the size of the production unit (e.g. total employment or preferably total turnover).

1) Product SPPI: aggregation through elementary aggregates or a 'family tree' of service products

If a product classification can be determined within a service industry, then this classification can be used to form an elementary aggregate or 'family tree' structure for an industry. The produced classification might originate from an existing classification (rare) or through a specific survey that has been undertaken (more common) or through advice from an industry association. Each of these elementary aggregate components is weighted according to the estimated proportion of production for these products within the industry. Using this approach, surveyed businesses will contribute one or more sample price relatives⁴⁵ to the elementary aggregate structure⁴⁶. The weight of a

⁴⁵ In this context, following from the previous footnote, a price relative refers to a service product surveyed within the enterprise for which a micro index has been estimated. This micro index could have been made up of one or several price quotations for similar service products provided by the enterprise. In the case of several service products contributing to the micro level index, equal weights would generally be used in forming the micro level index at the firm level unless the firm had very detailed information available to allow different percentage weights to be used at this micro index level.

sample price relative will be equal to the production units' first stage weight multiplied by a proportion of its second stage weight. This proportion should equal the estimated proportion of its total production on service products represented by the elementary aggregate component that the sample price relative is contributing to. See box 7 below as an example of this weighting methodology.

An advantage of this form of index aggregation is that sub-indices for service products (i.e. which form the elementary aggregate structure) are produced which may be a useful output if deemed to be of suitable quality. A potential disadvantage of this method is that it relies on the relevance of the product classification forming the family tree structure.

2) Industry SPPI: aggregation of firm level indices

Another possibility is to first form specific indices for each production unit (e.g. establishment) in the survey. These specific price indices are then aggregated together to form the service industry index, where the relevant weights are the multiplication of the enterprises' first and second stage weights as described above. The advantage of this method is that the production units can use their own familiar service classification, so that the potential classification bias can be reduced. Within a production unit, sample price relatives may or may not be weighted depending on the diversity and relative production values of the different service products produced by the unit.

As pointed out in section 1.3, product SPPIs can in general be regarded as preferable. A drawback of industry SPPIs is that the production unit may produce services that are officially classified for some other industry than the one that is their main activity. However this could possibly be corrected to arrive at product SPPIs by moving certain price relatives to contribute to the aggregation of appropriate 4-digit industry. Another serious shortcoming of industry SPPIs is that the method is unable to provide information about price development of individual services (e.g. as provided through the elementary aggregate structure described in method 1 above). This is especially problematic if the service industry in question includes a large number of different service groups.

⁴⁶ Note, a business will only contribute a specification to a component of the elementary aggregate structure if it has significant production for the particular service product in question. Thus one does not expect a business to contribute specifications to each component of the indices' elementary aggregate structure.

Box 16. Weighting example for product SPPI of 4-digit level industry xxxx

Industry survey showed that the industry xxxx produces 4 main product groups y1, y2, y3 and y4 with approximate shares 20%, 30%, 15% and 35%. This defines the elementary aggregate structure for the SPPI.

5 establishments are chosen in the sample for industry xxxx using PPS sampling⁴⁷. They have the following characteristics:

Establishment	Probability selection	Turnover	Shares of y1, y2, y3 and y4 on turnover, %	Price quotations within product groups taken for each establishment
A	1/5	100	(0.25, 0.25, 0.5, 0)	(1, 2, 3, 0)
B	1/8	70	(0.7, 0, 0, 0.3)	(4, 0, 0, 2)
C	1/10	40	(0, 0.4, 0, 0.6)	(0, 3, 0, 3)
D	1/50	10	(0, 0.5, 0.5, 0)	(0, 3, 3, 0)
E	1/100	4	(0, 0, 0, 1)	(0, 0, 0, 4)

For each establishment, price quotations (specifications) within a product group have equal weights. Price relative for each specifications are aggregated geometrically to form an enterprise level price relative for the product group. These price relatives (micro indices) must then be weighted together with other enterprises' price relatives to form the elementary aggregate (i.e. product group) indices.

	Establishment	1st stage weight ⁴⁸	2nd stage weight	Total weight (1st x 2nd)	Elementary index weight for enterprise price relative
Product group y1	A	5	100 x 0.25 = 25	125	125/(125+392) = 0.24 0.76
	B	8	70 x 0.7 = 49	392	
Product group y2	A	5	100 x 0.25 = 25	125	0.23
	C	10	40 x 0.4 = 16	160	0.30
	D	50	10 x 0.5 = 5	250	0.47
Product group y3	A	5	100 x 0.5 = 50	250	0.5
	D	50	10 x 0.5 = 5	250	0.5
Product group y4	B	8	70 x 0.3 = 21	168	0.21
	C	10	40 x 0.6 = 24	240	0.30
	E	100	4 x 1 = 4	400	0.49

Having produced SPPIs at a 4-digit industry classification, there may be a desire to aggregate these to higher levels (e.g. ISIC division level) to form macro level indicators, which may be of particular interest to central banks or treasuries monitoring inflationary pressures. The most appropriate source of weights for combining 4-digit industry level indices to higher aggregates within the industry

⁴⁷ Probability proportional to size (PPS) sampling is recommended in the PPI manual, see pages 113-114 of this manual for a worked example. In simple terms, the probability of an establishment being selected in the sample is proportional to a measure of size for the establishment obtained from the sampling frame (e.g. turnover). Consequently the larger the measure of size of the establishment the higher the probability that it will be included in the sample.

⁴⁸ The first stage weight for an establishment is equal to the inverse of its probability of selection

classification would be industry based statistics on value added from the national accounts (often input-output tables).

3.8 Quality assessment

Quality assessment is extremely important when a new pilot study has been started. This is not to say that the work can be stopped when SPPIs are compiled regularly. Quality assessment procedure is discussed below from two points of view, first looking assessment of SPPIs per se and then assessing SPPIs from the point of view of national accounts. The assessment procedures are based on experiences in Netherlands and Switzerland.

Assessment of SPPIs (Netherlands)

Evaluation of different pricing methods should be done at the end of the pilot phase to compare the methods and choose one. Box 8 below lists the evaluation criteria that are in use in Netherlands.

Box 17. Assessment of SPPIs in Netherlands

- Ability to approximate transaction prices
- Objectivity (for example, a charge out rate is more objective than reprising a project, because reprising can be dependent on the person who estimates the price)
- Pricing frequency
- Continuity (How long can this pricing method be applied without a change)
- Practicality (it is a severe drawback if a method is too difficult and takes a long time to implement or is expensive to maintain)
- Transparency of the method
- The response rate
- Plausibility of the results
- Response burden (measured in the time that respondent need to fill in the survey)
- The opinion of the pilot-study respondents about the methodology

The criteria matrix is formed from these criteria. Each point is scored (for example very positive (++) , positive (+), neutral (0), negative (-), very negative (--)). The criteria are also weighted (high (A) or low (B)). This is somewhat subjective and

depends on the person who fills in the matrix, yet it provides an easy way to compare the methods with each other. An example of criteria matrix is shown in appendix x.

Assessment of SPPIs from the point of view of national accounts (Switzerland)

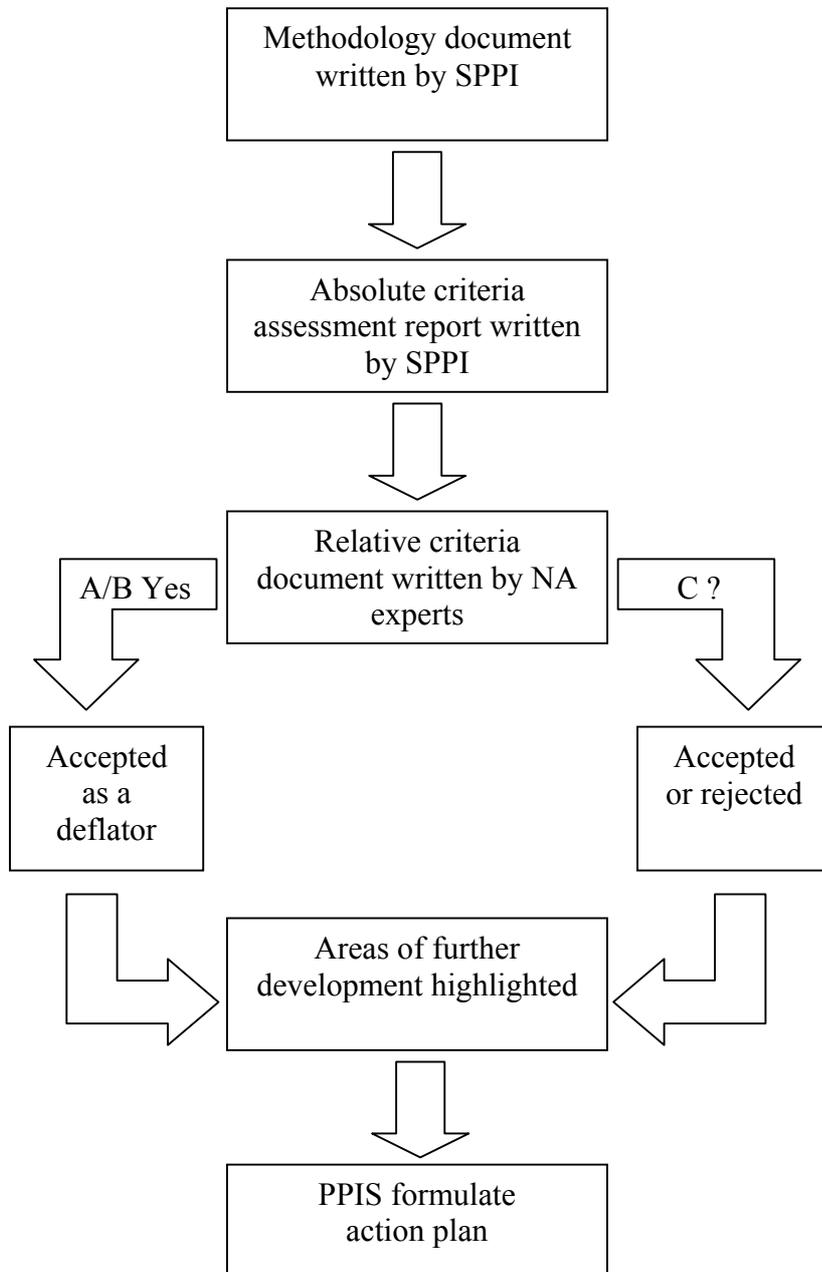
Another way of assessing SPPIs is to consider their quality as a national accounts deflator. The criteria that are used in the evaluation can be divided into two groups: absolute measures that indicate how reliable the SPPIs are in their own right, and relative measures that compare the SPPIs to deflators that are used currently.

The criteria for the absolute measure can be divided into following groups:

- Statistical properties of the survey
- The definitions and specifications of the variables (should be in line with the NA definitions and specifications)
- Periodicity of data collection, timeliness and length of the series
- Quality checks (ability to explain erratic movements) and periodicity of index revisions
- The transparency and available documentation of the production and quality assessments

The relative criteria assessment is done by national accounts experts who will classify the method used into A, B or C method according to classification proposed in Eurostat's handbook on price and volume measure in National Accounts. A more extensive treatment of the quality assessment criteria of SPPI for deflation can in Eurostat's handbook on price and volume measure in National Accounts. A flow chart of quality assessment process is shown below:

Figure 2. Flow chart of quality assessment project



After the quality assessment has been carried out properly and the necessary actions have been taken to improve the survey, the full-scale data collection can be started. The extension of the survey proceeds in similar manner to the pilot survey.

3.9 Maintaining the quality of service prices

Maintenance of service price quality is an unavoidable task in the compilation of price indices. Ideally, prices for a representative set of service products could be surveyed from one period to another but in practice the market changes continuously. New services appear replacing old ones. For example, in the telecommunication sector the new opportunities of UMTS technology may provide new service products that are swiftly adopted by the enterprises. Sometimes services as such remain unchanged but the pricing mechanism might change and, consequently, pricing methods have to be changed. Also the business demography might be changing which might influence needs to revise the sample frame. For all these reasons, maintaining representativeness of the sample and at the same time capturing pure price changes in the survey data for a SPPI is a challenging task.

The maintenance work of service prices thus includes 1) evaluation of the representativeness of service products in the sample, 2) continuous observation of sample price specifications, 3) replacements of sample prices. Use of representative products in a SPPI is an essential precondition for monitoring correctly the evolution of prices. Confirmation of sample price specifications is of the utmost importance in ensuring that the prices of the same products are followed over time. When sample prices are replaced, quality adjustments should be made when necessary.

The maintenance work has to be done after the periodical price survey starts and within the cycle of the survey period. To get the maintenance work over timely, accurately, and efficiently, the price compilers need to be prepared in advance. They have to reserve time for discussions with reporters on changes in the market and possible solutions. Proper preparation for surveys is in general time consuming, and it is possible that not enough time is available for all maintenance tasks during the survey periods. Therefore, focusing on maintenance work outside the current periodical surveys (e.g. half-annually or annually) is a practice worth considering.

Further information on the maintenance of price index can found particularly in Chapter 8 of the PPI Manual.

Appendix 1: Stages in the development of SPPI - an example

Stages in the development of SPPI for business, management and consultancy activities (74.14 NACE) in France (the index will be finalised in 2005 with base year 2004)	
Year 2003	
January-February	Preliminary study of the sector : INSEE figures, web sites, trade organisation figures
February	Meeting with the trade organisation to present the project of this new index
May	Second meeting with the trade organisation on the consulting management index only
June 18 th to July 8 th	Four test-visits into companies: Accenture and Cap-Gemini, for example. Two big companies, two intermediate companies and one small company have been selected with the trade organisation. One visit was too late for the test.
July 24 th	Internal meeting on the different methods. The best practice recommended for this sector was average price by skill-level of employees (qualification).
August	Sample chosen For the product parts: Systematic sampling for the largest companies based on the annual statistics for services survey as a frame. Random sampling by stratum (turnover*product) below a threshold. For the consultancy part: judgemental sample because of the bad frame quality.
September	Beginning of the field officers visits.
Oct-Dec	Price collection began/Field officers' visits continue.
Year 2004	
May to September	Examination of the "difficult cases" in order to obtain a complete sample, with prices back to the 2 nd quarter 2003
September	Meeting with the trade organisation to show results
Year 2005	
First or second quarter	Public dissemination of the index

Appendix 2: Example on a criteria matrix for legal services

	Weight	Model prices	Realised turnover per hour	Charge-out rates
Approximation transaction prices	A	+	0	--
Objectivity	A	-	+	++
Frequency of measuring	A	-	++	-
How long does the method stand?	B	+	+	+
Practicability to take into production	B	+	+	+
Ease to explain	B	+	+	++
Response rate	A	-	+	++
Plausibility	A	-	+	+
Respondent burden	A	+	+	++
Opinion respondents	B	+	++	+

4. Compilation of SPPI for specific service industries

4.1 Introduction

This chapter is based on country practices and deals with feasible solutions to implement SPPIs in some specific service industries.

A selection of service industries has been made by the Task Force considering different criteria: the size of industries, the speed of technical change that is likely to affect price measurement, the need from the national accounts to have as soon as possible accurate deflators (i.e. using an A-method instead of other methods) and the economic trend in some service industries for which prices are more free nowadays.

An assumption of this chapter is that the view and the practice of one country are similar to those of another country. However, in each service industry, a paragraph is devoted to an overview of national methods.

As a preliminary choice exists to treat first some service industries, this chapter may evolve with time. This guide remains a living manual and will be updated at some stages with new inputs on new service industries from countries.

The service industries covered are listed below:

ISIC Rev 3.1.	NACE Rev 1.	Title
6023	60.24	Freight transport by road
611	61.10	Sea and costal water transport
621	62.10	Scheduled air transport
622	62.20	Non scheduled air transport
6301	63.11	Cargo handling
6302	63.12	Storage and warehousing
641	64.1	Post and courier services
642	64.20	Telecommunications
701	70.1	Real estate activities with own property

72	72	Computer and related activities
7411	74.11	Legal activities
7412	74.12	Accounting, bookkeeping and auditing activities; tax consultancy
7413	74.13	Market research and public opinion pooling
7414	74.14	Business and management consultancy activities
7421	74.2	Architectural and engineering activities and related technical consultancy (Here the Engineering part only is covered)
7422	74.3	Technical testing and analysis
743	74.4	Advertising
7491	74.5	Labour recruitment and provision of personnel
7492	74.6	Investigation and security activities
7493	74.7	Industrial cleaning (The ISIC 7493 corresponds to Building cleaning and industry cleaning activities)

The descriptions have the same format. The structure of the presentations is the following:

1. Description of the sector

This section gives a general outline:

- How the service industry is **organised** in countries: is the sector concentrated or not? What was the last sector's development? What are the uses of the service production?
- What are the price **mechanisms** and price determining factors of services in this industry?

2. Classification aspects and scope of the survey

This section shows in detail the classification used in the country referring to harmonised classification systems as CPC, NACE, ISIC. The discussion is also related to the final uses/users of the service. In some services industries the split of the services production between business and the rest may be difficult to be measured, which issue is addressed.

3. Sample design

The section describes the sample frame, the stratification criteria, the sampling methods (the most suitable theoretically or/and the most practical one). The section focuses also on any special features of the service industry.

4. Main pricing methods

The section provides a reason and clear recommendations or preferences on the pricing method(s) to be used, taking into account the specificity of the country.

The choice of an adequate pricing method is based mainly on:

- pricing mechanism;
- easy identification of the service quotation (e.g. in the business accounting system);
- adequacy in capturing quality changes;
- repeatability of the price quotation;
- response burden for businesses;
- resources in the NSO;
- timeliness of the data collection.

5. Costs and benefits of the alternative pricing methods

This section may describe the advantages and disadvantages of the alternative pricing methods compared with the main pricing method(s) of the section 4.

6. Quality issues

The section provides information what is the quality of services in this industry and how quality changes are dealt with. As the general principles should be covered in chapter 3, this section may describe how quality adjustments are made practice for specific services.

7. Collection of information and specification of the services

This section covers two topics: how the data collection is organized and what are the specifications of the service for the particular service industry.

The collection of information may include:

- description of the survey,
- different ways of collecting data (mail, field officer, web-based etc.),
- different treatments due to the business' size or due to the collection' frequency if any,
- description of the contact person in the enterprise,
- Etc.

The specification of the service to be quoted by the businesses is a very important issue. An adequate and accurate service's specification may secure the process of comparability over time and of quality treatment. In each service industry, this section

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should describe in details the characteristics of the service to be quoted. The specification may be illustrated by a survey form.

8. Specific aspects

This section may include the aspects of:

- export price indices;
- sub-contracting;
- indices maintenance (e.g. weighting system),
- future developments of the service industry,
- etc.

9. Overview of national methods

This section describes what services are covered in SPPIs in various countries and which pricing methods are used. Any other methodological issues can be mentioned here in the light of national experiments.

4.2 Freight transport by road

1. Description of the sector (ISIC 6023 / NACE 60.24)

The efficient transport of goods is a fundamental requirement of any modern economy and, within most nations. Road haulage may be proposed as the most important element of the freight-transport industry. This had led to the parallel development of SPPIs for road freight transport in many countries⁴⁹. A UK paper at the 2002 Voorburg Group conference has reviewed the different approaches taken by a number of nations.

Within the road freight industry, there are typically many companies, which compete effectively, avoiding issues of confidentiality. The industry structure and market share is relatively stable for road freight companies, which should allow re-weighting on a five-year cycle to remain representative of road-freight activity.

2. Classification aspects and scope of the survey

Traditionally, activities of companies engaged in road haulage were focused on simply providing the physical means of transporting goods from point A to point B, with a small minority having an ancillary, but less important, interest in providing storage and warehousing facilities for goods in transit. As a result, the task of isolating and collecting data for the total activity of contracted road-freight services was relatively straightforward with the vast majority of in-scope companies being classified to ISIC v3.1 6023 (CPC v1.1 6433, 6434 and 6435). However, in recent years, the industry structure has changed and it is now a more complicated process to ensure that prices data, used in the compilation of a PPI, are truly representative of the entire road freight industry.

Although the volume of road freight business has remained buoyant in recent times, competition in the industry has increased and, in some sectors, it is now a story of too many road-freight companies competing for too little business. Many of the largest companies have opted to concentrate on specialist niche markets or destinations (such as some of those serving international destinations) and have also diversified, to offer clients a wider range of specialist, transport-related services. Indeed, many enterprises now describe their activity as the provision of freight logistics, designing and implementing supply chain management. This can often cover the movement of people, services and information, as well as goods. In these cases, the actual transport of goods may no longer be the primary activity as logistics companies can offer clients a complete and over-arching range of freight-related

⁴⁹ UK, USA, Sweden, Netherlands, Australia, New Zealand, Belgium, Mexico, Czech Republic, Japan, Switzerland, Norway, Korea, Finland, Spain, Portugal, Luxembourg and Poland

services, tailored to suit the needs of each specific client. These services may include some or all of the following:

- freight forwarding;
- cargo consolidation, management and handling;
- stock control and re-ordering;
- dealing with documentation;
- storage and warehousing;
- information management services, e.g. operating web sites linking loads to haulers and the increased use of Electronic Data Interchange (EDI);
- courier services;
- negotiating return loads for clients' own transport;
- transport consultancy services.

Some have gone even further and moved upstream into the specialised fields of packaging, crating, palletising and containerisation of goods, and even into the fields of plant-hire, vehicle-recovery, repair and maintenance. In addition, increased access to, and use of, the internet has led to the establishment of global partnership networks, linking international logistics companies, haulers, shipping and railroad operators. These partnerships can arrange and undertake all freight services for goods destined for any part of the world under a single, integrated contract.

Such diversification and increased sophistication has tended to leave the smaller independent operators behind in terms of development of their business activities and they are left, in the main, dealing with regular, contractual work for a limited number of clients, serving a specialised market, bidding for spot-contract or one-off loads, or concentrating on distribution within a defined geographical region. From the point of view of the PPI, this trend towards diversification has created an attendant problem, namely the potential for re-classification of the activities of some major enterprises out of the road freight industry, where this is no longer the largest single activity.

The ISIC defines a list the industry activities, which it is often necessary to shaped to dominant national activities. The product classification of the road freight industry may appropriately partitioned into the type of goods being transported (e.g. liquid, livestock, refrigerated etc). Where operating costs (such a fuel costs) differ across international boundaries, it is recommended that international road freight be assigned as a separate product group within the industry, to maintain homogeneity in product groups.

It is recommended that the ISIC and CPC classifications are used as a preliminary and adequate basis for road-freight. National deviations from these product activities should be recognised and included in the national PPI.

3. Sample Design

As a first approach, the sample design is recommended to use Probability Proportional to Size (PPS). Options for stratified sampling, using employment or turnover as the stratification variable, may also be applied to improve efficiency of the sample through reducing variance. Where there are regional variations in price movements, consideration should be given to a stratification by region. If national road-freight is recognised to be dominated by a small number of large companies, a mixture of purposive and random sampling may be considered. This would ensure that the leading companies are always included in the sample, with the remaining companies sampled randomly.

4. Main pricing method used

Within the road freight industry, larger companies tend to earn revenue from repeated contract work from established customers, while the smaller companies tend to operate on an ad-hoc, single-contract basis.

In line with SNA 93, the basic price (the per unit revenue received by the service producer) is the recommended price of the road-freight service provision. This should discount taxes but include subsidies and discounts. To achieve this, transaction prices are favoured, where possible, in preference to the list prices. The specification of the service in road freight requires significant detail to ensure a repeatable service and recognised customer are defined. Ideally both domestic and export activity should be captured during price collection, although many countries just collect the domestic component of intermediate-service provision.

The road-freight industry offers a complex variety of pricing measures, which range from cargo-type (liquid, containers etc.), distance (short-haul, long-haul, international) and rate (price per hour, price per kilometre or price per m³). The prices are often agreed in different frameworks, such as model, spot, transaction/contract, list and tariff. As always, it is important that the PPI capture the actual price of the service, including any discount. Nations have implemented one (or a mixture) of these pricing methods⁵⁰.

⁵⁰ UK - transaction and list prices; US – transaction and list prices; Sweden – model prices; Netherlands – transaction, list and model prices; Australia – transaction price; New Zealand – list or transaction prices; Belgium – transaction prices; Mexico – list prices; Czech republic – transaction price; Japan – transaction price; Switzerland – model price; Norway – transaction price; Korea – transaction price; Finland transaction price; Poland – transaction price.

Transaction/contractual price

Transactional or contractual pricing usually applies to large road-freight suppliers and regular customers, who negotiate discounts from the list prices through their guarantee of business volume. In transaction pricing, the price of these services is measured from actual and specific contracts for the movement of goods, both domestically and internationally. The PPI-survey contributors are asked to supply services and prices, which they consider to be typical and representative of their business and, importantly, should be based on repeating contracts wherever possible. It is recognised that there is a potential weakness in this pricing method, as a large element of the overall market may not be fully represented, namely the one-off or spot market, where the service relates to a single journey which is unlikely to be repeated.

List price

A list price is the published price for services (usually published as rates applied, based on mileage, weight, volume and additional services) and is often used as a starting point to negotiate discounts for a spot price or transaction/contractual price. However, it does not capture the actual transaction price unless the discounts are known. List price collection may therefore not entirely capture the pressures of the market environment.

Model price

This method collects the fictitious price of specified road-freight journeys. The trips are priced in the base period and all subsequent collection periods. If a model journey is no longer considered to be representative of the typical journeys of the company, an alternative journey is usually selected by the respondent.

5. Costs and benefits of the alternative pricing methods used

Transaction pricing places the least compliance burden on the survey respondent. However, they are most suitable to large road-freight companies, undertaking repeated and long-term contractual transport for customers. Using a transaction pricing mechanism usually ensures that the required prices data is relatively easy to retrieve from the contributor's accounting/financial system and minimises the form-filling burden. Transaction pricing is not suitable for smaller company respondents, who compete for individual journey contracts. The transaction price is sensitive to the volume of business that a customer can offer and this should be defined in the service-product specification.

List price collection is most appropriate for smaller road-freight companies and offers a small compliance burden. However, it is recognised not to fully track the price movements arising from increased competition.

Model pricing offers a compromise, in the absence of a transaction price. It does require an investment of time from NSI and industry to define a representative set of road-freight models. However, the collection work at the time of the survey to the NSI is identical to that of transaction prices. The respondent however is required to price the model outside of his normal business and therefore increases the compliance burden. There is also a danger, with time, that the road-freight journey is no longer representative of the business of the respondent company and models require a level of periodic maintenance.

6. How to deal with quality issues

Within the road-freight industry, there are components of service quality such as timeliness, which are typically fixed and included in the service specifications. When a service is no longer representative of a company's activities, an alternative replacement should be sought. The alternative service should be as close to the original as possible. However, the systematic adjustment of quality in road-freight services can be difficult to define.

7. Collection of the information

In collecting prices, it is important that the products are representative of the business. To achieve this, it is important that the priced services are defined and agreed with senior management of the business, from areas such as marketing or accounting. It is important that the specific nature of the journey and customer type is defined. This will allow appropriate discounts to be included. In an ideal situation, the following characteristics of a road freight service should be collected

- size and type of vehicle;
- nature and weight of cargo;
- distance of journey and/or destination;
- routing information (distribution or joint cargo)
- time criteria for delivery, if applicable;
- availability of return cargo;
- inclusion of loading services;
- name and customer-status of the customer;
- domestic or export category;
- any other special conditions which might apply to the contract.

However, collection of these attributes could place an unreasonable, and unwelcome, burden on data suppliers to provide that level of detail in every case. Therefore, a more pragmatic approach may be applied which is prepared to accept descriptions of freight services which differ from the above, but are in line with the normal business practice of the enterprise. This is subject to the important proviso that the data supplier is able to identify the specific contract and can supply the latest (and correct) price for that service on a regular, repeating basis.

8. Specific aspects

Subcontracting is frequent within the road-freight industry. However, subcontracting should be excluded from the price collection. With increasing freedom to conduct business in other countries, the export of services becomes an increasing component of road-freight revenue. Differentials in fuel costs between countries can bias prices and the domestic or export nature of the service should be captured in the definition. Experience in deriving a PPI for road freight, through consultation with industry and trade-associations, has indicated that it may be appropriate to include a product for warehousing and distribution in the road-freight PPI. This may be contentious as the ISIC includes this activity as a separate ISIC (63.02). However, there is community recognition that the service activity is an important (and often indistinguishable) component of revenue for companies classified to freight transport by road (ISIC 60.24).

Future consideration should be given to whether to include the significant road-freight activity of those companies, which are classified in other transport-related classifications, such as storage and warehousing. Greater consideration should also be applied to a common method of capturing the single, spot-contracts, which are one-off activities and yet form a very significant part of the road-freight revenue. It is recommended that the impact of productivity changes (such as increases in legal vehicle size/weight and more fuel efficient engines) in the ability to provide the service are taken into account.

9. Overview of national methods

In the UK, road-freight contributors are asked to provide details of actual transactions undertaken for real clients (or for regular routes serving a number of clients with similar requirements and cargoes) as a preference. However, the collection recognises the variety of ways in which companies set their prices and a mixture of transaction and list pricing is used. A fixed panel of survey-collection operates, with the intention to move to a rotated sample in the future. In view of the difference in fuel costs between the UK and Europe, the UK publishes separate SPPIs for domestic and international road-freight.

In Australia transaction pricing is used to measure the price movements. The Australian sample is mostly long-haul coverage with an intention to increase the short-haul component. The index has demonstrated relative stability with time.

In the Netherlands, a mixture of transaction, list and model prices with a high percentage of international road-freight are collected. Employee number stratifies the Dutch sample. Six types of transport, both international and national, make up twelve lower level aggregates. The road-freight journey is used as the basic unit of the PPI. Transaction price is collected from larger companies, with each respondent providing between one and twenty price quotations.

In the US, a hub and spoke network often sees a cargo carried by a number of different vehicles to balance volume and schedule constraints, thereby minimising costs and time. The PPI is derived from a mix of spot, contract, list and tariff pricing although list and tariff have been recognised to be synonymous. In the US it is typical to charge for fuel as an additional surcharge.

In New Zealand a mix of transaction and list prices are collected.

4.3 Sea and costal water transport

1. Description of the sector (ISIC 611 / NACE 61.10)

Sea freight transport is mainly important for countries with maritime situation or with large intercontinental trade activity. Some countries such as UK transport most of their external trade (95% in terms of weight) by water. For the competitiveness of both exporters and importers it is essential that shipping markets are open and offer freight rates that are reasonable and not unnecessarily expensive.

SPPI for sea freight transport are price indices for service imports and exports. They complement the indices of foreign trade prices, which refer to imports and exports of goods only.

On a macro-level SPPI for sea freight transport also serve to deflate the sea freight revenues as part of national accounting.

In the Voorburg meeting 2003 methodological papers on sea freight transport were presented by China (Hong Kong), Germany, Sweden and United Kingdom.

2. Classification aspects and scope of the survey

Sea freight transport is part of NACE 61.10. It comprises coastal (domestic) transport und maritime (continental and intercontinental) transport. It excludes inland water transport via rivers, canals, lakes and other inland waterways.

NACE 61.10 includes:

- transport of passengers or freight over water, whether scheduled or not,
- operation of excursion, cruise or sightseeing boats,
- operation of ferries, water taxis, etc,
- transport of towing or pushing of barges, oil rigs, etc,
- renting of ships and boats with crew.

Transport of passengers, operation of excursion, cruise or sightseeing boats in general is included in the CPI. The transport of towing or pushing of barges and rental of ships and boats with crew can be considered as economically less significant for most countries. Thus sea freight transport forms the essential part of an SPPI for NACE 61.10.

A significant element of seaborne freight is carried by roll-on-roll-off ferries (albeit normally loaded aboard on road-going vehicles), but this is excluded from the consideration in this chapter.

3. Sample design

The design of the survey is mainly dependent on the methodology (line shipping, inclusion/exclusion of tramp shipping) and the number of relevant market competitors in sea freight transport. Sampling rotation is advisable, especially among smaller companies.

Sampling is mainly based on business registers for service industries. Stratified sampling by turnover or number of employees could be used. Shrinking markets (in terms of the number of enterprises and/or overall activity of the sector) may lead to a loss of respondents over time.

The weighting structure for the survey –expressed in terms of turnover- is based on parameters such as origin and destination of transport, quantity of freight, type of freight, type of cargo. The breakdown of the weighting structure is dependent on available information from transport or business statistics, general market information and specific surveys at companies (questionnaire on turnover, kind of transports etc.). The weighting structure is the basis for the selection of representative transport services in the price survey.

4. Main pricing methods used

General method applied by statistical services:

Contract pricing for scheduled transports

The survey aims at actual prices including price reductions, not list prices. Surcharges for the client (e.g. Fuel adjustment Factor, port charges, war risk) should be included.

For tramp shipping it is difficult to define representative transports which are comparable over time as there are no regular transports with identical specifications. This makes pricing difficult.

5. Costs and benefits of the alternative pricing methods

The pricing methods of countries (China, Germany, Sweden, UK) do not vary essentially.

6. How to deal with quality issues

Precise specification of transport services is necessary and to be kept constant over time. Quality changes over time are less important.

7. Collection of the information

The products selected for the price collection shall be representative for the business. Therefore in consultation with the companies statistical offices choose a number of transport services which are representative for the business activity and which are conducted regularly in the same way. Information on the main transport activities of companies may come from transport statistics or from commercial sources.

These services are specified as detailed as possible regarding the main price determining parameters. These parameters are, among other things,

- origin and destination of the transport,
- type of freight,
- weight or volume for non-containerised cargo,
- size of container,
- type of cargo (general, dangerous or refrigerated),
- need for services (loading/unloading, storage etc.).

The specification of services needs to be reviewed regularly.

8. Specific aspects

The increasing share of container transport must be taken into account. A definite allocation of container freight in terms of product classification is not always possible. The index structure therefore should mainly focus on traffic relations. A distinction of different types of goods is advisable only at the second level.

9. Overview of national methods

China (Hong Kong):

Hong Kong is well known as a major international maritime centre and has maintained its position as the world's busiest container port in the world 2002.

AN SPPI is published for the maritime transport as a whole covering both sea passenger transport and sea freight transport. A separate SPPI for sea freight transport services alone is not published.

Producer prices for sea freight transport are quarterly averages of actual transacted prizes net of any discounts, premiums, rebates or allowances given to buyers, but including surcharges. Respondents shall provide prize data for transport services which are typical and representative for their company, are based on stable and continuing transactions and –for the respondent- are readily available. Respondents are also asked for the total amount of business receipts of sea freight services plus receipts in respect of individual major services and receipts for prominent product items of major service products.

Data are collected through the quarterly survey of service industries covering establishments engaging five or more persons in the service industries. The survey is a stratified sample. A rotational replicate sample design is adopted. Every year about one-third of the sample will be updated to include newly selected establishments while one third of the sample will be rotated out.

Germany:

The German index of freight rates refers only to liner trades (the statistical observation of tramp shipping was ceased in 2003). Freight rates are collected monthly through a sample from German shipping companies, ship brokers and agencies. This monthly data collection is useful as sea freight rates are very volatile over time (influence of political or economic crisis in various parts of the world). Currently 20 units which are the dominant German market competitors are monitored.

Freight rates are calculated for each type of goods with regard to a specific traffic relation on a pier/pier basis. The objective is to cover the effective rate. For the index computation a total of 117 traffic relations were selected. In combination with different types of goods 672 index positions were formed. For the weighting the

detailed material of transport statistics (mainly physical data) was used. Additional modelling to convert physical data into monetary data was necessary.

The breakdown of the index of sea freight rates in the publication is divided into homeward-bound and outward-bound trades. An additional regional breakdown of the results by the four traffic relations of Europe, Africa, America, and Asia/Australia is available.

For tramp shipping till 2002 specific information on ship transports was taken from the specialised press but quality issues could not be dealt with due to lack of detailed information. Because of to the unsatisfactory quality of the results this kind of survey was ceased in 2002.

Sweden:

The sea freight market for Sweden is international and there are several submarkets in which the price system works in different ways. The market that, from an international viewpoint, is dominant in terms of volume is the tramp market. Line cargo shipping is the second largest sub-market, in which traffic is mostly carried out by large container vessels that service particular ports. In Sweden there are a lot of sea and coastal freight transport companies but the industry is dominated by a few large companies.

The price collection for sea and coastal freight transport services has been carried out from the third quarter of 2003. The index has been developed in cooperation with the Swedish Shipowners' Association and large enterprises in this industry. Prices are collected on a quarterly basis.

For the price surveys Sweden applies model pricing⁵¹ choosing a number of services which are representative for the business activity, these being specified as detailed as possible regarding type of freight distance of transport and customer. The key criteria for the use of Model Pricing are: Regular updating of the models used, representativeness of the models and actual price charged.

For the spot market the envisaged method for the survey seems to be inappropriate. Further discussions with enterprises operating in the market are necessary.

UK:

For UK because of its geographical position efficient shipping is vital to the country's economy.

⁵¹ In essence the Swedish approach -despite deviation in terminology- seems almost identical with the method of the other countries.

Since 1950 there was a dramatic decline in the UK's position as an important nation for sea freight transport. Despite its decline the UK shipping industry continues to be one of the more significant operators, carrying more than 4% of global trade.

In 1995 the UK Inter-department business register listed around 900 enterprises classified to freight, sea and coastal water transport generating turnover of about 2 billion British pounds. Since 1995 in a sample 20 companies are supplying viable price quotations. Through this sample a reasonable range of the activities could be covered.

In addition to the standard criteria of representativity and repeatability data contributors were asked to provide prices for real contracts and to take account of all discounts in the prices supplied.

From 1996 to 2003 the UK industry deteriorated to such a degree that just 11 of the original data supplier remained. Attempts to find suitable substitutes for lost price quotations have not been productive as the UK industry continues to shrink. As an immediate challenge UK intends to strengthen the quality of the current index by improving the quality of the sample.

4.4 Air transport

1. Description of the sector (ISIC 621, 622 / NACE 62.10, 62.10)

Air Transport Service industry might be of different sizes in various countries, but in the majority of countries the pattern is quite similar, i.e. the number of largest enterprises is rather small for passenger air transport, whereas small providers are prevailing for other kinds of air transport, also including air taxis and air sightseeing. During the last few years a number of new, mostly small, air carriers came up and try to compete with low air fares. How much these low price carriers count for business flights is not yet fully evident. Furthermore, in general, an SPPI for a service sector should comprise all end-users (business to business, business to government, business to households). In practice, in the air transport sector, it is often difficult to separate prices for different end-users. In that case it might be easier to calculate an SPPI for all users in one estimation.

Air transport services cover three major categories of services, scheduled air transport as well as non-scheduled air transport and space transport. Furthermore a distinction can be made whether passengers or freight is being transported.

Several papers concerning air transport services have been presented at the 18th and 19th meeting of the Voorburg Group on Service Statistics in 2003 and 2004. Contributors have been Sweden, New Zealand, Austria, the UK and the USA.

Papers are available at: <http://stds.statcan.ca/english/voorburg/index.htm> ; <http://stds.statcan.ca/english/voorburg/2004-prel-pgm.htm>

2. Classification aspects and scope of the survey

In the International Standard Industrial Classification (ISIC Rev.3.1) for division 62 the only distinction is drawn between Scheduled and Non-Scheduled Air Transport. Space transport is added as a supplementary group to division 62 in NACE Rev.1.1⁵².

According to CPC Rev.1.1⁵³ the corresponding activities for air transport services vary over: **(1)** passenger air transportation on regular routes and on regular schedules; transportation of passenger baggage and other items that may be carried at no extra cost, **(2)** passenger air transportation on a non-scheduled basis supplied in aircraft of any type; sightseeing services and air taxi services by helicopters; transportation of passenger baggage and other items that may be carried at no extra cost, **(3)** transportation of letters and parcels by air on scheduled and non-scheduled flights, **(4)** air transportation of individual articles and packages assembled and shipped in specially shipped containers designed for ease of handling in transport; air transportation on freight not elsewhere classified. Furthermore, **(5)** space transportation services; launching and placing of satellites in space; services provided by space laboratories and **(6)** rental and leasing services of freight- or passenger-carried aircraft of any type and for any purpose with crew.

The following table illustrates the appropriation of CPC codes to the corresponding ISIC codes.

Air Transport			
ISIC code Rev. 3.1	Description	CPC code Rev. 1.1	Description
I 62	Air transport		

⁵² Statistical classification of economic activities in the European Communities.

⁵³ Central Product Classification

I 6210	Scheduled air transport	66110	Scheduled air transport services of passengers
		66210	Air transport services of letters and parcels (scheduled)
		66290	Air transport services of other freight (scheduled)
		66400	Rental services of aircraft with operator
I 6220	Non-scheduled air transport	66120	Non-scheduled air transport services of passengers
		66210	Air transport services of letters and parcels (non-scheduled)
		66290	Air transport services of other freight (non-scheduled)
		66300	Transport services via space
		66400	Rental services of aircraft with operator

The national versions of the above mentioned CPC classification may slightly vary among each other because of the different country characteristics. Efforts to compile an SPPI for air transport activities are made by Sweden, UK, New Zealand, USA, AUS, HKG, JPN and Austria. The main focus lies on business passenger- and freight transportation services on regular routes and on regular schedules.

The price indexes are primarily used as deflators in National Accounts and for volume measures in business service statistics.

3. Sample design

The sampling frame comprises all producers of air transport which are included in the business register. The turnover according to sector activity can be used as the major stratum criterion. In theory, any available sampling strategy can be used. In practice, due to size and structure of the industry, the potential sampling techniques may be reduced to stratified or purposive sampling. Rotating samples can only be used in countries with a large number of enterprises in the surveyed air transport sector.

4. Main pricing methods used

The direct use of prices of non-unique, repeated services and unit prices seem to be the most adequate pricing methods in this sector.

4.1 Passenger Air transport

Direct use of prices of non-unique, repeated services

Taking account of already existing tariff information systems, the concept of the direct use of *prices of non-unique, repeated services* presumably is one of the most appropriate pricing method for scheduled passenger air transport services. The most important destinations are to be combined with representative ticket types. This will result in a number of price quotations on a regular base. A variable of considerable influence on the price is how long in advance a ticket is bought (six months, one month, two days).

Unit (value) prices

An alternative solution, to avoid price fluctuations by directly using prices of *non-unique, repeated services*, is to collect unit prices for different representative types of tickets and routes. If airlines are willing to cooperate, average prices for representative routes and tickets can be surveyed quarterly for business and economy class tickets.

4.2 Air Freight Transport

Direct use of prices of non-unique, repeated services

For freight transportation by air the direct use of *prices of non-unique, repeated services* would also be an eligible method to compile an SPPI. Representative transactions specified by an accurate description of type of freight, weight of the cargo, destination, distance etc. should be chosen in cooperation with leading enterprises and airlines. Either standard transactions for all enterprises or specific transactions for each enterprise can be selected.

In most TF member countries either no indexes for any kind of air freight transport and non-scheduled passenger air transport are produced or are currently under construction. On that account, there are no assured facts concerning the best pricing method for these CPC codes available at the moment.

The collection of Point-in-time prices will be suitable for a business to business SPPI, whereas period prices should be preferred for a business to all SPPI.

5. Costs and benefits of the alternative pricing methods

The collection of prices for a number of ticket- and destination combinations is a rather simple but nevertheless a very effective method in the sector of scheduled

passenger air transportation. The crucial factor lies in the sampling of representative ticket types and destinations. A sample of destinations can be drawn after investigating Civil Aviation Statistics, which might not allow distinctions between passengers according to their purpose of travel. Such estimates are necessary in addition using information from passenger surveys, etc. Representative ticket types can be sampled in cooperation with leading business travel agencies and major airlines.

For both, the use of *prices of non-unique, repeated services* and unit prices, it is of particular importance for price statisticians to establish long term cooperation with the relevant industry bodies to ensure keeping the selected price quotations up-to-date. If a chosen transaction is no longer representative, it should be immediately replaced.

6. How to deal with quality issues

As mentioned above, because of the unavailability of the relevant data, for passenger air transportation no distinction can be made whether the trip is for business or leisure purposes. Therefore the difficult task is to compile “clean” sub-weights by sub-categories of combinations because of data problems. The initial rather practical approach will be to start with simple rough weights and to improve the calculation of sub-indices according to the availability of appropriate sub-weights. Rough weights based on turnover can be estimated by assuming that some ticket categories and destinations are rather booked by business travellers than by touristic travellers and vice versa.

Another concern is how to deal with changes in fares and service characteristics. Changes in fares are often accompanied by changes in the quality of the service such as charges for meal, booking conditions, duration of tickets and changes of free baggage. Furthermore an answer to the question how to treat frequent flyers in an index has to be found. No perfect solutions to deal with such quality problems has been found till now, but Statistic New Zealand initiated a case study dealing with some of these quality issues.

The case study is a part of a Voorburg Group mini presentation paper. It can be found at <http://stds.statcan.ca/english/voorburg/2003%20tokyo/papers/2003-081.pdf>.

7. Collection of the information

Data collection should cause no tremendous problems. After establishing an ongoing cooperation with responding airlines and enterprises, prices can be collected via mail, fax or even on postal way. If airfares are partly covered by the national CPI the collection of the SPPI relevant data can be combined with the monthly CPI survey in order to minimise respondent burden.

In order to work efficiently on quality and price changes it is advisable to entrust high level staff with this task.

8. Specific aspects

As pointed out earlier, one of the major problems is to distinguish between business and touristic travellers. At the moment airlines are not able to make such kind of data available. The UK uses data from the International Passenger Survey, carried out by the ONS, to estimate the percentage of business passengers per destination.

The data should include national enterprises providing services inside and outside the national territory. Subsidiaries of foreign enterprises should also be included in the population. Whether their prices are collected might depend on their representativeness.

Additional charges, like airport taxes, which may influence the price, should be excluded if they are not included in the output of surveyed air transport services.

The surveyed price should be the price offered by the airline. Intermediary providers should be excluded for an SPPI.

Theoretically the price for an observed service should be recorded when the service is provided. Due to an ongoing discussion concerning the time when the price should be measured (time of purchasing the ticket, time when the flight departs) no decision has been found in the Task Force on Service Prices till now.

In the future, low-cost carriers have to be included in the sample to avoid biases due to an unrepresentative market situation.

9. Overview of national methods

Sweden currently produces an overall quarterly index for air transport, which consists of a domestic scheduled passenger air transport index and an international scheduled passenger air transport index. In consultation with the enterprises average prices for representative routes and types of tickets are surveyed quarterly for business and economy class tickets. As a result of a methodological change in 2004, the publication of the PPI for domestic scheduled passenger air transport was stopped due to confidentiality reason. In Sweden indexes for the different flight routes, both for domestic and international scheduled passenger air transport, are weighted together to get a total index. Non-scheduled air transport is excluded from this index. AN SPPI for air freight transport is currently under construction.

In the United Kingdom two passenger air transport indexes are published due to a sharp distinction between business and private passengers. The index for scheduled air transport of business travellers is published as a part of the Corporate

Service Price Index (CSPI) whereas the private airfares index is published as part of the Retail Price Index (RPI). By directly using *prices of non-unique, repeated services* 3 major airlines and 40 destinations are observed. In the UK, currently no indexes for air freight transport or non-scheduled passenger air transport are produced.

New Zealand currently publishes a quarterly single air transport index which falls within the transport and storage index of the SPPI. It includes aircraft engineering services, air freight transport (international and domestic), air passenger transport (international and domestic) and other air transport. As in other countries for passenger air transport business and economy class tickets for a number of destinations are surveyed. For air freight transport a number of different specified types of freight for a number of destinations are surveyed. Due to confidentiality reasons the PPI cannot be published at that detailed level.

The USA is calculating an Air Travel Price Index (ATPI) since 1995, which is based on information of the Passenger Origin and Destination Survey (O&D). The ATPI, which is published quarterly, consists of the following three index series: The Domestic Origin ATPI (domestic origin, domestic or international destination), the Foreign Origin ATPI (foreign origin, US destination) and the Full-Scope ATPI (combination of both). The index only covers domestic carriers and the reported fares include taxes and airport fees. Currently the USA is revising its methodology for an SPPI for air transport. The alternative approach is to collect total passenger revenue (excluding taxes and fees) and total passengers for a given market, which allows calculating the average revenue per passenger for a given route and passenger class (economy, business).

Austria has finished the first preparatory work, and is going to compile an index for scheduled air transport of business passengers by using *prices of non-unique, repeated services*. Since 2000 expenditure on airfares is included in the CPI, whereby no separate sub-indexes for the various destinations are produced. After installing a survey routine for scheduled passenger air transportation the air freight transport sector will be investigated.

4.5 Cargo handling and 4.6 Storage and warehousing

1. Description of the sector (ISIC 6301, 6302 / NACE 63.11, 63.12)

Transport and Storage is an industry of strategic importance for New Zealand. New Zealand's remoteness and insular location are factors which influenced the development of this industry.

Cargo Handling and Storage and Warehousing are two sub-industries within the larger Transport and Storage industry. The structure of these two sub-industries is highly competitive and, as a result, the enterprises involved in these activities are

among the most efficient on a global scale. Together, the two groups generally contribute by less than 10 percent to the Gross Domestic Product (GDP) of the Transport and Storage industry. The Transport and Storage industry contributed approximately 5.0 percent to the total GDP in the year ending March 2004.

A few large companies dominate each of these sub-industries. These companies participate in most of the surveys conducted by Statistics New Zealand and respondent burden is a serious issue for them. In addition to the respondent burden issue, the limited number of firms in these two sub-industries brings an additional challenge: a rotation policy cannot be implemented for the PPIs.

2. Classification aspects and scope of the survey

The commodity classification used in the current PPI structure is the 1996 Australian and New Zealand Standard Commodity Classification (ANZSCC96). This classification has been developed for use in Australia and New Zealand and is based on a provisional version of the international Central Product Classification (CPC). Between 2004 and 2008 a new classification will be implemented: the Australian and New Zealand Standard Product Classification (ANZSPC01), which is based on a final version of the CPC (version 1) that better reflects contemporary standards.

The industry classification currently being used in the indexes in New Zealand is the 1996 Australian and New Zealand Standard Industrial Classification (ANZSIC96), which is based on ISIC Revision 3. Work is currently underway to release an updated version for ANZSIC in 2006 (based on the North American Industry Classification – NAICS).

Under ANZSIC96 these two sub-industries fall within the Other Transport and Storage Services group in the Transportation and Storage industry. They are grouped as follows:

Storage Services Index:

Division I: Transport and Storage

Sub-division I67: Storage

Group I670: Storage

Class I6709: Storage not elsewhere classified (nec)

Sub-Class I670900: Storage nec

This sub-class consists of units mainly engaged in providing storage and warehousing services nec.

Cargo Handling Index:

The cargo handling index within the PPI falls under the main representative commodity index stevedoring services. Other cargo handling services appear throughout the index, including some in wharfage charges, however these will not be looked at in this paper due to the small weights applied to them.

Stevedoring services consists of units mainly engaged in the provision of labour for the loading or unloading of vessels. The index classification is as follows:

Division I: Transport and Storage

Sub-division I66: Services to Water Transport

Group I662: Services to Water Transport

Class I6621: Stevedoring

Sub-Class I662100: Stevedoring

3. Sample design

Statistics New Zealand Business Frame (BF) comprises the universe of companies classified as having the main business activity in a given industry/sub-industry. The sample size is selected by employing a number of criteria such as: size of company, location, general survey burden.

Purposive sampling could be used with good results, in countries where the number of players is limited.

4. Main pricing methods

An annually chain-linked Laspeyres formula is used to calculate the price index for Cargo Handling and Warehousing and Storage industries. The Laspeyres price index was chosen to meet National Accounts requirements that the index be consistent with their deflation practices in other areas.

Pricing services within the PPI are often difficult to observe or define. Three approaches can be used however, to overcome these difficulties:

1. Model service, which is sometimes desirable, as it gives detailed specifications for the provision of the service.
2. Priced service, which is standardised and gives a direct collection of detailed specifications.
3. Charge-out rate, which represents the price of the service with the charge-out rate of the person providing the service.

The storage services index contains 18 items (all excluding goods and services tax - GST) with approximately 12 different respondents being surveyed

using the Commodity Price Survey. A range of prices are collected for the storage of specific goods, with charge-out rates and standardised prices being used to price them. The price specifications for these items are any one or a combination of the following:

- General storage (assorted storage, basic storage, static storage, palletised goods, general goods)
 - short and long-term storage
 - per metre or per pallet per week (1.2 cubic metre pallet)
 - covered space
 - not stackable, of reasonable standard of care, away from dust
 - basic handling charge.

- Frozen/cool storage (at -18 degrees Celsius or colder)
 - small/large quantities
 - first/second/subsequent month's storage
 - per 100kg or tonnes per month.

- Standard storage (milk powder, paper and wood products)
 - per metres squared or 20/40 foot ISO container⁵⁴ per day
 - per 1,000kg per day.

- Reefer⁵⁵ charges (power supply/storage)
 - per refrigerated container
 - per day or part thereof.

As noted above cargo handling falls under the main representative commodity index stevedoring services.

Stevedoring is a labour intensive operation, so the major expense for stevedoring firms is salaries and wages. The approaches used for this index are a combination of charge-out rates and standardised prices.

The stevedoring services index contains 29 items (all excluding GST) with approximately six different respondents being surveyed using the Commodity Price Survey and one using an internal source, namely the Labour Cost Survey. A range of prices are collected for the processes involved in the loading and stowing of cargo.

⁵⁴ International Organisation for Standardisation. Designed for transportation by more than just one mode such as truck and rail or rail and ship.

⁵⁵ Refrigerated container. Used to keep perishable goods such as meat and fruit frozen or chilled.

29/08/2005

The price specifications for these items are any one or a combination of the following:

- Cargo handling (ship exchange)
 - rate per 20 foot ISO container
 - hiring of container cranes, 3 to 7.5 tonne mobile cranes or light fork lifts.

- Washing of containers (per 20 foot ISO container).

- Berthage - charge for gross registered tonnes (i.e. 100,500 or 5,000)
 - per day.

- Stevedoring (palletised general goods)
 - per 20 foot ISO container
 - per tonne
 - receiving/ delivery of cargo.

During a previous redevelopment (1995-1998), Statistics New Zealand introduced a “building block structure” for the PPIs. In this structure, prices collected for a service represent the lowest level; they are followed by commodity indexes (elementary aggregates) which are further combined into sub-industries (National Accounts Working Industry – NAWI). Weights for items priced within the commodity indexes are obtained from respondents in the sample. The weights for the commodity indexes and the National Accounts Working Industry Indexes (NAWI) are obtained from income and expenditure information in the Annual Enterprise Survey (AES). Statistics New Zealand sums the PPI weights to 10,000 for calculation purposes and expresses them as percentages for publication of index regimens.

Below is the regimen for the rail, other transport, and storage services index (on NAWI level). Note that rail transport has been combined with other transport, storage services for confidentiality reasons.

RAIL, OTHER TRANSPORT, & STORAGE SERVICES

ANZSIC Division I, Subdivision 62 & 6

Weighting Base: 1995

INPUTS		OUTPUTS	
Percentage of Total Inputs in Industry		Percentage of Total Outputs in Industry	
Fuel and Power	6.0	Rail Transport	14.5
Non-Domestic NZ Electricity	2.3		
Diesel & Fuel Oil	3.0	Other Transport and Storage	85.5
LPG	0.6	Travel Agency Services (Package Tours)	15.9
CPI Petrol 91	0.1	Storage Services	12.8
		Stevedoring Services	7.8
Transport and Storage	25.6	Air Passenger Transport (International)	7.4
Air Passenger Transport	8.3	Warfare Charges	5.4
Road Freight Transport	5.5	Other	5.4
Air Freight Transport	6.0	Pilotage Services	3.8
Transport Equipment Hiring & Leasing	2.9	Airways Corporation Charges	3.2
Sea Freight (International)	2.5	Air Freight Transport (International)	3.1
Port Charges	0.4	Airport Landing Charges	3.0
		Road Freight Transport	2.9
Communication	2.6	Commercial Rent - Factory & Industrial	2.7
		Sea Freight (International)	2.5
Finance and Insurance	0.2	Air Freight Transport (Domestic)	2.0
		Airport Concession Rentals	1.6
Business Services	18.7	Engineering Services	1.5
Commercial Rent - Factory & Industrial	7.1	Management Fees	1.4
Management Fees	3.2	Parking Services	1.1
Computer Services	1.9	Airport Departure Charges	1.1
Pest Control & Cleaning Services	1.6	Document Handling Services	0.9
Plant & Machinery Hiring & Leasing	1.4		
Legal Services - Corporate	1.3		
Commercial Rent - Office & Admin	0.9		
Stevedoring Services	0.7		
Other Consultants Services	0.3		
Accounting Services	0.2		
Advertising	0.1		
Other Expenses	46.9		
Other	31.5		
CPI - Hotel / Motel	13.7		
Stationery	1.7		
Total	100	Total	100

Notes:

- * The regimen summarises weights applied to commodities included in the index
- * Weights are derived from estimates of approximate basic value and intermediate consumption expenditure
- * Items with small weights (usually less than 1%) may not be individually specified above
- * Rounding error may occur

5. Costs and benefits of the alternative pricing methods

Model prices add significantly to the respondent burden. In addition to having to continuously ensure that the model employed still reflects the real world situation, a statistical agency has to first convince the respondent to co-operate in designing this model. It is important to find the right balance between the complexity of the model and the amount of respondent burden.

List prices – while not tracking the precise transaction price, they are employed quite often since they are most of the time readily available and they offer a reduced compliance burden.

Transaction prices – are desirable in countries where any of these two industries has a very high concentration of significant players.

6. Quality issues

Services provided by these industries are subject to some quality variation over time. This makes it sometimes difficult to monitor these changes effectively so that only pure price change is required. An example of this is the provision of warehousing services where in recent years there has been considerable improvement in the general timeliness (due to increased use of modern technology) and in the productivity level. Services in these two sectors are sometimes bundled and this further complicates the task of estimating the real price change.

Quality variations such as those mentioned above are accounted for when possible. Alternative respondents are sought when a given service is no longer representative for a company.

7. Collection of information and specification of the services

Statistics New Zealand uses the Consumer Price Survey (CPS) as the main price vehicle survey for PPIs. Actual response rates for these sub-industries are above 95 percent. Key companies are managed by a group of account managers.

8. Specific aspects

Cargo Handling and Storage and Warehousing industries are not characterized by rapid change. It is recommended to review the commodity and item weights every three to five years.

9. Overview of national methods

The United States of America, New Zealand, Japan and Australia all compile a price index for Cargo Handling. The USA collect transaction prices from over 100 respondents for simple cargo handling services on a monthly basis. In New Zealand and Japan smaller numbers of respondents are surveyed but composite and bundled services prices are collected. New Zealand's index is compiled quarterly whilst Japans is monthly. Australia uses list prices in the construction of their quarterly Cargo Handling index.

A larger number of countries produce price indexes for the Storage and Warehousing industry. The USA collects prices from around 200 respondents on a monthly basis, the prices collected are for bundled or composite services. Australia collects annual prices for grain storage services and quarterly prices for other storage services. The prices collected for grain storage are a simple service type while for other storage services prices are a mix of simple and composite type prices. Around 125 respondents are surveyed in total. Quality changes are taken into account case-by-case using the method most appropriate for the situation.

Other counties with Producer Price Indexes for Storage and Warehousing are: New Zealand, Mexico, Hong Kong and Japan. All countries price the industry using simple service type prices. New Zealand and Hong Kong produce the indexes on a quarterly basis while in Mexico and Japan it is monthly. In all cases countries rely on respondents to provide estimates of how much change in price is due to changes in quality.

4.7 Post and courier services

1. Description of the sector (ISIC 641 / NACE 64.1)

The different services of post and courier activities could be resumed as collection of documents, letters, parcel (in general, light freight), and delivery to the destination. The time between collection and delivery is one of the most important differences among the variety of services.

The total turnover of postal and courier services represented 0,94% of the EU25-PIB⁵⁶ in 2001. Nearly 80% of the total turnover of this sector was invoiced by National Post activity, and the rest, by courier services other than National Post activities.

⁵⁶ EU25: Belgium, Czech Republic, Denmark, Germany, Estonia, Greece, Spain, France, Ireland, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Slovenia, Slovakia, Finland, Sweden and United Kingdom.

Nowadays, the sector 'Courier services other than National Post' is changing, due to the fact that enterprises are diversifying their output. Companies are offering logistic, storage and freight transport by road services, to their customers. Besides, freight transport by road firms are competing directly with courier ones, because they offer courier services as well. This issue may imply classification problems.

Globalisation is also affected to these enterprises. Companies are establishing alliances with companies abroad, in order to improve the international delivery of parcels.

In the Voorburg Group meeting in 2003 (Tokyo), mini-presentations were given by Austria, Canada, Netherlands and United Kingdom in order to explain their experiences regarding SPPI for this activity. (See [1])

2. Classification aspects and scope of the survey.

NACE Rev. 1.1 describes this sector as follows:

64.1 Post and courier activities

64.11 National post activities

This class includes:

- pick-up, transport and delivery (domestic or international) of mail and parcels
- collection of mail and parcels from public letter-boxes or from post offices
- distribution and delivery of mail and parcels
- mailbox renting, poste restante, etc.

This class excludes:

- postal giro and postal saving activities and other financial activities carried out by national post administration (see 65.12)

64.12 Courier activities other national post activities

This class includes:

- picking-up, transport and delivery of letters and mail-type parcels and packages by firms other than national post. Either only one kind of transport or more than one mode may be involved and the activity may be carried out with either self-owned (private) transport or via public transport.

This class also includes:

- home delivery services
- city messenger and goods taxi services

Households and enterprises are both National Post companies' clients, but courier and local messenger firms focus their activity on companies. There are also some differences between the services they offer. Normally, national post services are more routine and they have very specific characteristics that cannot be changed. On the other hand, courier companies can offer 'tailor-made' services, signing contracts with their clients by fixing prices depending on the volume of documents, parcels, ... that they have to send from one point to another.

The structure of the population of postal and courier enterprises is quite similar from country to country, within European countries. Most of companies have few employers (small and medium size enterprises), but the biggest ones invoice almost the total of the whole turnover of this activity. In other words, this sector is controlled mainly by large companies. They domain the revenues of postal and courier services. The next table shows the figures of EU-25, 2001.

Size class (64.1 NACE Rev.1.1)	1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-
% No. enterprises	82.89	7.84	4.52	2.44	0.90	0.88	0.22	0.31
% Turnover	2.65	1.33	1.67	1.88	1.63	1.47	1.60	87.76
% Number of persons employed	2.14	1.03	1.24	1.47	1.21	2.35	1.40	89.17

Source: EUROSTAT-Newcronos

There is an important classification problem to distinguish between courier firms and freight transport by road firms. As it is mentioned above, both kinds of enterprises can offer similar services. The weight of the goods is usually the border to differentiate between them, but there is not a universal rule; depending on the country, the definition of these services varies. Normally the frontier is established in 20 kg (less than this weight is considered as a postal and courier service and more is freight transport).

3. Sample design.

As mentioned before, the structure of population of this sector is quite similar from country to country.

The population of class 64.11 is made up by a reduced number of big enterprises. The best option is to include all of them in the sample.

For courier companies, PPS sampling, by turnover or number of employees, is advisable. As it has been showed before, the big enterprises usually lead this market, then these enterprises should be always in the sample.

Another option is to include in the sample only the biggest enterprises (cut-off sampling), when they represent properly the whole market and domain the evolution of prices. This is a measure to reduce the response burden on small enterprises.

4. Main pricing methods used.

The most common method used for SPPI on post and courier services is model pricing:

- *Model pricing*: sets of services are very detailed described and respondents price them each quarter. The selected services have to be representative of this activity, and have to be removed when they don't represent the activity of this sector. Usually, these models are defined based on weight/size of parcels, speed of delivery and destination. Nevertheless, more characteristics could be taken into account, for example, time of delivery, insurance...

Optional methodologies are listed below. They can be applied alone or combined with others.

- *Unit value method*: the units have to be defined clearly for each product or service. Normally the units are one letter, one parcel (parcel are classified normally by weight and/or size). To ensure the homogeneity of the units, in their definition details on weight/size of parcels, speed of delivery and destination must be included. Information about quantity of sold units has to be available.

- *Contract pricing*: each firm in the sample chooses some of their clients (representative clients) and always prices the same services (representative services) provided to the same clients.

5. Costs and benefits of the alternative.

Model pricing: the main advantage of this methodology is that quality changes will be captured. An important point is to maintain the representativeness of

the model, because if it is not representative, this method loses all its good characteristics.

Unit value method: if the services are homogeneous and quality adjusted, unit value method is an optimum choice. A drawback is that very detailed information about quantity of products sold could not be provided by enterprises because they don't have it.

Contract pricing: this is the ideal method, due to the fact that it measures the price of real services. One of the disadvantages is that it is difficult to apply when enterprises produce unique products and/or services.

6. How to deal with quality issues.

Quality changes are easier to measure for this industry than for others, mainly because postal and courier services are defined by characteristics that are stable over the time.

The main method used for quality adjustments is overlapping. This method can be applied because normally, new and old products are sold simultaneously, or if not, enterprises can price the old services.

If model pricing method is used, virtual services are priced, and supposing that the old and new services are offered by enterprise, the overlap method is not problematic to apply.

7. Collection of the information.

The most frequent way of collecting data is by survey (sending a questionnaire to each enterprise of the sample) or downloading the prices from the websites of the firms (normally, only large enterprises have websites). The problem of getting prices from websites is that they are list prices and usually, discounts are not reflected.

The prices of postal and courier services are quite stable. Therefore quarterly collection of data is enough to study the evolution of producer prices.

8. Specific aspects.

Postal and courier products are represented in CPI. *Handbook on price and volume measures in national accounts* (Eurostat) recommends:

'The use of detailed CPIs to deflate output other than that consumed by households can be a B method if price developments can be shown to be similar for households and business. However, CPIs unlikely to be suitable for the full range of postal services, because of the availability of discounts and the different range of products consumed by businesses. Using detailed CPIs for business purchases where it is known that businesses receive discounts or purchase a different range of products than households would be a C method'.

This guide recommends the use of representative SPPI that take account of quality changes and discounts as one of the best method (A method) to deflate output. If SPPI does not take account of quality changes or do not cover all the services, they are B methods. They are also B method UVIs and volume indicators.

9. Overview of national methods.

Austria

This SPPI is in developing phase. Model pricing will be applied as pricing method. The determining price factors selected are kind of good to handle, size, weight, destination, type of means of transportation, speed and time of delivery.

United Kingdom

Contributors are asked to price basic services, and moreover, data suppliers have to detail those services, if they are representative of their activity. Those basic services are defined based on destination (within the UK, other European Community, rest of the world and one-off contracts) and speed of delivery (same day, next day and other). The service description provided by data suppliers should included nature of the consignment, weight and origin and destination.

Netherlands

For couriers, three different types of price are collected, list prices, fictitious prices and prices of real transactions. These factors are taken into account: weight and/or size, duration between pickup and delivery, destination, insurance, tracking, inclusion of customs formalities, inclusion of extra services and bulk discounts.

For post, one respondent has been recruited yet. Its products are stratified into four classes: Big corporate clients, Medium-sized corporate clients, Small corporate clients (includes household clients), and International (international mail was excluded from the first three classes). Within each class, the top-30 products (thus

cut-off sample) are followed in the price survey (120 products in total). These products cover a significant portion of production.

Canada

Methodology based on model pricing, taking into account the following specifications for courier services prices: geographical, type of parcel by weight and speed of delivery.

For local messenger enterprises the specifications are simpler. Several cities of each Canadian region are selected and only two services are priced: delivery in one hour or less, and delivery of three to four hours.

Sweden

These indices are partly under development. The national post index is calculated using list prices from the Internet. The services which prices are being collected have been chosen together with the National Post. They are also providing turnover to calculate the weights every year.

For the rest of companies, component pricing and model pricing are going to be used. The companies which services are representative, are chosen.

Spain

This index is under development. Unit value method is the methodology chosen to develop it. The units are defined in terms of weight, destiny and time of delivery. Enterprises with more than 100 employees and/or 6.000.000 euros turnover are in the sample (representing more than 70% of total turnover on postal and courier activities).

4.8 Telecommunications

1. Description of the sector (ISIC 642 / NACE 64.2)

Business telecommunications is a very dynamic service industry, which is susceptible to both rapid changes in regulation, technology and customer movement to new services. It is one of the most challenging services against which to accurately capture current price changes. There is a global movement towards communications convergence, which may result in the integration of telecommunication services with IT services (telephone, computer and television). This makes both an industry-structure model and representative weighting pattern a challenging problem to

establish and maintain. The industry appears to change service-contract conditions as frequently as price changes, supporting the need for an appropriate quality adjustment methodology. Owing to the importance of business telecommunications in many countries, SPPIs have been widely developed⁵⁷.

Increasing government deregulation (combined with further regulation of existing suppliers) has stimulated strong competition amongst business telecommunication service providers, with a consequent trend amongst suppliers to offer better and different services to the user community. There has been a recent increase in the number of service providers as a result of government deregulation of the industry, combined with a lowering of the entry requirements. Business-telecommunication industry structure and market share is rapidly changing and it is recommended that the product and industry weights are rebased annually, if possible. This would allow rapid industry changes to be incorporated with new product services being added and old services removed, avoiding an increase in bias of the price index as the true service structure evolves. This being said, some countries implement a base-year Laspeyres index to conform with their other PPIs.

2. Classification aspects and scope of the survey

The business telecommunications activity is defined within the ISIC v3.1 6420 class with service products broadly classified in CPC v1.1 as 8411 to 8416, 8422 and 8429. Although the activity and product classifications capture the generic services of the industry, it is recommended that a PPI development construct a flexible service-product structure that reflects the national activity. In current business telecommunications, the product groupings are largely influenced by marketing, technological and regulatory considerations. The structure of collected and published telecommunication data usually exceed the detail, provided in the defined CPC structure.

Telecommunications service activity may be proposed as being divided into three fundamental categories:

- Fixed-line telecommunications services (such as Integrated Services Digital Network (ISDN) and leased circuits);
- Mobile telecommunications services (such as cellular phone services and pager services);

⁵⁷ Australia: transaction pricing, Canada: transaction pricing, Switzerland: transaction and model pricing, Czech republic: list pricing, Germany: list pricing, Finland: transaction pricing, France: transaction pricing, UK: transaction pricing, Hong Kong (China): transaction pricing, Japan: transaction and model pricing, Korea: transaction pricing, Mexico: list and transaction pricing, Netherlands: list and transaction pricing, New Zealand: list and transaction pricing, Poland: list pricing, Sweden: list and transaction pricing, Slovak Republic: list and transaction pricing, US: transaction pricing.

- Inter-telecommunications services (the connecting services of networks between telecommunications companies).

The level of service product classification for an SPPI, may often depend on the pricing method applied. When unit-value pricing is applied, the lowest level of service product detail is dictated by the available revenue and volume data. Where other pricing methods are applied (billing or rate methods) the structure of published service-rates will dictate the level of service product detail.

In PPI development, it is appropriate for the product classification system to be based on the type of service provided. This is different from the ISIC industry classification system, in which outputs are categorised by the major output of each company. In the industry classification system, all the service outputs of a company are counted in one industry division, although minor output can be quite different from the output of the industry in which the company is categorised. This can cause a subsequent problem in the use of turnover data for telecommunication-service weighting provided by suppliers, which is classified to ISIC divisions. This is becoming an increasing problem as the number and diversity of telecommunication suppliers expand.

3. Sample Design

As a preferred approach, the sample design is recommended to use Probability Proportional to Size (PPS) if possible. Options for stratified sampling, using employment or turnover as the stratification variable, may also be applied to improve efficiency of the sample through reducing variance. If telecommunication is recognised to be led by a small number of dominant suppliers, a mixture of purposive and random sampling may be considered. This could ensure that the representative and leading-company sales are always included in the sample, with the remaining companies sampled randomly. This approach is subject to increased bias as the sample number increases.

4. Main pricing method used

The dominant business-telecommunications pricing methods that have been applied include the billing-method, rate-method and unit-value method. The rate method and unit value method have been found to be the most effective in monitoring prices within both fixed-wire and wireless industries. The unit-value method has been assessed as providing the best pricing method for services dominated by usage-costs and the rate method has best application to the services dominated by non-usage. As wireless telecommunications is a service that is often biased towards usage costs, the unit value approach is favored.

Business telecommunication companies monitor and react quickly to the price structure and level revision undertaken by competitors. This causes pricing

revision to be dynamic and diversified pricing formulae to be created. Business-telecom service pricing may be generally partitioned in to three categories; fixed recurring monthly charges, fixed non-recurring charges and variable usage-charges.

In the rate pricing approach a set of profiles is established for typical service customers (small, medium and large companies) with service products identified and weighted. However, this approach does not easily accommodate the market changes in services offered and requires frequent revision.

The unit-value pricing approach is implemented by obtaining a unit-value at the lowest level of aggregation, which is the ratio of revenues (in currency) to volume (in minutes) for a homogeneous group of products.

For *fixed* line service products, a suitable list of items could be

<u>Variable charges</u>	<u>Fixed charges</u>
- Local calls	- Connection charges
- National calls	- Rental charges
- International calls	
- Calls to mobile	
- other calls	

For *mobile* service products, a suitable list of items could be

<u>Mobile charges</u>
- Calls and fixed charges
- SMS
- Connection

The revenue and volume (minutes) data may be collected from the service enterprises themselves, or from industry regulators who may provide a census of data from suppliers.

5. Costs and benefits of the alternative pricing methods used

The rate method of pricing uses a specified list of business telecom characteristics, such as unlimited calling within an area with a given number of users. The method is appropriate as long as the transaction characteristics are fully specified and constant. The billing rate is used as the price in the index. The rate method requires only one entry per rate-method collected and selection could be based on probability. The rate method reduces the concern over a bias towards

smaller accounts (as encountered with the billing method) and enterprises keep records of different rate categories and this minimises the respondent compliance burden. The rate approach avoids the reporting of items on complex bills. However, the use of the rate method may differ in its suitability for local telecommunications and long-distance telecommunications. Local telecom is sometimes based on a flat fee charge, with no usage charge. In this circumstance the rate method is suitable. However, in long-distance calling, the usage charge does not lend itself to pricing using the rate method. A disadvantage of the rate method of pricing is that it does not capture all the discounts applied and the PPI developer would need to seek an average discount for each, considered rate.

The unit value pricing method is a favoured and popular system for pricing local calls, which have a usage charge structure, long-distance calls and wireless services. The revenue of a specified service is divided by the time consumed for the service. The yielded unit value is multiplied by its base weight and aggregated within categories. In effect, the unit value method can be considered to be the rate method on a "per minute" basis. As with rate information, the telecommunication enterprises record the value and volume measures for their own analysis, which minimising the respondent burden to a survey. The benefit of unit value over the billing method of pricing is that, unlike the billing price method, the unit-value approach generates no bias towards smaller accounts caused by respondents favouring the reporting of less complex bills. The unit value approach also offers advantage over the rate pricing method in that it captures price change when services are bundled together. Neither the bill or rate method captures these price changes, when the service is priced on usage. Using a unit value approach allows the enterprises and NSIs to understand where users are using the service. The use of unit values allows the creation of relatively homogeneous categories, which ensure that movements in units between rate plans remain within the category. A disadvantage of the unit-value pricing approach is that the mix of service-products in groups does not satisfy the strict requirements of a Laspeyres index. However, community opinion is that the variance of macro-average pricing would be more accurate than the bias associated with a billing price approach. This assumption has yet to be proven. A unit value approach will not guarantee a pure measure of price change, but will provide an approximation. The unit-value approach also requires cooperation of telecommunication suppliers and/or industry regulators.

The bill method assumes that a set of representative telephone bills and prices is available throughout the lifetime of a business telecoms index. The bills in a base year could be used to define the set of services used in a base year and generate the weighting pattern. This approach is valid if the price changes are the only movement in the index and there is no change in the service use. The respondent would be asked to provide the price updates on the bill and the associated discount information. A disadvantage of this approach is that use of one service on the bill may affect the discount (and hence price) of another service on the bill (particularly with bundles services) which would require informed (and unlikely) knowledge on the part of the respondent. This approach places a large burden on the survey respondent and has been shown to bias the survey response to smaller, less complex bills.

6. How to deal with quality issues

There is a community concern for business telecommunication on how and when to introduce new services and omit old services from the index. When using a base-year Laspeyres index, introduction of a new service and weight generation can be difficult, with turnover data sometimes not available for the base year. Equally, non inclusion of new services or continuation of old services can create a bias in the index which can increase with time. The unit-value approach can partially reduce the need for a quality adjustment methodology as the use of average, weighted prices can accommodate migrations between services within product classes.

7. Collection of the information

The collection of survey responses may be undertaken from either a sample of individual enterprises or from a central industry regulator. When collecting from enterprises, it is recommended that an initial visit by a field officer is undertaken. This will brief the respondents and ensure appropriate initial collections. Survey responses should be assessed at each collection to detect changes in service provision specifications and to track corporate usage.

8. Specific aspects

Business telecommunication services change rapidly in their specification, with rapid migrations of corporate usage. This should require a developed PPI to undergo frequent quality assurance to maintain its relevance.

As the business telecommunications industry (and associated type of services and pricing menu) is driven from technological change, future development of a business telecommunications PPI should be directed to addressing the following shortlist of concerns and pricing limitations voiced from the price-index community.

- To move to re-weight the service products on a more frequent basis to capture rapid changes in service consumption.
- To research methods of capturing the price of bundled service products (with discounts) which is increasing as an industry practice to corporate customers. This will likely increase as convergence of the telecommunications and IT activity increases.
- A standard method of quality adjustment of business telecommunications would be useful to capture the improved transmission of data and speech through improved technology.

In fixed-wire services, there is a strong, current trend in the provision of corporate, broadband internet-connection services. This should be considered in a PPI structure of telecommunications services. In wireless services a future trend is identified towards third-generation (3G) communications, which will offer the ability to transmit data at a greater rate than before and support a greater diversity of service.

The globally slow increase in popularity in the use of mobile internet access, will depend greatly on the willingness of national governments to release (through sale) wider spectral bandwidths of the radio-frequency spectrum. It is likely that the mobile telecommunications market will consolidate with time, under the pressures of limited spectral bandwidth available to smaller enterprises and resulting reduced service capability (with small fund availability) and the need of larger companies to acquire wider bandwidth through acquisitions.

A selection of recent and representative references is provided (See [5], [12], [14]).

9. Overview of national methods

In Japan, the PPI is priced using a sample of services and actual transaction or model prices are collected. The pricing scheme captures discounts on a real-time basis (where they are applied before the release of the statistic) or retrospectively (through a revision of the PPI series when the discount becomes later known). The telecommunication services are partitioned (at a top level) into:

- fixed telecommunication services;
- mobile telecommunication services;
- inter-telecommunication services.

In Italy, the business telecommunications price is collected through a Consumer Price Index (CPI) and is partitioned at a top-level into fixed-line networks and mobile networks. For both fixed-line and mobile networks, a basket of services is used, which (for each major supplier) samples the most widespread types of contract for the services offered (weighted according to the average consumption). The approach has recognised the tendency of the industry to change the contract as frequently as the price, supporting the need for quality adjustment. In the mobile market, contractual customers are identified as corporate or household. However with mobile rechargeable-card services, it has not possible to distinguish between corporate and household usage. The CPI applies annual chain-linking, allowing the annual reweighting of service activity and updating of the service structure (introducing new products and removing obsolete services when they cross a revenue threshold). There is no discrimination between corporate and non-corporate activity.

The United States of America have recognised the weaknesses in the billing method and has moved to use a mixture of rate and unit-value pricing.

The UK applies a unit-value approach to both fixed-line and mobile services, using revenue and volume data from the UK industry regulator Ofcom. The unit-value approach replaces the previous rate method of pricing.

4.9 Real estate activities with own property

1. Description of the sector (ISIC 701 / NACE 70.1)

Real Estate is an area of the economy that affects everyone, from the large corporation to the individual homeowner. For this reason it is important to accurately monitor price movements within the industry.

Real estate services encompass a range of activities concerned with the buying, selling and renting of commercial and residential properties. This paper focuses on the corporate sector.

2. Classification aspects and scope of the survey

The development of this industry was based around services provided by companies in the UK Standard Industry Classification (SIC 1992) 70.20 and 70.30. There is an additional section of the Real Estate SIC, buying and developing own real estate, which does not have a corporate element so is not covered here.

Output relates to two main areas. Firstly, the services provided by real estate agents as intermediaries in the selling, letting and acquisition of properties, other property management and related professional services. These services are mainly provided to the property owners although some are to prospective purchasers or renters. Secondly, the provision of rented accommodation (non-residential) with payments made to property owners either directly, or via an agent.

This feature has led to the development of two separate price indices:

- Real estate agency services
- Letting of self-owned property

Real Estate Agency Services is split primarily into Agency services, Property management and professional services with an approximate 40/30/30 percent split in terms of turnover.

For each of these components activity is split into 4 main categories of property: office; retail; industrial and others.

Letting of self-owned property (non-residential). This is the provision of rented accommodation for non-residential purposes, measured by total rental payments to the property owners either directly, or via agents acting on behalf of the owners. In practice it can also include other services, such as use of utilities, ground leases, maintenance charges, and business rates. As with estate agency services the sample is set up to represent the same four areas of property: office; retail; industrial and other.

Due to major pricing differences across parts of the UK the industry index is split into the following regions:

- London;
- Southern England;
- Midlands and Wales;
- Northern England and Scotland.

Northern Ireland is not yet covered by the index.

3. Sample design

For the first of the two sections identified above, real estate agency services. The sampling frame is structured using the following properties: region; type of property and the type of estate agency activity. For each component of the industry structure two elements are surveyed separately and combined to produce the index. These elements are commission rates and property value indicators.

Information for the letting of self owned property is taken from an external source. Data are obtained from a monthly index run by the UK Investment Property Databank (IPD) who are recognised as established providers of the industry standard.

4. Main pricing method used

The two indices, Real estate agency services and Letting of self-owned property, require different pricing methods but they also complement each other, and together represent the majority of corporate service activity within the real estate sector.

The first combines data on commission rates collected from real estate agents with indices of capital values and rental values provided by an external organisation (the UK IPD).

The second uses an index of the rental income from investment properties also provided by IPD, and which is treated as a proxy for this sector of the industry.

There are four main methods used for the charging of estate agents services:

- Commission: a percentage of the sale value or a percentage of the rental charges,
- Fixed fee,
- Incentive fee based on a percentage fee above a specified amount,
- Work charged on an hourly basis, for example, receivership work, court work and expert witness work. These activities account for a relatively small proportion of industry turnover.

Approximately 80 per cent of real estate agents' work is charged for by applying percentage fees, by far the most common method. However, small contracts will be charged on a fixed fee basis and some areas of professional services will be charged on an hourly basis. For rent review work estate agents will typically receive a percentage of the savings accrued.

Property management services tend to be charged on a contract basis. Although contracts may be repeated, aspects of the contract can change leading to difficulties in the measurement of pure price changes and quality changes.

A number of factors will determine the percentage commission charged for selling property. For example, if it is thought that the property will sell relatively easily and the customer agrees on the price recommended, the rate of commission will be relatively low. Property located in prominent location may be charged a lower rate of commission. Selling can occur by sole agency, joint agency. With sole agency the sole agent receives the commission. With joint agency, the commission is usually shared among the joint agents. Occasionally with joint agency, the first agent to introduce the final buyer will get the commission, but this is quite rare.

Letting services are typically charged for by a percentage rate of the first year's rent, regardless of the number of years in the contract.

5. Costs and benefits of the alternative pricing methods

The UK Investment Property Databank is an independent, information specialist business, dedicated to performance measurement and market analysis for the property industry.

Data collected by IPD are checked for accuracy and validity, providing an overall service offering good value for money whilst simultaneously meeting the requirements of CSPI.

6. How to deal with quality issues

The effectiveness of the current methodology will be examined as part of the quality assurance process to which all industries covered by the CSPI are subject.

For real estate agency services, there will be particular emphasis on the usefulness of collecting the data on commission rates. The theory of collecting such data and combining it with information on property values (as described earlier) seems fairly sound. However, what appears to have happened so far in practice is that commission rates rarely change and, when they do, it is a result of a change in the service being provided (and so a specification change or quality adjustment ensues). Changes in the index so far have therefore been very closely related to the changes in the capital value and rental value indices that are used. This raises the question of whether or not the capital value and rental value indices might be good enough proxies for a price index on their own.

Occasionally contributors have had difficulty in quoting rates for agency work, as it can be part of an overall package provided to clients. In these cases charges for any one particular service can be influenced by those for others, e.g. agency work could be partly affected by any valuation or consultancy work carried out at the same time. In such instances, quotes are provided for specific transactions that do not reflect the full range of business of the contributor.

There have been a few difficulties with contributors interpreting the representative commission rates that are required. For example one contributor took an average of 10 transactions for each market sector and calculated the average commission rate for each sample. However, quarter on quarter changes tended to be caused by changes in the mix of properties in those samples rather than market pressures on their own. The contributor was asked to pick out typical transactions for each market sector and report on those each quarter, e.g. the commission rate for the letting of a 5,000 square foot office property in a particular kind of location.

7. Collection of the information

Commission rates are combined with capital value or rental value indices for each of the components of the sample structure. Each of these components has a weighting that relates to the base period to enable the construction of a standard Laspeyres price index. These weightings were derived from turnover data collected from the contributors when surveyed for the first time (then updated in a separate turnover inquiry in 2001 to rebase the CSPIs to year 2000).

Combining the commission rate figure with the appropriate capital value or rental index value derives price relatives for each component for each contributor. The index values as provided are used which means the actual capital or rental values do not need to be used in the calculation. Price relatives for each component across all contributors are then calculated (using the weights derived from turnover data).

The IPD capital value index is derived from figures for capital growth: the change in capital value from one valuation to the next net of any capital flows, divided by capital employed. (Capital employed is the capital value at the start of the year plus half of any net capital flow, and half of income receivable, i.e. flows of capital and reinvested income are assumed to be spread evenly throughout the year.)

The IPD rental value index is based on estimates of rental growth, which are the percentage changes in the rental value used in the valuations from one year to the next.

The gross income index used for property rental payments is derived from calculating the changes in gross rent receivable.

8. Specific aspects

The rationale for combining commission rates with property value indicators is recognised internationally, e.g. by the National Accounts Working Party's Task Force on "Price and volume measures for real estate, renting and business services". For the record though, this is reiterated briefly here.

Monitoring estate agents' margins only could produce misleading results, e.g. if margins remained constant at 5% say, the index would remain constant. However, if property prices are increasing then the income earned would be increasing – and so this needs monitoring too to enable a true measurement of estate agents' charges.

9. Overview of national methods

The Australian real estate industry is divided into two main sectors: residential property and commercial/ industrial property. Each of these sectors can be broken down into two main components: property sales and property management. The real estate index is therefore composed of the four activities: sale of residential property; sale of commercial property; management of leased residential property and management of leased commercial property.

In the US the index for Lessors of non-residential buildings tracks rental payments to the owners of non-residential buildings or properties.

Lessors of Non-residential Buildings (SIC 6512) are establishments primarily engaged in the provision of non-residential buildings to others for rent. Establishments in this industry own non-residential property, and lease it to others (tenants). The leasing of non-residential buildings has two parts. First, the physical space is contracted through a lease. Second, the management of the entire space consists of heating, cooling, electrical, plumbing services, maintaining the physical structure and maintenance of common areas (hallways, lobby and outdoor areas).

In Japan real estate services are divided into four categories. The first provides rental services of real estate for residential use. The second provides rental services of real estate for non-residential use. The third category provides agent or intermediary services, such as for buying, selling, and renting real estate. The fourth concerns services related to the management of real estate.

The Corporate Service Price Index (CSPI), compiled by the Bank of Japan, covers services traded among corporations. In other words, the CSPI does not cover the services to the consumer households. Rental space services for residential use, and a part of agent, intermediary, and management services for households are thus beyond the scope of the CSPI. The CSPI covers space rental for business use, the rest comprises agent, intermediary, and management services for businesses.

10. Future developments

The inclusion of other real estate agency services, such as valuations and property management, will be pursued in the future. This will depend though on an assessment of the extent to which the current proxy indicator is a suitable indicator of price changes for all real estate agency services.

Commission rate data are collected by region and, ideally, should be combined with regional indices for capital and rental values. Such indices will be pursued with IPD and their impact on the existing index will be assessed, along with the capability to produce regional CSPIs for this industry.

The data provided by IPD relates to the properties included in their survey. It appears that there are other kinds of non-residential property that may not be covered by these, such as those not held for “investment purposes” (according to the definition used by IPD). So, as for real estate agency services, the appropriateness of the existing proxy indicator needs further review.

4.10 Computer and related activities

1. Description of the sector (ISIC 72 / NACE 72)

In many countries, computer services are an increasingly important part of the total production of services. Accordingly, the national accounts have given high priority for the development of a price index for this area. During the Voorburg group meetings of 1999, 2002 and 2003, several countries⁵⁸ presented their work for developing a price index for computer services. Some of the areas of computer

⁵⁸ Australia, Canada, France, Sweden, the UK and the US

services presented included pre-packaged software, facilities management, maintenance and repair services, system design and data processing.

Computer services are often quite complicated and uniquely adapted to the needs of the customer. Different types of services are combined in various ways and tailor-made for the customer, thus making it difficult to define the service. The computer services industry exhibits rapid changes. New enterprises are being founded as others end their activities. Moreover, mergers are common. There are also changes taking place within enterprises, often through specialisation or a broadening of activities. During times of economic decline, many enterprises concentrate on improving skills within their own organisations instead of hiring external consultants. Larger enterprise groups often have their own companies that only sell computer services to other companies in the enterprise group. These services are not usually evaluated at the market rate.

2. Classification aspects and scope of the survey

According to ISIC, International Standard Industrial Classification of All Economic Activities, Rev.3.1 code 72, computing service activities are classified as:

721 Hardware consultancy

722 Software publishing, consultancy and supply

723 Data processing

724 Data base activities and online distribution of electronic content

725 Maintenance and repair of office, accounting and computing machinery

726 Other computer-related activities

The ISIC makes no distinction between pre-packaged and customised software. Pre-packaged software services can furthermore be divided in to three levels: programming languages and compilers, operations systems and applications (sold as a suite or separately) and games.

Many times, the service is a combination of two or more of the above-mentioned categories. However, it is usually so that small enterprises only handle data consultancy or repair and maintenance services. On the other hand, enterprises that also offer operational services are usually somewhat larger enterprises. There are usually no clear-cut definitions between the various service areas, but rather, services often consist of a complete package of services where specialists in different areas cooperate together.

3. Sample design

PPS sampling by turnover or number of employees is recommended. If the sample size is large enough, a stratified sampling can be an alternative. As the computer industry is very changeable, it is suitable to frequently draw a new sample and update the weights between enterprises as well as services within enterprises. In order to reduce the response burden on small enterprises, it is advisable to investigate for each type of computer service if the sample should be drawn from all enterprises or if it is possible to make a cut-off limit at some level.

4. Pricing methods

Model pricing, contract pricing, specification pricing, hourly rates and fixed fees are the main types of pricing methods used for services.

Model Pricing

With this method, the respondent is requested to give a price for a fictive, well-defined service. In practice, an offer for a specified job is requested, and then the price is again set in the coming periods. The method gives a theoretically correct price concept since it takes changes in production into consideration. The method can be used either for the whole contract or separate services. A model can also be formed by choosing a number of representative personnel categories to conduct a fictive job. Hourly prices and the number of hours needed to conduct the work are then collected.

Contract Pricing

The respondent chooses a representative contract among existing contracts, and the price is once again set for the coming periods. By representative, we mean that one chooses a contract with a customer who is expected to be long-lasting, or with whom the contract is expected to be extended.

Component Pricing

The respondent chooses a representative service, which is broken down into a number of key components. The components are then priced in future periods.

Hourly rates

Hourly rates can be divided into at least three categories; list of hourly rates, realised turnover per hour and average hourly rates, of which the last two are transaction prices. It is advisable to split up the staff by category and level of experience. In most cases, a list of hourly rates barely constitutes a reference for

prices and is usually used only by smaller enterprises. Furthermore, the price lists are usually only updated once a year.

Fixed fee

A fixed fee can be used for more regular services. Fixed fees are used when it is known how much time a certain personnel category needs to carry out a certain type of work.

The most common pricing method used for hardware and software consultancy services is hourly rates. However, even model pricing in the form of a model consisting of hourly prices and the number of hours for different personnel categories occurs. Contract pricing for consultancy services has been experienced as well.

List prices and specification pricing is generally used for pre-packaged software. Prices for pre-packaged software and games can be collected in shops and list prices can be combined with the information of discount rates to the retailers. However, standard software programs are not only sold over the counter in shops, but also via other channels and in different forms. It is common that the company pays for a license to use the software rather than purchases a package in a traditional sense. Either the price of the package, the price of the license or both are priced.

Model pricing can be used for data processing, information storage and retrieval services. Computer facilities management means that the client's IT system is taken over as part of a long-term contract. Specification pricing, model pricing or average hourly rates are used for these services.

Fixed fees and model pricing but even hourly rates are used for maintenance and repair services. The maintenance services refer to the servicing of computers, etc. during the time period specified in the service agreement. However, repair services refer to the repair of machinery after the period covered by the service agreement and a price is paid per repair job. Hourly rates are commonly used for repair services and call centre services.

5. Costs and benefits of the alternative pricing methods

Data consultancy services are often unique for each customer, and are often combined with operation and maintenance services. The contract is also complicated and detailed. Use of model pricing or contract pricing for these services involves a considerable burden on respondents. It could be feared that enterprises to a large extent then choose only small assignments for price measuring. A heavy burden on respondents can also lead to lower quality of information received as well as non-response. Estimating volumes based on virtual projects needed for model pricing is difficult. In addition, the model needs to be reviewed often, so that measured prices

are up-to-date. This is especially important concerning industries that rapidly change their assortment of services. The problem with quality evaluation arises when a new contract is written, or when there is a change of customers.

Collecting data on realised turnover per hour or average hourly rates decreases the burden for the enterprises in comparison with model pricing and contract pricing. In addition, the data is often available in the standard accounting system. However, the method does not take changes in productivity into consideration, which may result in an upward bias in the price index. By dividing up consultants into different categories of staff and experience levels, we try to measure prices at constant level of quality of services. It is important to include the effects of discounts, and thus list prices are not recommended.

Operational contracts are often very complicated and uniquely formulated for each customer. The disadvantages with contract pricing for consultancy services described above also apply to facilities management services. On the other hand, specification pricing can be used by first dividing up a contract into representative components, and then measuring the prices for these components. However, since operational contracts are often priced as a package, some enterprises may have difficulty in breaking down operational contracts into detailed levels. This problem may be reduced in the future, since nowadays customers often ask for detailed price information.

6. How to deal with quality information

When measuring hourly rates for consultancy services, it is important to break down the consultants into different categories of staff and experience levels. By doing so, constant level of quality of services performed can be maintained to the greatest possible extent. Today we lack the tools to measure changes in productivity per consultancy hour.

The pricing of computer games is a difficult issue as the games often are popular for a very short time. Another difficult issue is the comparison of licenses to use the software as the content of the licenses changes quite often. Two quality adjustment methods used today for pre-packaged software are the maximum overlap method where products that are available during two overlapping periods are measured, and "link-to-show no change" where the whole price change is thought to be due to a change in quality. In case of a version update, a direct comparison to the old version can be used. Further, the possibility to use Function Point (FP) Analysis⁵⁹ as a measure of constant quality output for pre-packaged software has been studied.

⁵⁹ Function Point Analysis is a technique of breaking software systems into small standard functional components, so they can be analysed and compared. Function points are a unit measure for the size of software output for each standard function component, which can be used to measure productivity, unit cost and quality of the software projects.

At this point, the Hedonic model has been rejected due to problems with model specification and lack of relevant data.

The overlap method can be used as a quality adjustment method for maintenance and repair services. The method means that the value of the quality change of maintenance of a replaced computer model and replacing computer model is assumed to be equal to the difference in price between maintenance of the two models during a period when both models are available.

7. Collection of the information

By using the simplest possible methods, the quality of answers can be increased and non-response reduced. Personnel in the finance department fill in most of the questionnaires. These people may have trouble in evaluating quality without the help of personnel who have more understanding of the operations and services performed.

8. Specific aspects

The computer industry is characterised by many rapid changes. Accordingly, it is important to closely monitor the existing indices at regular intervals. This is also true for samples and specification of services. In order to make quality adjustment of the price index based on hourly rates, we need to develop methods to measure changes in productivity per consultancy hour. This work is probably best done in close cooperation with enterprises in the industry.

9. Overview of national methods

For computer consultancy services, Australia uses model pricing in the form of hourly charge-out rates for different staff levels as well as price per unit of work, e.g. price per job. Model pricing is used for data processing, information storage and retrieval services as well. On the other hand for maintenance services hourly charge out rates is used as pricing method.

An input approach to derive a price index for computer consultancy services is used in Canada. The labour cost index is combined with the realised net multiplier index⁶⁰ using a geometric average to calculate a total price index. The indexes are subject to revision. This input approach is used for data processing, hosting and

⁶⁰ The realised net multiplier is calculated from ratios of the annual revenue from contracts for informatics professional services to the expenses incurred to complete these contracts.

related services as well. For pre-packaged software, final purchase prices are collected and used for the deflation of investment expenditure of businesses in the final demand category of GDP.

In France, the method for measuring the price development for consultancy services is based on transaction prices per day and per qualification. In direct sales of software packages to the end user, catalogue prices are monitored. In the case of indirect sales, the rates of discount given for retailers are monitored. For facilities management services, studies on comparing the approaches model pricing and average price per unit of work are on-going.

In Sweden, computer consultants are first divided into different categories and experience levels, and average hourly rates are then collected. For facilities management services, specification pricing is used; average prices per unit of work for supervision of servers, information storage, supervision of data communication, back-up services and placement of computers are collected. Fixed fees and model pricing are used for maintenance services for computers, printers and servers. For repair services, average hourly rates are collected.

In the United Kingdom, daily or weekly consultant rates are used for IT consultancy services. Contract pricing is used for facilities management and outsourcing as well as for software maintenance and support. A price for unit of work is collected for data processing services.

As the pre-packaged software products have a short life span, in United States a large sample is drawn based on probability proportionate to size, representing suite and non-suite application software, computer games and system software. The prices reported for licenses are primarily based on transactions for single and multi-user licenses sold to distributors, retailers, large business etc.

4.11 Legal activities

1. Description of the sector (ISIC 7411 / NACE 74.11)

The actors of the legal services sector can be differentiated between lawyers, barristers and solicitors, notaries and patent attorneys. The lawyers, barristers and solicitors deal with advising clients in legal matters as well as disputes (consulting in non-forensic affairs, mediation) and represent them in courts of law and other legal agencies. Most of the lawyers specialize in legal activity fields such as civil, commercial, criminal, family, fiscal, insurance, labour, renting, social, traffic law etc..

Notaries are responsible for stating legal situations in the field of family, company and real estate rights such as real estate contracts, partner inscription in company registers etc..

Patent attorneys accompany their clients from the invention, over the declaration of a patent for the innovative product or services, the protection of the product or services from competitors' patents until the prolongation of a patent.

The three groups differ in their education and skills: from notaries with the most profound education in law to patent attorney with a more technological and science background and less detailed knowledge in law.

The legal activity services sector is a relatively regulated market as the state has to keep law and order for its citizens. That is the reason why the legal activity services sector is very much structured according to country specific requirements. The systems of Central European countries differ tremendously from the Anglo-Saxon legal systems. Here legal practice follows laws and acts whereas in Anglo-Saxon countries the jurisprudence is mainly focused on precedent cases. The degree of regulation is higher in these countries compared to the Anglo-Saxon countries.

2. Classification aspects and scope of the survey

The legal activity services are classified according to NACE 74.1 Legal, accounting, bookkeeping and auditing activities; tax consultancy; market research and public opinion polling; business and management consultancy; holdings. Here in 74.11 Legal activities the tasks of the legal advisers are defined.

Taking the service product classification the CPC codes for these sectors are 82111/19/20 /30.

Lawyers legally represent one party's interest against another party, whether or not before courts or other judicial bodies, by or under supervision of persons who are members of the bar. They advise and represent their clients in civil cases, criminal actions or in connection with labour disputes. They do general counselling, advise their clients in legal affairs and prepare legal documents. The latter is mainly the case for notaries and patent attorneys.

Explicitly law court activities are excluded, they belong to NACE 75.23.

The scope is to generate producer price indices for the legal activity services. The objective of price statistics is to collect prices that refer to products and services which are in advance well defined and for which a constant quality over time is more or less guaranteed. In the legal activity service sector it is difficult to find standard products or services that do not vary in quality over time and/or with the client. The legal adviser usually has to take respect of individual customer needs. A legal case hardly ever occurs again in the future with the same preconditions and rule of interpretation.

On a quarterly basis the SPPI are going to be produced though in the legal sector no extreme price changes are expected within one year.

In many countries a CPI (development of prices for households) for legal services has already been generated. But the pricing method of the SPPI is different⁶¹.

3. Price mechanisms

It has to be made a strict distinction between price mechanism which gives an overview over market structure and processes how the prices are set and price method which gives an overview over the statistical methods how the prices are analyzed and integrated in the SPPI.

Firstly an overview is given over the price mechanisms in the legal sector.

It depends on the country's legal system and degree of regulation which billing method is used most. The Anglo-Saxon countries usually charge fees after free price negotiations and sometimes on success basis whereas e.g. in Germany the scales of fees still play an important role for price setting (though tendencies of deregulation can be revealed). Especially the very specialized lawyers and those who possess a certain degree of market power are able to push through their price ideas in free contract negotiations.

A Freely contracted fees

Freely contracted prices are charge-out rates, ad valorem or flat rates.

Charge-out rates (hourly rates)

The client pays an amount that equals the multiplication of a person day – usually eight hours - with the hourly rate. The rate itself can be negotiated between client and attorney. It is of interest that the hourly rate in general is independent of the legal activity field. After a long education and intensive practical experiences on the job these experts expect a certain compensation for their work irrelevant of what tasks they have to fulfil for their clients.

Many middle-sized and big companies (regarding their turnover) use a list of external commercial hourly rates for different staff levels. Smaller companies use to have an average hourly rate for all employees dealing with the cases. Contrary to big companies the secretary or support staff is not billed separately but integrated in the general average rate.

Ad valorem prices

⁶¹ A major difference being the principle “Business to business” or “Business to all” (see the current discussion) versus “Business to private households” in the CPI.

In many countries, especially in the Anglo Saxon legal systems, *ad valorem* prices are found as freely negotiated prices (in the Central European countries they rather exist in the legal scales of fee). They are either a proportion of the value of claim or the fee relates to price classes which represent the various values of claims. So the client does not negotiate about the amount of the value of claim but about the proportion or factor that relates to it.

Flat rates

Flat rates that integrate all modules for a complete case are also charged - here time and the single service expenditures are not exactly calculated. The client is offered a fix base of calculation, these rates occur more often in the Anglo-Saxon countries than in the others.

Success-correlated fees

In the Anglo-Saxon countries free price negotiations are common. In these countries the lawyer's performance is more honoured than elsewhere as fees on success basis are permitted by the legislative which is not allowed in other countries.

B Scales of fee

Scales of fees that exist in Central European countries have their origin in the legislative and regulate the market prices.

Fix fees

In the fee scales a certain amount of fee is listed that relates to a precisely defined legal service. They apply to standard and routine matters that do not require a detailed and elaborate occupation with the case and client (e.g. signature authentication).

Ad valorem prices

This kind of fee represents the most important and the most occurring share of turnover derived from the scales of fee. The amount of fee increases stepwise. It does not rise proportionally with growing values of claim. The proportion of the fee corresponding to its value of claim decreases with rising value of claim.

In most cases the legal advisers either set charge-out rates after free price negotiations or they bill *ad valorem prices* according to the scales of fee.

4. Main pricing method used

Secondly the statistical approaches are listed in the following how to develop SPPIs from the given price types.

As mentioned thinking of turnover figures in most cases the legal advisers either set charge-out rates after free price negotiations or they bill their fees according to the scales of fees. Therefore regarding the legal activity service sector only the time-based method that covers charge-out/hourly rates and the model pricing approach which is based on *ad valorem* prices will be discussed as price methods in detail.

A Time-based method (charge-out rates / hourly rates)

As law companies and legal advisers usually do not publish prices of their hourly rates or services these rates have to be surveyed via direct inquiry. In the questionnaires it has to be distinguished between middle-sized/big companies (regarding their turnover) that differentiate their hourly rates according to staff levels running from (senior) partner to secretary and freelancers and smaller offices that charge an average hourly rate. Contrary to big companies the secretary or support staff is not billed separately but integrated in the general average rate.

It is essential to verify whether these list prices are actual prices. It has to be paid attention to the fact that list prices often do not represent real market prices. The issue of list prices is discussed in the general part of the manual (chapter 2.4.1).

The charge-out-rates approach offers the advantage that the official statistical inquiries can be kept short and simple. However, methodologically spoken hourly rates are considered as an approach less preferred than others as lawyers charge per hour independently of their performance or success in the case. Here the output cannot be defined precisely which would be the requirement of price statistics.

B Model pricing

There exist two approaches of model pricing in the legal activity service sector:

- i. Model pricing on the basis of a scale-of-charge system
The Official Statistical Office itself calculates the price of a given model case on the basis of the legal scale of fee. The model case is defined through criteria such as activity field, kind of claim of the client, participants in the case, amount of value of claim, date etc. The prices are observed over the time changing due to changes in the scale of charge and/or values of claim.
- ii. Model pricing involving surveys
Model cases are defined through the same criteria. Difference is that

the respondents have to answer questions about possible price changes in the model cases. Here no scale of fee is the basis of price calculation but the negotiation between lawyer and client.

Both variants of model pricing can contain as basis either real cases or fictive cases that are modelled with the help of experts.

Due to the experiences of the last two years the first type of model pricing based on a scale-of charge system is described here in more detail.

The legal scales of charge as they exist in Central European countries have their origin in the legislative and regulate the market prices. They contain two types of prices:

Fix fees regarding price statistical purposes are easy to follow up by desk research. The Statistical Office has to look up the updated versions of the scales of charge and observe the occurring price changes.

Ad valorem prices are the most important fee type in the scales of charge regarding turnover figures. The observation of *ad valorem* price changes is analyzed in an elaborate system of model pricing. Changes of *ad valorem* prices most often depend on changes in the values of claim. The other factor which has an impact on price changes is the adjustment of the legal scales of fees which, as mentioned, occurs very seldom – they normally are stable and are not adjusted for a longer period of time

Nevertheless, it is difficult to define representative values of claim as legal cases differ from client to client and time to time.

Changes in the values of claims of the various activity fields have to be followed up with the help of adequate reference indicators. These reference indicators shall highly correlate with the value of claim over time. Reference indicators shall form a system of comparable, consistent and plausible data. Specific indicators may be (e.g. for notaries) housing price indices or data from National Accounts. .

Before the current price observation will be initiated a weighting pattern has to be calculated which weights the activity fields according to their total turnover of all companies of the industry sector. So here a relatively detailed aggregation level can be generated. On the basis of the weighting pattern the observed price changes will be calculated with the help of a Laspeyres type index.

Regarding the patent attorneys there are also difficulties in producing a weighting pattern for their activity fields. The patent attorney usually takes care of the client throughout the product life-time and a distinction between the different patent phases is not done by the patent office – neither in their bills nor other documents -and therefore a differentiation of the activity fields can hardly be estimated.

5. Sample Design

In order to gain insight into the structure of the market participants of the legal activity services sector it is recommended to contact the chambers that represent lawyers, notaries and patent attorneys. By this information the sample can be stratified according to company size and turnover or employee figures.

A random stratified sampling according to turnover is considered to be the most adequate method for the set-up of inquiries. Regarding increasing company size it should be evaluated to use a total sample as the big law companies usually represent the dominant market players and price drivers.

6. Data collection

Two kinds of data collection in order to receive the relevant information for the construction of SPPIs are preferred:

1. Charge-out rates (hourly rates) in the area of free price negotiations can easily be followed up by direct inquiry of the respondents of the various sectors – via a written questionnaire (mail or online). By this method the weighting pattern can be calculated as well as information about price structures can be received. Partly it is recommended to contact the bigger legal companies according to their turnover relevance via telephone or in personal interviews.

2. The model case approach is the preferred method to reveal *ad valorem prices*. Model cases are constructed with the help of experts which show alternatives of the various legal activity fields as well as different amounts of values of claim. Here in the legal sector it is a difficult task to construct representative cases as no legal case is identical over time and distinguishes from client to client. So a couple of adjustments may be necessary over the time.

7. How to deal with quality?

Generally spoken quality changes in the legal sector can hardly be revealed. Technological progress in the information and communication sector (eg PC-equipment, velocity of data transfer) has also an impact on the work of lawyers and notaries, but not to such an extent that technological progress would lead to a new input/output relationship.

On the contrary, legislation is of a very complex nature. The complex legal systems surely outbalance any technological progress or quality changes in legal works. Their measurement is difficult to conduct.

Concerning charge out rates productivity progress is a factor which may influence the service and product quality and which is difficult to measure.

Model cases should be revised over the time to a certain extent which does not neglect the comparability of data.

8. Burden for the respondents

Charge-out rates can easily be answered by the respondents via a simple and short questionnaire. However, this target group is especially reluctant to give away their hourly rates.

Model pricing based on a scale of charge system provides the advantage that the fees can be followed up by the Statistical Office without inquiries in the area of the scales of fee. In the beginning experts and chambers have to invest time and efforts to set the cases. But after completion of the modelling lawyers are released from further official tasks.

9. Specific aspects

Exports are not relevant for legal services activities. The legal system is country specific. For international cases the lawyer collaborates with corresponding partner law companies.

The timing which prices of which period should be included in the analyses for the SPPI is an important question. Legal cases often last longer than a year. So this could be solved by regarding the prices at the point time of contract closing as relevant for the SPPI.

10. Overview of national methods

The Australian Bureau of Statistics has been developing an SPPI in the area of legal activity services since 2000. Fees are billed according to values of claim as well as hourly rates. Due to the fact that changes in the values of claim are difficult to observe Australia puts focus on the collection of hourly rates and neglects the fees depending on the values of claim.

Austria started its works for the construction of an SPPI in the legal activity services sector in December 2002.

In Germany the works with the SPPI construction started in April 2003. The pilot study has been finalized in December 2004 and submitted to Eurostat. Nevertheless some fine-tuning of the methodological approach is still necessary. Soon after the adoption of the amendment of STS-regulation a publication of SPPI for legal services is to be expected.

Since 2004 there are tendencies that the German legal market becomes more and more deregulated (this does not apply to the notaries). In non-forensic cases law not only allows but also supports to run free price negotiations.

The main important fees of legal advisors in Germany can be differentiated between charge-out rates (hourly rates) for the area of free price negotiations and fees on the basis of the legal scales of charge for the regulated market area in forensic cases - here *ad valorem* prices⁶² represent the most relevant fee type relating to turnover figures.

In Japan the legal services industry is divided into services related to cases and disputes, to intellectual property rights and to legal documentation and certification. There are higher regulations than in the Anglo-Saxon countries, but price negotiations are undertaken by the market not by the legislative. In Japan hourly or monthly rates are surveyed, for patent services registration and application fees are observed. The index for legal activity services has been published since 1985.

New Zealand's legal activity services sector is structured by a mixture of large and smaller businesses. It is partly regulated. Nevertheless, the price finding processes run freely and are due to contract negotiations between client and the law company. Scales of fees were abolished long time ago. Statistics NZ use two approaches to develop a legal activity services SPPI: model pricing and charge-out rates. Additionally the published SPPI (since 1994) is distinguished between a corporate and a personal/private part¹.

In Sweden price collection has been carried out since the first quarter of 2003. Price information is collected on the average invoiced hourly rate for the following categories of staff: part owner, associate 0-2, 3-5 and 6-9 years professional experience. The index applies to the price development of legal services for enterprises.

In the USA the US Bureau of Labor Statistics has been issuing SPPIs for the legal activity services since 1995. Here the law companies are differentiated between firms with a national practice, firms with a regional practice, specialty or "boutique" firms, and local practices.

In the USA the market is hardly legally regulated and fees are often calculated on success base. Usually the business relationship is based on freely negotiated contracts between the law company and the client.

⁶² *Ad valorem* prices correlate positively to the amount of claim of the legal case (in Germany the legal scale of fee provides tables that list the amount of fee for the corresponding value of claim – the correlation between fee and value of claim is not necessarily proportional).

The standard ways to pay for basic legal services include hourly fees (the most common arrangement), flat or project fees, retainers, contingency fees, percentage fees, and a combination of two or more of those methods. Hourly rates are adjusted almost yearly and take into consideration the market development and cost of living.

The Bureau of Labor Statistics collects both fixed fees (for real estate transactions, simple divorces, wills) and hourly rates.

4.12 Accounting, bookkeeping and auditing activities; tax consultancy

1. Description of the sector (ISIC 7412 / NACE 74.12)

The different services in this sector include Accounting, bookkeeping, auditing services and tax consultancy. The large firms concentrate more on auditing and tax consultancy while the smaller firms focus more on accounting and bookkeeping.

The Voorburg Group prepared a paper on Accounting services for the September 2001 meeting in Sweden and looked at the situation in eight different countries and in particular it looked at the position in Canada.

In Ireland there are approximately 1,700 accountancy enterprises, employing almost 12,000 staff with a turnover of almost €1 billion. There are 4 main players in the industry.

2. Classification aspects and scope of the survey

This group corresponds to 7412 in ISIC Rev.3 and Class 74,12 in NACE Rev. 1.

The class includes:

- Recording of commercial transactions from businesses or others
- Preparation of financial accounts, examination of such accounts and certification of their accuracy
- Preparation of personal and business income tax returns
- Advisory activities and representation (other than legal representation) on behalf of clients before tax authorities

This class excludes:

- Management consultancy such as design of accounting systems, cost accounting programmes, budgetary and control procedures
- Bill collecting

3. Sample design

Sampling of companies is based on the Business Register and the Annual Services Inquiry. Sampling by turnover or number of employees can be used. It is necessary to include a stratification of small and large firms in the sample due to the different nature of the services provided by the different size of firm. Accountancy and bookkeeping services are mainly carried by small to medium sized firms while auditing and tax consultancy are undertaken by larger companies.

Firms are asked to state the percentage revenue generated by each of the following:

- Auditing Services
- Tax Consultancy
- Accountancy
- Bookkeeping
- Other

These will be used within the weighting system for that firm.

4. Main pricing method used

Model pricing

This involves keeping track of a model contract. Companies are asked to select a representative contract/model and quote in each quarter what their price would be to undertake that project if it were up for renewal in that quarter. Once companies have selected a model the specifications of that model should remain constant. A contract can be either based on a contract signed in the past or based on a virtual contract. This contract/model should be representative of a significant portion of turnover.

When pricing the model the respondents are asked to take account of the following:

- Labour costs (staff by grade and number of hours)

- Overheads
- Gross Profit Margin (the representative margin that would apply in current competitive climate)

Respondents are asked to explain the reasons for price changes.

Respondents are also asked to outline if variation in the model occurs.

Optional Methodologies used can be applied to the Accounting Sector:

Hourly rates:

Hourly rates are easy as regards collection of data. Clients are usually charged on the basis of hours worked per person involved. The rate per hour depends on the grade, experience of person working on a job and the season. In some countries hourly rates do not fully capture price changes for services provided.

5. Costs and benefits of the alternative pricing methods

With model pricing, changes in price for the same product are easily tracked from quarter to quarter. However, it may be time consuming for the respondent as the specifications of each model need to be re-costed for each pricing period. (see methodology note above)

Hourly rates are easy to collect. However they do not fully capture price change for services provided. Difficulties can also arise in linking invoices to hours worked.

6. How to deal with quality issues

When there is a change in the price of a contract.

Respondents are asked to explain the reasons for price changes.

Respondents are also asked to outline if variation in the model occurs.

If hourly rates are used quality changes may not be captured.

7. Collection of the information

The most frequent way of collecting data is by survey (sending a questionnaire to each respondent) by post or email. Most of the prices for accounting

contracts change annually for example auditing. Also, hourly rates are usually updated annually. Thus it would be appropriate to compile the data for a quarterly or even less frequent index.

8. Specific aspects

Sending questionnaires out after the end of each quarter increases the response rate.

It remains difficult in this area to separate the volume and price effect.

In the future, analysts expect more mergers of giants of the industry such as between Price Waterhouse and Coopers and Lybrand in 1998. It may make it more difficult to survey those firms. New services are evolving related to the development of the Internet. There is a constant increase in the range of advisory services and non-traditional accounting services.

9. Overview of national methods

In Canada, it is considered that two kinds of information are needed in building a price index for accounting services: Revenue (total and distributed by category of services) and Contract information (price, service provided and other details).

Respondent companies pick service contracts and monitor these. Few contracts remain identical for year to year, so respondents are asked to indicate for each representative contract, how much of the price variation is due to change in service and how much is due to price change. (This is an improvement over the previous approach where average weekly earnings were used as a price deflator for estimating production at constant prices in the Canadian system of national accounts).

In Australia accounting firms derive most of their revenue from tax services. Most firms agree that the pricing model of staff level, times the charge out rates, times the hours billed, times the recovery rate is an appropriate model for their services. In many cases real price change can still be measured using other information (e.g. monitoring contracts) which has to be identified on a case by case basis. Timing issues arise when staff time sheets within an accounting firm are not submitted until the next quarter.

In Sweden price collection is carried out quarterly and the prices are the average invoiced (actually paid) price per debited hour for different categories of services. The services are chosen by the companies themselves and each company are also asked to annually leave weights between their services. In Sweden auditing and bookkeeping are split into two indices that are published quarterly. Tax

consultancy is no longer measured, mainly because it was difficult to separate it from other consultancy and legal services. The weight is 43 % auditing, 39 % accountancy and bookkeeping services and 13 % tax consultancy for companies within Class 74,12 in NACE Rev. 1 in Sweden.

In France, the survey on Prices for accounting services started in 1996. The number of contracts monitored per company is between 12 and 20. For each contract the survey asks for the actual number of hours spent on the contract, for the corresponding fixed rate invoicing based on hourly rates and for the amount, which is actually charged to the client, real invoicing. Invoicing according to the actual number of hours spent on a contract would usually be different to real invoicing which corresponds to the number of hours actually billed and which is the result of negotiations between the accounting office and the client.

In Japan, two items of accounting service are compiled in the Corporate Service Price Index (CSPI). They are certified public accountant services and licensed tax accountant services. Actual transaction prices are surveyed to compile the index for each item. Certified public accountant services are covered using monthly or annual fee for auditing annual accounting records with specified clients from the same accountants to fix quality of services. Licensed tax accountant services include two types of services. The first one is fee for services, which combine bookkeeping with a set of preparation and review of tax returns. The second is a monthly fee for advisory services. Both types of service are surveyed with specified clients from the same accountants to fix quality of services.

In New Zealand prices are collected for both Intermediate and Senior Accountants from a wide range of firms throughout New Zealand. The questionnaire specifies for each charge out rate: Title of the position, Qualification required and Number of years experience.

In the UK the Fee income method and model pricing are used. Contract charges may be easier to measure in small firms rather than large firms, as in small firms' services may be more repetitive. It was envisaged that the survey would recommence in 2000 on a model price collection basis for medium and smaller firms and on a fee income method by professional grades of workers for larger companies.

In the USA, for accounting, auditing and bookkeeping the following price determining characteristics apply: Labour hours required, degree of professional expertise, season, type of buyer, size of buyer and recurring vs. non-recurring service.

In the Netherlands, following a pilot study, it was decided that it was impossible for firms to do model pricing each year. Hourly rates are considered the best measure of price change for the service.

In Germany separate SPPI for auditing and tax consultancy services (including bookkeeping, accountancy) will be calculated. Pricing method for companies with main activity in the auditing sector are hourly rates, actually paid, by degree of professional expertise. Auditing companies often are very large firms with

activity in different sectors. Therefore hourly rates are also asked for tax consultancy and management services.

Companies with main activity in the tax consultancy sector are smaller or medium size firms. Here model pricing, based on a legally set scale of charge is used. This scale of charge system is the price determinant for almost 90% of turnover in the tax consultancy sector. The model price approach is based on detailed data from tax statistics and additional information from tax consultancy firms.

4.13 Market research and public opinion pooling

1. Description of the sector (ISIC 7413 / NACE 74.13)

Market Research is the systematic data collection and analysis of a target market, competition and/or environment with the aim of increased understanding. This analysis helps to support and guide business decisions. Market research is a process of gathering information rather than selling a product.

Market research takes on a number of forms and structures depending on the business need of the customer. Traditional elements such as telephone and face to face interviews are still employed by Market Research organisations. In addition to this, new methods are being employed that use up-to-date technology. Examples of these include; Television Panels, Internet tracking and e-forums.

2. Classification aspects and scope of the survey

This group corresponds to 7413 in ISIC Rev.3.1 and Class 74.13 in NACE Rev.1.1.

This class includes:

- Investigation into market potential, acceptance and familiarity of products and buying habits of consumers for the purpose of sales promotion and development of new products, including statistical analyses of the results.

- Investigation into collective opinions of the public about political, economic and social issues and statistical analysis thereof.

This class excludes:

- Research and Development activities classified under ISIC 731 and 732.

3. Sample design

Sampling of companies is conducted by utilising the Business Register in conjunction with member lists from the Association of Market Survey Organisations (UK) and the Association of British Market Research companies. All lists are able to provide employee numbers and turnover to aid in sampling.

Businesses have been stratified by employment size in the sample due to the differing nature of work provided by the different sized organisations. Larger businesses have more scope for conducting extensive research with the latest technology such as Television program tracking boxes. Smaller businesses concentrate their services on traditional market research methods such as telephone and face to face interviews.

Businesses are asked to state what percentage of revenue the following market research methods generate:

- Group Discussion
- Tracking Study
- Hall Test
- Other Interview, Attitude and Survey Work
- Other Market Research

4. Main pricing method used

Model Pricing

Companies are asked to select a representative contract/model according to the above product groups. Companies are surveyed and asked to provide a quote for the contract quarterly, as if the contract were up for renewal. A model is kept as consistent as possible once it has been selected. Contracts are either based on real examples or hypothetical contracts. Models/contracts are selected to represent a significant portion of projects that contribute to a company's turnover.

When quoting prices, respondents are asked to take account of:

- Staff, Travel and Subsistence Costs
- Method Costs and type (i.e. telephone interviewing)
- Hours involved in analysing and producing final products
- Number and length of interviews or number of respondents
- Additional outputs (i.e. presentations)

Large and uncharacteristic price changes require explanation from the respondents. Respondents are also asked to provide justification for varying models/contracts.

5. Costs and benefits of the alternative pricing methods

The benefits of the model pricing method lie in its close association with the industry pricing method. Market research companies base their prices on contracts between themselves and the customers. The contract reflects the market information that the customer wants to retrieve through the research company. It also stipulates what the research company will do in order to achieve this goal.

The model pricing method matches this activity and simulates an industry-like client asking for a quote. Therefore, the price quotes and index are representative of the industry. This reason makes model pricing an attractive option as a pricing method.

The models that clients are asked to provide prices for are developed by Office for National Statistics and industry staff. Key industry players such as trade associations or councils are vital in its development and producing representative models which respondents are able to quote prices for.

The model pricing method would need to be revisited at the point when respondents are no longer able to provide prices or the models are not representative of the industry. A situation like this raises the cost of maintaining the model pricing method. However, arguably, no more cost is born of this method than any other.

The model pricing method offers the additional benefit of accounting for changes in standard industry practices without the hassle of complex resource intensive index methodologies like Hedonics.

An alternative to the model pricing method is collecting prices of hourly charge rates of staff. The charge out rate depends on staff level, experience and role within the project. The benefits and disadvantages of this model lie in its simplicity.

Collecting hourly charge out rates of staff is easy to collect and relatively simple for respondents to provide prices each quarter. Quality Assurance of this method is also straightforward and less likely to cause the additional costs of industry redevelopment.

The major disadvantage of hourly charge out rate is that the method fails to capture other variables that impact on costs and prices in the industry. For example, a variable that impacts on cost could be telephone costs in relation to telephone interviewing. Staff charge out rates may stay consistent however the price to customers may rise because telephone companies increase their rates. In this instance, the hourly charge out rates would not record this change.

The hourly charge out rates price methodology is too simplistic for the UK market research industry.

6. How to deal with quality issues

Quality problems arise when the model prices no longer represent the 'norm' with in the industry. At this point, developing staff are likely to take another look at the industry and develop new models. New models are crucial to ensure that the price quotes and subsequent index are representative for the industry.

Quality Assurance procedures are essential in ensuring that models are representative. The benefit of early action in addressing this quality issue is two fold. Respondent's benefit by a smaller burden when the models are representative and prices are readily available. The branch benefits from a more accurate index.

Changes in methods as a result of changing variables, such as technology, are accounted for by updates in the model prices.

7. Collection of the information

Survey responses may be undertaken from a sample of enterprises or from a central industry trade association or regulating body. The UK has a high number of market research companies and an over arching trade association so both avenues were explored and the sample included enterprises from the business register in conjunction with trade association member lists. Businesses are currently surveyed on a quarterly basis.

8. Specific aspects

Market Research is a relatively slow evolving industry in comparison with other industries such as Computers and mobile phones. Whilst ongoing quality assurance is built into the business-as-usual work, the industry requires few major re-developments.

9. Overview of national methods

Japan publishes "market research" as one index series from the 1985 January index figure. Current index series is on the 2000 base. Prices of periodically market survey services and ad hoc market survey are surveyed by adopting two types of pricing method; direct uses of services (including list prices), unit value method.

Examples of sample prices;

1. Periodically market survey based on the same questionnaire thorough the Internet.
2. Ad hoc market survey (e.g., by interview, by mail) specified by the type of people and the number of items to be surveyed.

Further, when the services are hard to specify, list rates based on hourly rates of researcher are surveyed. For each sample, a certain level of researcher is specified.

4.14 Business and management consultancy activities

1. Description of the sector (ISIC 7414 / NACE 74.14)

Business and management consulting branch is made up of two very different sub-branches: **management consulting services**, on the one hand, and **public relations services** on the other. In France, the weight of these two sub-branches is approximately 90% (management consulting services) and 10% (public relations services), respectively. Public relations services are far less developed in France than in the United States or United Kingdom, for example.

Management consulting services is made of a wide range of activities: business strategy studies and advice, financial consulting, auditing of marketing functions and proposal for improvement, auditing and proposals related to the organisation of the staff, studies to improve productivity for example.

Due to the increasing overlap between management consulting and IT, one of the main difficulties is drawing a clear distinction between management consulting and IT. This problem is found mainly in large companies, which often refer to “management consulting in the broad sense”, including IT consulting.

Public relations services provide support for a company in its relations with different public. This may involve promoting the company’s products, promoting the company itself (internally or externally) or its brand-name, promotional work with the company’s clients. In order to fulfil its mission, a public relations consulting agency must handle relations with a all set of partners and networks: the press, in particular the financial press, unions, public authorities, networks that shape opinion in general.

2. Classification aspects and scope of the survey

In CPC, the group 831 includes “management consulting services” (class 8311) and “business consulting services” (class 8312: public relations services and other business consulting services).

Within management consulting services, it is possible to identify the following sub-classes:

- strategy consulting (general management consulting services)
- financial management consulting services
- human resource management consulting services
- marketing management consulting services
- human resource management consulting services
- production management consulting services
- other management consulting services

Some enterprises are specialised in “resources coordination and management services” for the preparation, implementation or completion of a project on behalf of a client (cost control, forecasting of expenditure, quality control, for example). We classified this kind of activity in **other management consulting services**. For more details, refer to [18]

3. Sample design

The identification of a sample is a complex phase in management consulting services. Using classic sources, we have identified in France many companies who are not included in the sample for two main reasons. Firstly, many companies work only for subsidiaries within the same group and prices are not linked with market prices in some cases. Furthermore, many companies are classified as consultants since they consider this to be a more “prestigious” field. In practice, they do very little if any consulting. They may in particular operate in the field of IT services, stocks and shares portfolio management or estate agency management. As a result, official sources of statistics include many more consulting companies than those counted by other organisations such as professional associations. In order to identify a relevant sample, it is therefore important to combine the use of these sources of official statistics with figures issued by professional associations.

4. Main pricing methods used for services

The fixed price method is fairly classical for labour based services activities. **The fixed price** predominates in this industry. In order to calculate the price of a service, the consultant company uses a cost analysis for each category of staff, e.g. multiplied unit cost by the estimated time spent on the project. This gives us the cost of the project to which the consultancy company applies a target profit margin. The price finally proposed to the client will be negotiated, which roughly amounts to negotiating the consulting company’s profit margin. Some companies may charge a risk coefficient to take into account the uncertain nature of the time spent estimates.

Finally, a large number of companies use catalogue-type prices according to qualifications in order to set their fixed prices.

Invoicing on a time spent basis is clearly the minority. This may relate in some cases to the provision of staff, at the client company's premises. Clients are increasingly asking for fixed price invoicing. Fixed price invoicing provides greater security to the client than invoicing on time spent basis, which can "get out of control".

For major clients, **the referencing system** is used. The purchasing departments of major groups are pushing for this system: it involves defining daily rates according to qualifications and a system of discounts for large volumes. When the consultancy company uses this system, the client can call on it for a given project. Prices charged are those defined in the referencing system. In practice, prices can however be renegotiated.

Although still marginal, **the success fees** are growing, particularly when the client is in manufacturing industry. In this case, part of the price is dependent on the consultancy service provided. For example, a consultancy company may put forward proposals in order to improve productivity. Part of the price may depend on how productivity changes, once the recommendations have been implemented.

Some sizeable enterprises are specialised in **company merger and takeover consulting**. This involves a certain type of financial advice. The way prices are set in this case is very specific: a percentage is applied to the sums involved in the merger-takeover. This percentage depends on the size of the operation, its complexity and negotiations with the client.

As far as **public relations services** is concerned, **annual contracts** may be signed with regular clients. Invoices are issued on a fixed price basis with an estimate of the time spent at the start of the year. Even for regular clients, it appears that **services provided change from one year to another**, which makes it difficult to monitor contracts over time. One business unit has told us of a special invoicing system for crisis reporting. This involves a starting price (a lump sum of 30 000 euros in this example), which applies even if the firm spends very little time on the matter. This starting price is evaluated against the service provided in a difficult context. If a lot of time is spent on the matter, an invoice is issued on a 'time-spent' basis in addition to the starting sum/price.

In conjunction with the price setting and the operating method for the consultancy profession, it appears that monitoring **average charges according to qualifications** is relevant and possible.

As a rule, **time sheets are not completed** within the **public relations consulting profession**. In this profession, there is **no link between time spent and charge** (see the typical case of crisis reporting). This aspect is very similar to that observed in advertising agencies. Nevertheless, in response to pressures from clients and given the tense economic situation, a number of companies have advised us that

in 2004 they were going to set up more effective management tools which would allow them to monitor average charges according to qualifications.

Even when time sheets are completed, the business may very well not calculate average charges according to qualifications on an aggregated basis (but only on a contract-client basis). If the company has time sheets, without aggregating the results recorded, it is possible to monitor average charges according to qualifications by selecting certain client contracts. It is therefore necessary to select a sample of client contracts (giving preference to regular clients) and within each client contract, monitor average charges according to qualifications.

An alternative approach could be to monitor costs for a number of qualifications and the average margin over a quarter. It is possible to estimate average charges according to qualifications by applying the margin to costs. This method is still relevant, but less so than direct monitoring of the average charge according to qualifications since it uses a more aggregated approach. Nevertheless, it can be used to monitor rates charged and not catalogue type charges.

Another alternative approach is to approximate prices from the **turnover per head, corrected for variations in activity rates.** Ideally, this involves considering: turnover excluding subcontractors, number of productive staff on a full-time equivalent basis and the activity rate. The activity rate is an indicator widely monitored within the profession. In view of its highly aggregated nature, this method is not to be preferred over the previous two. It does however look at market prices, unlike catalogue type charges. For this approach to be relevant, the qualifications pyramid must remain stable over time. This approach may also be used in public relations consulting services, replacing turnover with the gross margin.

Considering the unique nature of the services provided, **the model pricing** approach does however seem to be possible in theory. As in other branches, care must be taken to ensure that market prices are collected and not only catalogue type prices. In order to collect market prices, we can, for example, ask the company for its average rate of margin for the quarter which will be applied to the total cost for the “fictitious” project (broken down by cost line).

5. Costs and benefits of the alternative pricing methods

There are two classic pitfalls that have to be avoided: catalogue type price monitoring, monitoring charges for all qualifications considered as a whole (this does not take into account the changes occurring within the structure of the work force). **It appears that monitoring average charges for all qualifications considered as a whole poses less of a problem than in IT departments.** According to businesses, it appears that the breakdown by qualification remains stable in time. In management consulting services we are not actually witnessing a general increase in qualifications (contrary to what we may see in IT consulting in particular). Some large companies even have a target qualification pyramid (stable over time), which they endeavour to achieve through staff losses and recruitment.

For all these approaches, **quarterly price monitoring has to be considered with caution**, particularly in public relations services. For example, with an annual contract, the client generally pays a fixed amount every month (total for the annual contract divided by 12). However the time spent on the matter is not linear over a year. Thus the average selling price in August will be artificially high on account of the fact that the time spent is more limited at that time. Furthermore, some contracts may involve end-of-contract regularisation according to the time actually spent. In fact, a new turnover figure will be recorded (regularisation of an annual contract) without the corresponding time spent, which may affect the price index.

6. How to deal with quality information

Two problems remain in relation to the monitoring of average rates according to qualifications: firstly, **changes in productivity** within one qualification group are not taken into account; secondly average rates according to qualifications are calculated on the basis of time actually spent (from time sheets) and not from time estimates (as therefore invoiced) in the context of the initial fixed charge which determined the price.

7. Collection of the information

Data collection should cause no tremendous problems. After establishing an ongoing cooperation with professional organisation and enterprises (particularly the most important ones) prices can be collected via internet or on postal way.

8. Specific aspects

In public relations services, there are many purchase-sale transactions. This lead to re-invoicing service charges (production of an in-house newspaper for the client company for example). As a consequence, like advertising agencies, the indicator that will be used as a basis for weighting purposes for public relations services will be **the gross margin**. In short, in relation to the price monitoring method, it is important to understand **the weight of fees in the gross margin** (share as a %).

9. Overview of national methods

The last inventory of OECD (at the end of 2004) mentions that New-Zealand, Australia, Portugal, Germany, Denmark and France have experience in this area or plan to monitor prices in this branch in 2005 (like Germany for example). It seems that this countries use in first charge-out rates method. It appears that model pricing

approach is not very used in this area: it could be interesting to test this kind of method, in order to compare the results with charge-out rate approach.

4.15 Architectural and engineering activities and related technical consultancy (covers only Engineering)

1. Description of the sector (ISIC 7421 / NACE 74.2)

Architectural and engineering activities and related technical consultancy form a sizable part of the business services. They encompass a wide variety of services as different as artistic designs, feasibility studies, and management of construction projects. The services range over different fields, from buildings to equipment and infrastructure and may be as small as the compilation of a small environmental report and as large as the construction of a high-speed railway through different countries. Additionally, the corporate cultures can vary from artistic in architecture to academic in high-tech firms and down-to-earth in project management. All these services have a high level of professionalism in common. They are custom made, like many business services. Engineering and architecture have a strong influence on the important sector of construction.

Part of the output of architects and engineering is included in gross fixed capital formation in National accounts. The average contribution to GDP of architects and engineering of six EU countries was 0.9% (total final demand minus imports)⁶³.

The Voorburg Group prepared a comprehensive Principal Paper on engineering services in 2002 including the approaches of seven countries⁶⁴.

2. Classification aspects and scope of the survey

The United Nations' **ISIC** discerns the following class:

7421 Architectural and engineering activities and related technical consultancy

The United Nations' **CPC** recognises the following product categories:

⁶³ Report of the Eurostat task force on Price and Volume Measures for Real Estate, Renting and Business Services. The percentages of the six countries ranged from 0,5 to 1,3 (1995).

⁶⁴ The countries that contributed to the Principal paper are United States of America, Australia, Canada, France, the Netherlands, New Zealand, and Sweden. A Norwegian paper in 2000 detailed a hedonic-like approach to PPI compilation for both architecture and engineering services, but this approach has been abandoned since.

- 83210 Architectural services
- 83211 Architectural advisory and pre-design services
- 83212 Architectural design and contract administration services
- 83219 Other architectural services
- 83220 Urban planning and landscape architectural services
- 83221 Urban planning services
- 83222 Landscape architectural services

- 833 Engineering services
- 8331 Integrated engineering services
- 8332 Project management services concerning construction
- 8333 Engineering advisory and pre-design services
- 8334 Engineering design services
- 8335 Engineering services during the construction and installation phase
- 8339 Other engineering services

Every class (four-digit level) in group 833 is split into the following subclasses (five-digit level):

- for buildings
- for civil engineering works
- for industrial plant and processes
- for other projects

For instance, 83333 is Engineering advisory and pre-design services for industrial plant and processes.

The EU version of the ISIC, the **NACE**, contains the following class:

- 74.20 Architectural and engineering activities and related technical consultancy

The European Classification of Products by Activity, **CPA**, which is derived from the NACE, splits Architectural and engineering activities and related technical consultancy at the fifth and sixth digit:

- 74.20.10 Plans and drawings for architectural, engineering, etc. purposes
- 74.20.21 Advisory and pre-design architectural services
- 74.20.22 Architectural design services
- 74.20.23 Other architectural services
 - This subcategory includes:
 - all other services requiring the expertise of architects, such as:
 - preparation of promotional material and presentations
 - preparation of as-built drawings
- 74.20.31 Technical advisory and consultative services
- 74.20.32 Engineering design services for the construction of foundations and building structures

- 74.20.33 Engineering design services for mechanical and electrical installations for buildings
- 74.20.34 Engineering design services for the construction of civil engineering works
- 74.20.35 Engineering design services for industrial process and production
- 74.20.36 Engineering design services n.e.c.
- 74.20.37 Other engineering services
- 74.20.40 Integrated engineering services for turnkey projects
- 74.20.51 Urban planning services
- 74.20.52 Landscape architectural services
- 74.20.60 Project management services related to constructions and civil engineering works
- 74.20.71 Geological, geophysical and other scientific prospecting services
This subcategory includes:
 - geological, geophysical, geochemical and other scientific consulting services relating to the location of mineral deposits, oil and gas and ground water
- 74.20.72 Subsurface surveying services
- 74.20.73 Surface surveying services
- 74.20.74 Map making services
- 74.20.75 Technical consultancy services other than engineering consultancy
This subcategory includes:
 - mineralogist, petrologist, geochemist and environmental geologist services

The industry makes a sharp distinction between engineering services, architecture and ‘related technical consultancy’. Most international classifications (see above) make this distinction at a low level only. It may therefore not be possible to make the split in the Business Register or business turnover surveys. The price survey could mix these industries, but there are potential differences between them in price setting and optimal price survey methodology. It is therefore recommended to split them into three groups. No country has started PPI development yet for ‘Related technical consultancy’. This industry could either be disregarded as a small part of the industry, be included in the PPI for engineering services or a separate survey could be launched. Similarly, even architecture could be disregarded at the start as smaller industry than engineering, i.e. use the engineering PPI as a first rough approximation for the whole industry. Especially if architectural and engineering activities and related technical consultancy are one commodity group in the Input/Output tables of National accounts, an aggregate PPI is probably used as deflator anyway. As engineering is both the main industry within this group and as there is quite some international experience in engineering services PPIs but not in architecture or ‘related technical consultancy’, this paper focuses mostly on engineering services.

There is no product classification for the industry that is used widely for turnover statistics or PPIs. As witnessed by the CPC, engineering activities can be

split up according to different criteria: (1) according to field (construction, technical installations, public space, traffic & transport, infrastructure, environment etcetera), (2) according to phase of the project (feasibility studies, advice and pre-design, design, project management, and services during construction) and (3) according to object (buildings, civil engineering works, industrial plant and processes). Companies organize and reorganize themselves in many different ways.

Engineering services are almost limited to firms within the industry and engineering firms produce almost only engineering services. Exceptions can be found on the borderline with construction firms and products. A special class of 'contracting engineers' combines engineering services and construction. They also deliver pure engineering services and these companies should be included in the sample frame. In some countries it is hard to make the borderline between engineering and construction. One price is set for the whole product which includes engineering and construction activities for example due to vertical integration.

Architects form quite a different industry. The main split in their products is that between architectural services and urban planning services.

3. Sample design

Most countries use PPS sampling. Alternatively, stratified sampling by turnover is used (e.g. in the Netherlands). It is recommended to sample large companies integrally. As the market structure and market shares in the industry are generally stable, reweighting once per five years should suffice.

4. Main pricing method used

The three main methods are:

- A) Model prices
- B) Charge-out rates
- C) Percentage fee of construction costs

Model prices and charge-out rates are the basic types of surveyed information. Both exist in a number of varieties. A special issue with model pricing in these industries is the duration and size of the projects. As some engineering projects are very large and last for many years these projects are too complex to include in model pricing. Thereby, a bias towards selecting small projects in the PPI survey arises. A method based on percentage fee of construction costs can be used for construction engineers and architects.

5. Costs and benefits of the alternative pricing methods

There are not many alternative methods known. Norway experimented with a hedonic-like analysis but stopped this approach. Direct use of prices of non-unique, repeated services and contract pricing are not possible due to the unique nature of the services. Component pricing can be imagined to work.

6. How to deal with quality issues

Model pricing attempts to price a constant quality output, but the aims of a Fixed Input/Output Price Index are hard to achieve as engineers change their work processes continuously and services are unique. A gradual increase in the overall technological level probably exists but is hard to quantify. As engineers' work is highly supported by automated systems, IT developments have potentially a strong effect on the industry. A problem arises in model pricing when an outdated service is replaced by a newer one; the choice for the method of quality adjustment procedure in linking to the new service can be decisive for how quality change is treated in the index.

It can also be hard to distinguish between the quality development of engineering services and construction. In other words, if a better building than before is built, does the volume of the construction industry or of the engineers rise?

7. Collection of the information

There are few specific collection aspects for engineers. For large firms the people filling in the survey are often controllers or bookkeepers who do not have a precise insight in engineering services. Especially for model pricing or explicit efficiency surveys professional engineers are required; preferably even high level staff like project managers. (see also the examples at the end of this section which show survey forms used in a bi-annual model pricing survey in Switzerland).

Another important issue concerns the use of job titles in hourly rates methods. A similar title (e.g. "constructor" or "designer") can mean very different staff in different companies. In the aggregation of a PPI based on hourly rates, it is important that no classes are formed by job title. In other words, it is recommended to refrain from the use of an elementary index formula that combines hourly rates only because the job title is similar.

In most areas of engineering, there are many companies who truly compete with each other. Confidentiality problems are therefore unlikely.

8. Specific aspects

CPIs do not always include architecture or engineering services as they are a very limited expenses category for households, and are rather investments than

consumption by their nature. If included, the CPI may benefit from a good PPI by copying the index (including taxes). 'Interior design' is another industry e.g. in NACE it is subcategory 748713.

It depends on the registration of the National Accounts whether to include or exclude subcontracting in the compilation of the PPI. In the Netherlands it is recommended to exclude subcontracting from the survey and if it is possible to survey subcontracting separately to compile one PPI for engineering and one PPI for subcontracting. In practice it is hard to distinguish subcontracting so it is sufficient to compile a PPI excluding subcontracting.

Export can represent a significant market share, e.g. in France. It is necessary to address the dealing with exports in the index, even if it is purposely excluded in the initial setup of the index. For instance, the survey for average charge out rates should explicitly state whether exports are included, excluded or surveyed separately.

Timing is an interesting issue for the PPI of engineering services. There can be a large period between the moment of the closing of a contract, the delivery of the service and the payments. It can be many years, for instance, between the initial feasibility study and the end of the project management of the construction of a large dam or railway line. A client could regard it as one big complex service, as he does not have any need for only part of it. Model price methods survey prices at the moment of the closing of the contract and charge-out rates methods reflect the prices at the moment of delivery.

9. Overview of national methods

In Australia the industry uses a number of approaches for price setting. For the survey, each firm uses the methodology which relates closest to the way the firm sets its prices. Both simple models and charge-out rates are used. Data has been collected for building/structural and civil engineering services. The scope of these services will be expanded in the future.

In Canada the price index is estimated by the wage rate index (only for personnel that work on projects) multiplied by the change over time in realised mark-ups on the labour services and other inputs. By including mark-ups per region and field, market conditions are reflected in the price index. Eleven fields are distinguished.

France uses charge-out rates as pricing method. In principle realized charge-out rates are used split by Industry, Construction and Infrastructure. Industry is split further on a deeper level in different stages. Not every respondent can generate turnover per field and the hours worked for clients. From these companies standard hourly rates are surveyed.

The Netherlands surveys realized charge-out rates. Turnover and the number of hours worked for clients during the whole quarter are surveyed, as much as

possible split up per grade of professional and per field. There are six fields in the aggregation structure. Additionally, realized charge-out rates per year and standard hourly rates per January 1st are surveyed). For price setting, architects use a standard industry-wide formula for percentages of construction costs; after a pilot study it was considered to base architecture PPI on this system, but this decision has not been made.

In New Zealand two methods are being used: firstly, maximum hourly charge-out rates for principals representing general engineering work and secondly, fees for general engineering work and industrial building. These fees are calculated by applying a standard range of fees (in the form of a percentage) supplied by an institute to a value of engineering work supplied by the Capital Goods Price Index.

Norway experimented with a hedonic index on a quarterly basis. As it required much data and work, there are plans to base the index on more conventional methodology. Now Norway uses realized charge-out rates.

Sweden has a survey panel of approximately 40 firms. It surveys charge-out rates per grade that occur in real transactions during the survey quarter. These can be taken directly from ongoing projects or newly closed contracts. The five areas of data collection are project management, industrial engineering, electrical engineering, heating and air conditioning/energy and construction and installation.

Switzerland has a biannual survey of model prices with an emphasis on small scale building projects.

In the United States services specifications are used to measure prices for projects based on both fixed fees and non-fixed fees. The respondents reprice the service monthly whereby the price is an estimated new transaction. The engineering services are classified either as building or non-building related.

Example 1: Electrical engineering services

Project description:	
Initial situation	
<p>Three-storey office building plus one underground parking level. Modular office partitions with suspended ceilings and double floor. Project assessment covers the entire low voltage wiring system, including the main voltage distributor and the following low voltage wiring items:</p> <ul style="list-style-type: none"> - Private Automatic Branch Exchange (PABX) - Complete fire alarm system - Universal cabling system for the building, including secondary fibre optic and tertiary copper cabling. - Automatic blinds 	
SIA volumes:	48,000 m ³
Office space:	8,500 m ²
<p>Partial phase 4.31 (preliminary design) has been completed. For this phase, the cost of electrical installations ($\pm 15\%$) is estimated at: CHF 3,500,000.--</p> <p><i>For the purposes of calculating the index, only partial phases 32/33 (preliminary project and building permit application process), 41 (calls for tenders) and 51, 52 and 53 (final project, project execution, putting into service, completion) are documented here.</i></p>	

1. Preliminary project and building permit application process (partial phases 32 and 33 based on RPH 108)	Your fees	
	Fees reported in previous survey	Current fees
<p>Basic information: Preliminary project and decision of public authorities</p> <p>Aim: Project approved, costs and timetables checked, construction loan approved</p> <p>Expected results: Drafting of general construction plans, disposition plans and technical diagrams Price estimate +10%</p> <p>The services to be rendered under RPH 108 articles 4.1.32 and 4.1.33 are as follows:</p> <ul style="list-style-type: none"> - Developing the project, which includes drafting of general construction, disposition plans and technical diagrams; - Determining technical characteristics as well as energy and power needs; - Determining connections and recycling system; - Choosing the most suitable building utilities and installations to match the building's purpose; - Devising a system of measurements; - Devising a system to identify utilities; - Deciding exact needs in terms of space and volume, deciding the locations of the various utility rooms, machinery, devices and main conduits; - Making sure that energy saving features are used in construction; - Helping to coordinate the setup of utilities and installations; - Handling the building permit application process, which includes preparing the application; - Calculating expected operation and maintenance costs (relating specifically to the given area of activity); - Drawing up a detailed price estimate (accuracy: $\pm 10\%$) Establishing a project timetable and deadlines based on decisions reached. <p>Deadlines: 151 Preliminary project phase to be completed six months after the contract is signed.</p>		
<p>Total fee for partial phases 32 and 33, preliminary project and price estimate, excluding VAT</p>	Fr.	58'000.00
		56'000.00

29/08/2005

Example 2: Civil engineering services

Building description:
<p>Three-storey apartment building. Building volume calculated using SIA method: 8,500 m3, including basement level.</p> <p>Ground floor and 1st floor are identical, attic leaning back, flat roof.</p> <p>Basement level with laundry room, workshop areas, storage space and utility rooms, no underground parking.</p>

Fee information to be provided:
<p>We would like to know how prices have changed with respect to the previous survey held six months ago.</p> <p>In other words, the fees you indicate should be based on current market prices for your field and take into account the fees you reported in the previous survey. Your fees apply to exactly the same services rendered under exactly the same conditions as the previous survey.</p> <p>As a reminder, please find below the fees you reported in the previous survey.</p>

Services to be rendered	Your fees	
	Fees reported in previous survey	Current fees
<p>Partial phases according to RPH 103, engineer as specialist</p> <p>31 Preliminary design, art. 4.2.31</p> <p>32 Preliminary project, art. 4.2.32</p> <p>41 Calls for tenders, art. 4.2.41</p> <p>51 Final project, art. 4.2.51</p> <p>52 Project execution, art. 4.2.52: project management, management of project changes and documentation, assistance during final inspection.</p> <p>Your rates include basic RPH 103 services where needed.</p>		
<p>Total amount charged for all civil engineering services to be rendered, phases 31 - 52, excluding VAT</p> <p style="text-align: right;">Fr.</p>	45'000.00	42'500.00

4.16 Technical testing and analysis

1. Description of the sector (ISIC 7422 / NACE 74.3)

Technical testing and analysis covers testing and inspection of all types of materials and products, certification of products as well as periodic road-safety testing of motor vehicles. The importance of technical testing and analysis industry is quite small in Finland accounting only for 0,35 % of the Finnish service sector turnover. The purpose of technical testing and analysis services is usually to meet the demands of the law or otherwise confirm safety and reliability of companies' products and procedures. The most important services in the industry are inspections, certification, testing services as well as measuring and validation services. Testing and analysis services are mainly business-to-business activities.

The industry turnover has been rather stable in Finland during the last few years. There are a few major companies and large number of smaller testing and analysis services providers in the industry. Many of the major companies are subsidiaries of multinational companies. Small companies usually focus on specific areas of testing and analysis, while major companies have a wider range of services.

Figure 1. Turnover of industry 74301 Technical testing and analysis and 74302 Periodic road-safety testing of motor vehicles.



In Finland technical testing and analysis is divided into periodic road-safety testing of motor vehicles and other testing and analysis services. Periodic road-safety testing of motor vehicles covers more than 30 % of the total industry turnover.

Testing and inspection of all types of materials and products includes a wide range of services. Testing of a certain character of a product can be carried out in a number of different methods. The same tests can also be performed according to different standards since competing standards exist. International harmonisation of testing standards is still under way. Thus there are a large number of services that

testing laboratories can provide. Finding the most representative services is a major challenge.

In Finland a large number of laboratories are classified under 731 Research and experimental development on natural sciences and engineering (NACE) in the business register. This causes difficulties in finding out the share of commercial technical testing and analysis of their turnover. Therefore laboratories are not included in the Finnish PPI. However, Finland is considering expanding the price collection also to laboratories in the future.

In Europe operates EUROLAB (the European Federation of National Associations of Measurement, Testing and Analytical Laboratories) that coordinates European organisations having laboratory activities. EUROLAB provides means for exchange of information and experience as well as promotes cost-effective testing, calibration and measurement services.

Certification of products includes series of standard tests to insure that a product is safe to use. Tests performed depend on characters of a product. A certificate is a proof that the product is in compliance with requirements. Different certificates are valid in different areas. For example with electric appliances FI-sign is valid in Finland, but a product needs a different certificate for the US market. Also international certificates exist. In future certificates are expected to further harmonise globally. Certification has extended from individual products to system certification. However, system certification has not yet been included in NACE.

Certificates can be divided into two groups: certificates that require an outside evaluation and certificates that don't require an outside evaluation. With certificates, which don't require an outside evaluation, a manufacturer can prove that the characters of a product are in compliance with safety requirements with self-made tests and sufficient documentation of tests performed. However, technical testing service providers also supply these tests and the documentation. These certificates, such as CE-certificate that relates to electric appliances, are reviewed by authorities with samples from the market. With certificates, which require outside evaluation, licensed technical testing service providers perform necessary tests and review yearly that a product still satisfies requirements.

Periodic road-safety testing of motor vehicles includes a certain standard set of tests for different kinds of vehicles. Since the service performed is always the same, companies providing periodic road-safety testing of motor vehicles usually have tariff systems for different kinds of vehicles. This testing service is targeted to both consumers and companies especially concerning cars, as the inspection is required by law. The price depends only on the size of a car, so companies and consumer have the same price. Other vehicles are usually for business purposes.

The price development of testing with the use of models and mock-ups is in not included in the Finnish PPI because of its small significance to the Finnish economy. In this kind of testing the focus is generally shifting towards computer aided testing.

2. Classification aspects and scope of the survey

In NACE (Rev.1.1) and ISIC (Rev.3.1) technical testing and analysis is classified as follows:

	Revision	Class	Label
ISIC	3.1	7422	Technical testing and analysis
NACE	1.1	743	Technical testing and analysis

This class includes the following services:

- Testing and inspection of all types of materials and products:
 - Testing of composition and purity of minerals etc.
 - Testing activities in the field of food hygiene, including veterinary testing and control in relation to food production
 - Testing of physical characteristics and performance of materials, such as strength, thickness, durability, radioactivity etc.
 - Qualification and reliability testing
 - Performance testing of complete machinery: motors, automobiles, electronic equipment etc.
 - Radiographic testing of welds and joints
 - Failure analysis
 - Testing and measuring of environmental indicators: air and water pollution etc.
- Certification of products, including consumer goods, motor vehicles, aircraft, pressurized containers, nuclear plants etc.
- Periodic road-safety testing of motor vehicles
- Testing with use of models or mock-ups (e.g. of aircraft, ships, dams etc.)

CPC (Rev. 1.1) divides class 8356 Technical testing and analysis services into five subclasses: (1) composition and purity testing and analysis services, (2) testing and analysis services of physical properties, (3) testing and analysis services of integrated mechanical and electrical systems, (4) technical inspection services of road transport vehicles and (5) other technical testing and analysis services.

In Finland, where classification is based on NACE, technical testing and analysis is divided further into 74301 Technical testing and analysis and 74302 Periodic road-safety testing of motor vehicles.

3. Sample design

The sampling frame consists of all technical testing and analysis service providers, which are included in the business register. The sample can be selected using PPS sampling. Also stratified sampling based on turnover, employment etc. can be used.

In Finland the sampling was conducted in two stages. The sampling frame was first divided into inspection of motor vehicles and other testing and analysis services. The national CPI already covered partly periodic road-safety testing of motor vehicles, so it provided a natural starting point for data collection. CPI survey was expanded to cover SPPI relevant data⁶⁵. The sample from other testing and analysis services providers was selected using discretion because not all companies classified as technical testing and analysis services providers in the business register are actually in this line of business. There are subsidiary enterprises that provide services only for parent company. This means that those prices don't usually follow the market prices.

4. Main pricing methods

There is a wide range of services in technical testing and analysis industry, because of the large variety of products and characters being tested, testing methods and standards. Therefore majority of services are one-off and rather complex. Periodic road-safety testing of motor vehicles constitutes an exception. Inspection of motor vehicles is usually a repeated standard service. Therefore direct use of prices of well-specified services and model pricing seem to be the most appropriate pricing methods in this industry.

4.1 Periodic road-safety testing of motor vehicles

Direct use of prices of well-specified services

Taking into account that periodic road-safety testing services are rather simple, non-unique and repeated direct use of prices of well-specified services is the most appropriate pricing method. Existing tariff systems on the most important testing services can easily be used as price quotations. Thus this pricing method is quite simple and effective.

4.2 Other testing and analysis services

⁶⁵ Even though the price definitions of these two indicators are different in theory, that is no problem in Finland in practice, as long as the value-added correction of the base data is taken into account (there is no subsidies or other taxes).

The price of a test depends on the product and the character being tested, testing method and standard used, number of samples, quickness of results etc. Pricing based on working time is a poor price indicator because tests performed during an hour can vary extremely. Although other testing and analysis services are often complex and unique, it is possible to find services that recur. These services include food production control, purity tests, air and water pollution tests etc. In these cases the same tests and analysis are performed regularly with the same testing methods and standards. Therefore pricing based on actual contracts and simple model pricing are the most appropriate pricing methods.

The price of a certification consists of the initial testing and annual testing to insure that the characters of a product have not changed. Thus, in addition to the first testing payment, a company has to pay an annual fee in order to keep a certificate. Because required tests depend on the characters of a product, every product needs a different set of tests. Companies providing testing services usually base their pricing on time use. Time used on testing depends on the complexity, size etc. of a product. Therefore pricing based on time is not the best indicator of the price development. Simple model pricing is preferred.

5. Costs and benefits of the alternative pricing methods

A possible alternative pricing method is pricing based on working time, particularly concerning certification because this kind of services are often rather complex and unique. Since companies providing testing and analysis services sometimes base their pricing on time use, this kind of information could be rather easily available. Pricing based on working time is, however, a poor price indicator because tests and analysis performed during an hour can vary extremely. Because tests need to be carefully defined so that the service remains constant, it is easier to price the test itself rather than hourly rates.

6. How to deal with quality issues

Technical testing and analysis services evolve with technology and the new ones replace old services. This industry is however full of different kinds of standards and certificates. Once the services selected to price collection are well defined, there should be no problems with quality issues. The price of a test and an analysis depends on the product and the character being tested, testing method and standard used etc. As the service selection in this industry is extremely wide, it is essential to carefully define all the factors that influence pricing and try to select those services that are most representative from that the point of view.

Additionally, it is essential to control for the representativeness of services. As new services evolve, the demand for old services declines. Regular updating of services and weights in price data collection is therefore important.

7. Collection of information

Collection of price information is rather simple after representative services are selected in co-operation with respondents. Services need to be strictly defined in price questionnaires so that any confusion is avoided. If the national CPI covers partly periodic road-safety testing of motor vehicles, the CPI survey can easily be expanded to include SPPI relevant data. As for other testing and analysis services, after initial contact with the companies the prices can be collected via email, fax, mail or web-application.

The data collection includes also the collection of micro level weights for each service category. These weights are collected from the enterprises annually.

8. Specific aspects

Technical testing and analysis service providers have an extremely wide service selection. Because there is such a large number of different services, finding the representative ones is a major challenge. In future global harmonisation of different standards may ease this task slightly, but other price determining factors of testing and analysis services still create a huge selection of services. Majority of testing and analysis services is unique, especially concerning certification. Because of this, it is even more difficult to define representative model services.

This is a good example of the industry where there is a large difference between the service product versus industry orientated index calculation structure. If the bases of the index are service products then the sample frame should include also major companies that are classified to other industries. If the purpose of index is to provide a good deflator then one of the main things is to decide the basis of index in co-operation with NA experts.

9. Overview of national methods

UK has published technical testing index since year 2000. The sample was selected using stratified sampling based on employment size. UK has divided technical testing and analysis services into six groups: (1) composition and purity testing and analysis services, (2) testing and analysis services of physical properties, (3) technical automobile inspection services, (4) testing and analysis services of integrated mechanical and electrical systems, (5) other technical testing and analysis services and (6) other technical inspection services. The most important service category in UK is Other technical testing and analysis services; this includes testing child restraints, testing medical equipment, humidity testing, pressure gauge testing etc. Because majority of testing services is one-off contracts, the pricing methods used are model pricing and pricing based on actual contracts. In UK inspection of

motor vehicles is not as important service as in Finland with weight only less than 15 % in PPI.

4.17 Advertising

1. Description of the sector (ISIC 743 / NACE 74.4)

Advertising services consists primarily of two separate activities. The first activity is the creation or preparation of advertisements. Included in advertisement creation services are writing copy, art work, graphics, and other creative work. The second activity is the placement or presentation of the advertisements. Advertisements may be placed or presented in a variety of medium, such as periodicals, newspapers, radio, television, on-line, bill boards, and flyers. Market research or advice can also be included if provided in conjunction with ad creation or placement.

Papers on advertising services were presented at Voorburg Group meetings in Örebro in 2001 and in Nantes in 2002.

Advertising services are provided in all countries. The amount of advertising revenue is closely related to the business cycle. As economies grow or improve, advertising revenue increases. Conversely, during a tightening of the economy or a recession, advertising revenues decline. According to the 1998 Service Annual Survey from 1994-1998, a period of economic boom, advertising revenue increased an estimated 49.9% in the US.

2. Classification aspects and scope of the survey

In general, advertising services are provided by establishments which create and place ads such as advertising agencies. They can also be provided by establishments which provide direct advertising such as direct mail or other advertising services such as outdoor advertising (bill boards, transit and aerial advertising.)

Advertising services may be performed by advertising agencies using their own personnel such as account managers, production managers and media planners. The advertising agency may also contract out part of their services. If the cost of hiring outside talent is passed on directly to the client, then this cost is not revenue for the advertising agency. However, any markup or additional fees the agency accrues from using this talent is included in the advertising agency's revenue.

Sales of advertising can occur in many different industries. Some of these industries in which advertising sales are considered primary revenues are newspaper publishing, periodical publishing, radio broadcasting, television broadcasting, cable television, internet service providers, web search portals and internet publishing.

Advertising sales in these industries are not considered part of advertising services because these sales are really the publication, broadcast or display of the advertisement.

Within the advertising services sub-sector, there are many intra-industry transactions. An example of these intra-industry transactions are Media Buyer Services (MBS). Media buyers purchase ad space from media outlets and then resell this ad space primarily to advertising agencies.

Advertising is also created and placed by in-house advertising departments which are departments within a company or corporation specifically created to design, prepare and place advertising for the parent company. These in-house departments do not receive payment for their services but are salaried operations. Even though advertising services are provided by these departments, there is no marketed economic output generated. Therefore, these departments are not in-scope for a producer price index.

Most classification systems have a similar design for the advertising services sub-sector.

In the former Standard Industrial Classification system, advertising services were part of the business services sector. In the new North American Industrial Classification System, advertising services are included in the Professional, Technical and Scientific sector. NAICS 5418, Advertising and Related Services, industry group includes establishments classified in the following NAICS industries:

- NAICS 54181, Advertising Agencies
- NAICS 54182, Public Relations Agencies
- NAICS 54183, Media Buying Agencies
- NAICS 54184, Media Representatives
- NAICS 54185, Display Advertising
- NAICS 54186, Direct Mail Advertising
- NAICS 54187, Advertising Material Distribution Services
- NAICS 54189, Other Services Related to Advertising

The structure of ISIC Rev.3.1 Class 7430 and NACE Rev. 1.1 Class 74.40 are virtually identical. The ISIC and NACE Advertising structures are only slightly different from NAICS. NAICS includes direct mail advertising and public relation agencies which are excluded from ISIC 7430 and NACE 74.40. The ISIC class for advertising includes the creation and realization of advertising campaigns, specifically:

- Creating and placing advertising in various media formats
- Media representation

The International Product Classification (CPC version 1.1) has four products for advertising:

- CPC 83610: planning, creating, and placement services of advertising
- CPC 83620: purchase or sale of advertising space or time on commission
- CPC 83630: sale of advertising space or time (except on commission)

CPC 83690: other advertising services

Three of the product classes, 83610, 83620 and 83690 are included in advertising services.

One of the product classes, 83630, represents advertising sales by publishing and/or broadcasting companies. In these companies, the sale of advertising includes the publication and/or broadcasting of the advertisement. Advertising sales in these companies are not commission or fee based.

The publication structure for advertising services must accommodate the business structure of the companies in the sub-sector. For advertising agencies, different distinct activities or services are provided. These activities are ad creation and media or ad placement. In addition to this distinction between creation and placement, because of the product and price dispersion between different types of media, separate publication product lines for different types of media placement may be appropriate.

3. Sample design

A probability-proportionate-to-size sampling technique is recommended for this sector. Turnover data (revenue) or employment data should be used as the size measure. A comprehensive, detailed business register or similar source of establishments should be used as the frame for the sample. The frame should not be clustered by company or agency. Large companies have many separate affiliate offices which all function independently. Although these companies may share the same name, the clients and pricing structure are different for each location. Contracts are signed and pricing decisions are made at the local level. Especially for large, diverse countries, regional differences in the pricing decisions and contract negotiations make local pricing critical.

Industry concentration ratios indicate that large firms do not dominate in advertising services. But rather the advertising services sector is composed of many small firms. In the advertising agency industry in the US, the largest 4 firms account for only 4% of the employment and the largest 50 firms account for only 18.8% of the employment. In countries where the industry is structured in a similar manner with many small firms, large samples sizes may be required.

4. Main pricing methods

Model pricing is the main type of pricing methodology used for advertising services.

For the advertising services of ad creation, with this model pricing methodology, the respondent is requested to give a price for a fully virtual contract or a price based on a contract signed in the past. In the upcoming time periods, the respondents estimate what their price would be if that contract was renewed. The

method gives a theoretically correct price concept since it takes changes in production into consideration in addition to changes in the current competitive environment. A contract is selected that specifies the services being performed and lists the hourly prices and the number of hours needed to conduct the work in the contract. When updating the prices, respondents are asked to take into account the labour costs (type of staff, number of hours and hourly rates), expenses, overhead and profit. Respondents are also asked to provide information if any of the features of the contract or staff information are no longer applicable. The type of price the respondent provides is an estimate of the project fee or the project fee plus commission, if a commission is charged.

For media or ad placement services, model pricing can also be used. The respondent is requested to give a price for a fully virtual contract or a price based on a contract signed in the past. In the upcoming time periods, the respondents estimate what their price would be if that contract was renewed. There are no hourly rates or staff hours listed in these contracts. The type of price is an estimate of the project or retainer fee or the commission and should be the monthly (or quarterly if pricing on a quarterly basis) fee or commission received for the placement of the ads in the contract. If the price is a commission, it is based on the total monetary value of the placed advertisements. If the publication structure for advertising services has detailed indices for media placement for different media, then the model should be limited to a single type of media. For example, the contract should only contain ads placed in newspapers not ads placed in television or radio.

In order to obtain a full transaction price for these models, these two service lines may have to be bundled for the service of media placement that includes ad creation. In this bundled service, respondents often charge for only the placement of the advertising and include the creation for 'free' or vice versa. In this situation, the complete description of the service provided must include both these activities.

Fallback pricing methodologies for ad creation services and media or ad placement are:

Component Pricing - The respondent chooses a representative contract, which is broken down into a number of key components. One or more of the key components are then priced in future periods. This may make pricing easier for the respondent but does not provide a complete contract so discounting and other price changes may not be captured.

Hourly rates pricing - average hourly rates for specific ad creation professionals can be priced. In most cases, these professionals are a staff member, for example accounts manager or graphic artist. It is advisable to split up the staff by category and level of experience. In most cases, a list of hourly rates barely constitutes a reference for prices and is not generally acceptable. Furthermore, the price lists are usually only updated once a year.

Fixed fee - A fixed fee can be used for more regular services that don't have many components. However, this fee would be considered a list price if there are variables and the service is not fixed.

List prices for advertising services are not appropriate. Most prices in advertising are negotiated, highly variable and heavily discounted.

5. Costs and benefits of the alternative pricing methods

Ad creation is a custom service that is not usually repeated for the exact same services. The challenge is getting accurate estimates for this custom work. Model pricing using actually performed models yields the best results but all model pricing is still very difficult for reporters to price over time.

Average pricing can be appropriate for those services which have limited variability. The amount of bias created by the average is a concern when different clients and different advertisements are used in the average.

Using list prices would create a bias that should be avoided.

6. Quality issues

In general, no data is usually available to perform quality adjustment for changes in the contracts or models in this industry. However, estimating the net transaction price using the model pricing methodology for this industry significantly reduces the need for quality adjustments. Even though the reporter may not perform the exact same services every month that are specified in the contract as long as the reporter still offers those services, they can be priced and there is no need for quality adjustment. The reporter uses similar current contracts, which reflect changes in the economic environment, to estimate what the price would have been if the original contract had been sold in the current time period.

When services in a contract or model are no longer offered by the reporter, a substitution to a current contract or model is required. The current contract or model represents the services which are now being provided by the reporter. At the time of the substitution, an attempt should be made to solicit information from the reporter on the monetary value of the cost differences between the features in the old contract or model and the new contract or model. If the reporter can provide this information on a comparable basis, the data can be used to quality adjust the differences between the models or contracts. However, in most cases, the data doesn't exist. The features in the old contract reflect costs values from the original time period and the cost values for the new contracts are usually from the current time period. In this case, no comparison between the two contracts or models can be made.

7. Collection of information and specification of the services

The preferred method of collection is initial in-person visits to use probability proportionate to size sampling to select contracts to price. If PPS sampling and in-person visits are not feasible, then random selection of contracts can be used to select a variety of different services to price. Mail or fax or web or email reporting can be used to collect the updated information over time.

Ad creation services are comprised of series of services provided by different types of personnel either at the agency or contracted out from the agency. These services are account management, media services and a large variety of creative services. Some of the creative services are provided by copy designers, writers, art directors, graphic artists, and production managers. Also included in ad creation services are fees. Some of these fees are travel expense fees, fax fees, copying fees and other expenses fees. A percentage mark-up on the fees is also sometimes included in the final price (commission plus fees).

Ad placement services can be described using detailed terminology based on the type of media where the ad is placed. The media where the ad is placed is the largest price determining characteristics of the service. However, the price determining characteristics of ad placement services by different media are:

1. Radio

- length of the ad (15, 30, 60 seconds)
- time of day ad is aired
- day of week ad is aired
- delivery of ad by personality (D.J.) or by recording
- ad aired around features (e.g. weather, sports, and traffic report)
- ad aired during popular seasons during the year
 - holidays
 - graduation/weddings - May and June
 - back to school - August and September
- quantity of commercials bought (quantity discount)
- lead time of commercial purchase
- guaranteed or preemptible
- spot versus network radio
- number of network affiliates

2. Magazines

- size of the ad
- placement (position) of the ad
- black and white versus color
- number of colors in the ad
- "non-traditional" advertising features
 - coupons
 - gatefolds
 - pop-outs
 - product samples

- size of circulation
- geographic and demographic targeting
- discounts
 - frequency
 - volume
 - group
 - corporate
- bleed or non-bleed ad
- national versus local advertising

3. Newspapers

- type of ad (run of paper [ROP]/supplement; comics/ preprints; display/classified; black & white/color; coupon,)
- ad size (measured in column inches)
- day(s) of week ad is run
- placement and positioning (ROP versus specific section/position)
- section of newspaper (main news, sports, real estate, business, etc.)
- position of the ad (coupon position, right or left hand side, etc.)
- type of ROP rate
 - general (common for national advertisers)
 - category (rates for advertisers of certain products or services)
 - local/retail
 - classified
 - combination (e.g., Sunday/weekday or morning/evening combinations)
 - contract (for advertisers that frequently use newspapers)
- contract discounts
 - newsplan (for advertisers who place ROP ads totaling six or more times per year)
 - individual newspaper (discounts offered for bulk inches of space purchased)

4. Television (includes network, spot, and cable)

- time of day ad is aired
- length of the ad 15, 30, 60 seconds
 - infomercials (cable only)
- popularity of show (high versus low rating)
- geographic and demographic targeting
- discounts
 - volume
 - frequency
- duration the ad is run (a.k.a. *continuity*)
- run of schedule (ROS) versus fixed placement
- ad aired during popular seasons during the year
- national versus local advertising
- promotions and/or merchandising support

For the bundled service of media placement including ad creation, all the detailed price determining characteristics of both services must be described fully.

8. Specific aspects

As the advertising industry changes over time, some services such as media placement are changing from commission pricing to fee-based pricing. These fees are sometimes referred to as project fees or retainer fees. As the companies change their price mechanisms, the type of price reported needs to be updated to accommodate the change. These fees are still based on the model or contract pricing methodology. To illustrate the strong move towards fees and away from commissions, a survey conducted in the US by the Association of National Advertisers has shown that advertising agency compensation has gone from 61% commissions, 35% fees in 1994 to 10% commissions, 74% fees in 2003.

9. Overview of national methods

Korea, Finland and Mexico price advertising using list prices. Czech Republic and Hong Kong, China price advertising using transaction prices.

Australia prices advertisement placement using a unit value methodology. This methodology is employed due to the sensitive nature of commissions and fees. Companies report the average price for the middle of the quarter for the specified item across all clients.

New Zealand prices advertising creation and placement using charge out rates or fees and commissions applied to the price of the ad placement.

France measures advertising space sales using average prices for space and the commission or margin that is accrued to the advertising agency from that placement.

The US measures advertising placements and advertising creation using estimated net transaction prices for constant quality contracts or models.

4.18 Labour recruitment and provision of personnel

1. Description of the sector (ISIC 7491 / NACE 74.5)

Labour recruitment consists of all services relating to the search for and selection of candidates, and all ancillary services such as skills assessments. Recruitment consultancy consists of drawing up, in consultation with the client company, a description of the positions to be filled then searching for and selecting candidates. Recruitment agencies may use advertisements (increasingly online), the direct approach (“headhunting”) or a combination of the two. All internet-based firms that primarily attempt to connect potential employees with a permanent position at a client firm seem to be in the scope.

In terms of product, the provision of personnel consists of all forms of personnel supply including temporary employment. A distinction is then made between the types of personnel supplied: office staff, domestic staff, labourer or technician, paramedical staff, other types of personnel. A temporary employment company supplies on a temporary basis personnel, which it recruits and remunerates via temporary employment agencies, under conditions, which are stipulated by the employment code. The climate in temporary employment is closely linked to the general economic situation. Trend in the number of assignments is often an early indicator of economic turnarounds. The number of temporary staff being placed by agencies has consistently grown, reflecting a greater participation in the labour market and more flexible patterns of work. In this area, there are very large industry operators and a large number of “niche” operators. The “niche” operator tends to focus on a particular segment of the market where specialized skills or knowledge is required.

Two sub-branches were identified for monitoring prices: supply of personnel or help services (including temporary employment) and recruitment consultancy (or employment agency). The length of employment of the placed employee is not a major distinguishing characteristic between these two sub-branches. An employee who fills a position with the aid an establishment includes in “help services” receives salary and benefits from the temporary agency, not from the firm for which the employee is actually working. An employee who fills a position with the aid of an employment agency fills that position in the same way as anybody else who might have been hired directly by the company.

In the case of provision of personnel (including temporary work), the client pays the service company, which in turn pays some of this amount to the person supplied. In temporary employment, the temp agency pays the temporary worker his salary. It is important to recognize that the price should be collected is that charged to the client rather than that paid by the agency to the employee. The price can depend on factors such as: geographical location, type of work, the relationship between the temporary agency and the client, the length of the contract, level of skill. In some countries, the principle on invoicing consists of applying a multiplier coefficient to the temporary worker's hourly gross salary in order to obtain a price per hour. This price per hour then has to be multiplied by number of hours charged. The hourly salary is negotiable between the temporary employment company and the client company, according to the temporary worker's qualifications and the economic circumstances. All things being equal, changes in salaries result in changes in prices. The multiplier coefficient is a strategic variable for the temporary employment company. It may depend on many parameters: the temporary worker's qualifications, type of client or length of assignment. The longer the assignment is, the lower the multiplier coefficient is - particularly if the work is unskilled.

With major, regular clients, framework contracts exist which specify according to qualifications the hourly rate, which must be charged. These framework contracts seem to be honoured quite frequently, even when there is a change in the economic situation. Generally, in this type of contract, temporary employment

companies want a volume of activity, with comparatively low multiplier coefficients. The value of the multiplier coefficient for the same client seems to be quite stable over time.

There are several methods of invoicing for labour recruitment agency: a set price, a percentage of the new recruit's salary or re-invoicing of costs with profit. Taking a percentage of the new recruit's annual salary seems to be the main method. One of the difficulties in collecting prices for labour recruitment is well defined what the client pays the agency for its services.

2. Classification aspects and scope of the survey

In terms of international product classification (CPC version 1.1), group 851 includes "executive search and employment agency services" (category 8511) and "supply of personnel services" (category 8512).

Executive search services include services consisting of the search for, selection and referral of executive person for employment by others. The services may involve: formulation of job descriptions, screening and testing of applicants, investigation of references. The employment agency services include services consisting of selecting, referring and placing applicants in permanent and temporary basis, except executive search services.

The supply of personnel services is divided into the following subclasses: supply of office support personnel services, supply of domestic help personnel services, supply of other commercial or industrial workers services, supply of medical personnel services, and supply of other personnel services.

Recruitment agencies therefore come under category 8511 whilst temporary job agencies are in category 8512. If you need more details, please see the following website: <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=3&Lg=1>

3. Sample design

Sampling is mainly based on business registers for services industries. Temporary employment companies can be located very easily from this source so this was used directly. Regarding the supply of personnel outside of temporary employment, it can be more difficult to use business registers for services industries. Many of the largest firms transfer staff between companies in the same group, with no market price. We excluded these companies from the survey base and we used trade union's source in order to complete the sampling base.

PPS Sampling, by turnover or number of employees, is advisable. The PPS approach seems to be more relevant when the size variable is proportional to the survey variable of interest. In studies on price monitoring in services, our variable of interest is the change in prices from one quarter to the next rather than the price level for a given quarter. Another option is to include in the sample only the biggest firms

(the cut-off sampling method) when they represent “properly” the whole market and the evolution of prices. in the following manner: only choose businesses above a certain turnover (or number of employees) threshold. Economically for a given sub-group, this means that the change in prices in a sub-group is similar to that found for the industry leaders. In some countries, where the market of temporary agency is very concentrated, cut-off sampling is possible. PPS sampling is probably better than cut-off sampling in recruitment agencies because this market is less concentrated than provision of temporary workers. Some countries used “judgment samples”, where the sample is selected on the basis of the knowledge and judgment of staff compiling the index. Interviews with respondents, market reports, and industry associations can help to form the bases for the selection of “judgment samples”.

4. Main pricing methods used for services

When you consider pricing methods, it is crucial in first to well define the product you want to monitor the price. After, you can consider several methodologies: charge-out rate or contract pricing.

When monitoring average prices – charge-out rate method- by qualification and user sector (for example), hourly invoicing rates are calculated which take gross hourly salaries and multiplier coefficients into account. Assignments relating to the level of qualification and user sector required are selected; an average charged hourly rate is calculated based on the number of hours invoiced. This can be achieved, in theory, with the management system used by temporary employment companies. However, they are not indicators that small and medium-sized businesses normally use. Admission into the survey system therefore can be a great burden for the firm. We could decide, for example, to track the average price of a welder in the shipbuilding industry. We would link this to the "skilled worker for industry" post in our classification. The choice of qualifications and client sectors would of course depend on the companies' specialization.

With contract pricing, the principle consists of monitoring hourly prices charged for some qualifications based on the contract signed with a given client. One must ensure that this type of service can be monitored every quarter (regular client, qualification often required by this client). Of course, one must take qualifications and clients that are "representative" of the temporary employment company's business.

The principle is the same for supplying personnel outside of temporary employment: price per hour or day depending on the person's qualifications. In this case, we can choose charge-out rate approach or contract pricing approach.

It is possible to monitor price evolution in different ways for labour recruitment agency: we can collect a commission rate, a standard fee or a commission fee in the form of a percentage figure that represents the proportion that they take from an employee's salary. This last case is less straightforward because an

estimate of the price has to be calculated. This is achieved by applying the percentage figure to an average salary. If the percentage is stable and the average of the new recruit's salary (for the same service) increases, the price increases too. It would be difficult to monitor the price evolution in head hunting. Head Hunting involves unique matching of individuals to posts and is only carried out by a relatively small number of agencies. Perhaps it would be better to exclude head hunting in first. It would be more efficient to focus our attention on other labour recruitment agencies.

5. Costs and benefits of the alternative pricing methods

Monitoring average prices by qualification and sector (charge-out rate method) in temporary agencies can introduce bias associated, for example, the average length of assignments. Average prices are calculated whatever the length of assignment. For long assignments, the multiplier coefficient may be lower. If the average length of assignments increases over time, there will be a reduction in the average price due to this fact alone. After talking to companies, it seems that this limit is not very important: the average length of assignments seems stable and the link between hourly price and length of assignment does not seem to be as obvious as that. In any case, it is of course very important not to monitor an average hourly price with all qualifications and all user sectors taken into account (heterogeneity of the services). Nevertheless it would be difficult to consider exactly the same service over time. It is very important to define accurately the sample of qualifications. Another problem is price discrimination: the price would be different for the same qualification if the clients were different. For example the price would be lower for a large or a new client rather than other clients. The average price per qualification depends of the nature of clients (the proportion of large clients, of new clients...).

Choosing between these two methods (charge-out rate method and contract pricing approach) in the case of temporary agencies largely depends on the following two parameters: firstly, the burden of response and the companies' wish to calculate average prices by qualification and client's economic sector and secondly, the structure of the clientele and the specialization of the temporary employment company. If there are many clients, few of whom are regular, with different prices charged, it will be difficult to identify a particular number of "representative" clients.

6. How to deal with quality information

In first, it is crucial to define the output of this industry. The output definition of temporary work services is the provision of labour availability and not the result of the labour done by the temporary workers. When you consider this definition of output, you should not quality adjust temporary workers for how they are used by the client. This aspect is one of the best important points in this industry.

7. Collection of the information

Data collection should cause no tremendous problems. After establishing an ongoing cooperation with professional organization and enterprises (particularly the most important one in provision of temporary workers) price can be collected via Internet or on postal way. Nevertheless, there will be some cooperation problems within this industry, as temporary help companies are hesitant to divulge price information.

8. Specific aspects

A major concern in the industry of provision of personnel is the definition of the product. We can underline these sentences page 9 of this manual “The ESA recommends (paragraph 11.13) that persons employed by temporary employment agencies are to be included in the industry of the agency which employs them, and not in the industry of the enterprise for which they actually work. As a consequence of this recommendation, the value of services produced by the agencies amounts to all payments (including compensation of temporary employees) and not only “net fees” received by the agency. On the other hand, the ESA notes in the same paragraph that the treatment on a net basis might be more suitable for purposes of input-output analysis - that is temporary workers are to be reclassified in this case into the enterprise where they actually work and only net fees are recorded as value of services purchased from the agency. Any decision about the gross or net treatment of prices underlying SPPI should be made in line with national accounts practice and may thus vary between countries.” At European level, it is crucial to aggregate the same thing and not to mix very different approaches (gross and net approach). When you consider the concept of national accounts and different examples from European countries, it appears that the gross approach is more used and more adapted than the net approach. Of course, the weighting coefficient of provision of temporary workers in the business services industry is lower if you choose the net approach.

As we mentioned in the previous part, the definition of the service product in this industry is one of the key aspect (the provision of labour availability and not the result of the labour done by the temporary workers).

9. Overview of national methods

In Australia, “Employment Placement” represents businesses engaged in the provision of employment placement services including search, selection, referral, placements and recruitment on a permanent basis. “Contract Staff Services” consists of business engaged in job placement on a temporary basis where wage and associated costs are paid by the business performing the placement i.e. the contractor is effectively employed by the contract staff agency. The types of pricing methods used within “Contract Staff Services” and “Employment Placement” are: specification pricing, where clearly identified and representative products are

selected with conditions of sale, contract pricing, charge-out rate and average prices. For example, the firms can provide “the average percentage fee for the Top Ten accounts in the three months of this quarter, for full time placements” in order to monitor the evolution of prices in “Employment Placement”. Many Firms within the Employment Placement Industry charge their services as a percentage of the placed candidates starting salary. As this percentage fee rarely changes over time an adjustment is made to these specifications using the Wage Cost Index (WCI) to account for increases in fees applied as a result of increased remuneration over time.

Statistics Denmark began in 2004 the data collection in “labour recruitment and provision of personnel”. About pricing method in labour recruitment, hourly prices and standard prices (for example price for personality testing) are collected. About pricing method in provision of personnel, hourly prices for the personnel category and prices that look like weekly payment for single persons are collected.

In France, contract pricing and charge-out rate methods are used in order to monitor the evolution of price in “labour recruitment and provision of personnel”. Reductions in employers' social security contributions have a considerable influence on prices and the profit made by temporary employment companies in France. These reductions have become increasingly important in France, particularly following the introduction of a 35-hour week (Aubry laws 1 and 2). The temporary employment company receives the reductions in employers' social security contributions. In this case, it does not have a direct effect on price. This explains why prices can remain stable in very favourable economic circumstances, if there are more reductions in employers' social security contributions. The client company, knowing that the temporary employment company is going to benefit from these reductions, can negotiate a lower multiplier coefficient. In this situation, the mechanism by which employers' social security contributions are reduced has an effect on prices. Generally speaking, variations in reductions in employers' social security contributions impact on the prices charged and in particular the link between the economic climate and price variation.

In Japan's service price index, the CSPI, there is an item named "Temporary employment agency services" that corresponds to "labour recruitment and provision of personnel" services. This "Temporary employment agency services" includes temporary employment services, of which item includes office support occupations (e.g., secretaries, receptionist, clerks, book-keepers, data entry operators, and work processor operators), software development engineers, interpreters, translators, producers and editors of books, and instructors for computer operations. The pricing method adopted in Japan is monthly rate per person (charge-out rate method). This price is calculated from the total value of the transaction divided by the total quantity of the transaction that approximately equals to the number of the temporary workers. When calculating this monthly rate per person, however, the following characteristics are fixed in order not to reflect fluctuations other than those caused by supply-demand condition: (1) The contents of the work (ex. the payments to workers engaged in translation may differ from those to workers engaged in filing); (2) Region (there is regional price difference among temporary workers); (3) The content of the contract (the price may differ between fresh contract and renewed

contract); (4) The experience or trained level of the worker; (5) The corporation size of the firms that contracted with the agency.

Within the UK, the “labour of recruitment and provision of personnel” may be broken down into three different activities. Executive Search Services (Head Hunting) is directed towards finding senior administrators and manager for specific position. It is a specialized area and is carried out by specialist agencies. The Placement services activity consists on charging client employers a fee for a selection, referral and placement of applicants in a post usually in a permanent basis. In temporary employment, an employee will work under the terms of a contract. A principal contract is provided, when the labour recruitment agency is the employer of the individual supplied to the client. Head Hunting firms were excluded from the scope of the monitoring of prices because it involves unique matching of individuals to post and is only carried out by a relatively small number of agencies. About pricing mechanisms, respondents to the survey are allowed to return price information in a number of different ways: a commission rate (for example 50p per hour of a sales assistant), a standard fee for placing an employee in a vacancy, a commission fee in the form of a percentage figure that represents the proportion that they take from an employee’s salary. With the commission fee, the price is estimating by applying the percentage figure to a gross weekly earning figure for Standard Occupational Classifications (SOC).

In USA, the industry of employment agency is divided into three major groupings. The most important grouping is “contingent payment recruiting”. If a firm receives a commission fee that is paid only upon successfully making a placement, then the services conducted are considered “Contingency Payment Recruiting”. If a firm receives a portion of the commission, up front without necessarily filling the placement, this service is considered “Retained Executive Recruiting”. If a firm primarily does not receive commission payments at all, but rather some of fees directly related to membership in an Internet network of job-offers and job seekers, then the firm primarily engages in “Internet Recruiting Services”. In USA, there are two major factors that determine price in the industry of employment agency: commission percentage, and the first-year compensation package of position. Once the product is very well defined, contract pricing approach or specification pricing approach are used. It is very interesting to note that the variations in price due to switching of clients represent real price changes experienced by the firm, and are not quality adjusted for. In help supply services, temporary help makes up approximately 80 percent of employment and Professional Employer Organizations/Employee Leasing (PEO) firms makes up the remaining 20 percent. A PEO Firm engages in an agreement whereby a business transfers its employee to the payroll of a leasing organization after which the employees are leased back to their original employer where they continue working in the same capacity as before in an ongoing, permanent relationship. Pay rolling is a service where the business customer, not the temporary help firm, does the recruiting of the temporary employee and then asks the temporary help firm to employ the person and treat them as other temporary help. Once the product is very well defined – with a lot of criterion – contract pricing and specification pricing are used. In some cases, with custom services, repricing is a

very hard task or the firm: estimated prices should be considered in this case. It seems to be very similar to model pricing approach, nevertheless in the first period a “real” transaction occurs (it is not necessarily the case with model pricing approach). List prices can be used in temporary help.

4.19 Investigation and security activities

1. Description of sector (ISIC 7492 / NACE 74.6)

The industry of investigation and security service activities In Finland accounts for approximately 0.3 per cent of the total turnover of service industries in Finland. The main services of the industry are guarding of people and property, which generate the vast majority of the turnover of the companies operating in the industry and are, therefore, the foundation on which these companies build their business activity. In practise the share of the turnover of investigation in Finland is very small. This means that the methods described here are more concentrated for security part of the activity. For large companies in the industry, investigation and security services are usually activities of lesser importance, supplementing their guarding activities. However, they are significant to the companies from the point of their comprehensive security service image, and are used to enhance the range of the offered services so as to cover all the security needs of their customers. Small companies, in turn, naturally also offer guarding services but often specialise precisely on these services that generate smaller turnover, which they have then made into their own areas of special expertise.

Over the past decade or so, this industry has been growing strongly, and still continues to do so. The growth follows the global trend of increasing investments in security matters, especially by business enterprises. At the same time, central governments have been cutting their expenditure on security services. These facts together with today’s mounting atmosphere of insecurity have generated strong demand for the services of this industry. In addition to the foregoing, many business enterprises have subcontracted their security services to companies operating in the industry, thereby contributing to the growth of the industry even further. As the services and the companies in the industry get better, central governments are co-operating more and more with these specialist companies in producing and supplying their security services. While this development trend prevails, the growth of the industry can be expected to continue, as it will enable the companies operating in this industry to also start offering services traditionally provided by the police. However, in many countries this kind of development would necessitate legislative changes, as well as toughened criteria with regard to the training and development of staff in these companies.

The enterprises in this industry usually comprise a few large and medium-size companies, and a host of small operators. The large companies generate a considerable proportion of the total turnover of the industry, and are often major

international companies constituting market leaders in many countries. The small companies are minor localised operators, whereas the large companies operate over extensive geographic areas. The range of the services offered by these companies also grows as company size increases: the largest firms can supply a fairly sophisticated range while the smallest ones are content with providing the already mentioned traditional investigation and security services. The industry's main customers are other business enterprises and the turnover of the whole industry comes almost entirely from the services bought by them. Because of the proportion of its service contracts with business enterprises, demand by households only makes up a minor part of the industry's total demand. Nevertheless, improved availability of the services has been increasing the demand for them from households, too. However, for the time being the services provided to households will continue to make up a minor proportion of the total market.

Despite the strong growth of the industry, its market structure has remained relatively stable. Between them, the large companies cover a significant proportion of the market and dominate the industry. The market shares of these companies are steady and only really change as a consequence of business takeovers. The small companies in the industry fight for their market shares under pressure from the large ones. The market shares of these companies can fluctuate significantly as a result of competition. Nevertheless, the influence of this fight for market shares is minor on the market structure of the whole industry. Because of the aforementioned reasons, many countries use a five-year cycle for reviewing the weights of the price indices for the industry, and this can generally be regarded as a satisfactory weight revision interval.

2. The classification and definitions

The companies offering investigation and security services usually concentrate on their areas of core competence. They supply almost exclusively only those services that relate to their own industry, that is, they hardly ever engage in activities that depart from the main activity of their own industry. This makes their classification straightforward. ISIC and NACE classify enterprises supplying investigation and security services as follows:

ISIC Revision 3.1 class 7492 Investigation and security activities

NACE Revision 1.1 class 74.60 Investigation and security activities

The services under these classes are

- Surveillance, guarding and other security services
- Transport of valuables
- Body guarding

- Surveillance and street patrolling of residential buildings, offices, factories, construction sites, hotels, theatres, amusement venues, sport stadiums, shopping centres, etc.
- Public transport safety procedures, such as security checking of luggage and passengers at airports and security guarding of trains and underground trains
- Store detective services
- Operation of service telephone lines or the like for remote monitoring of mechanical equipment
- Screening of alarms (to identify false alarms) and calling of police, fire or ambulance services as necessary
- Consultancy on household and public sector security systems, including background security vetting of individuals
- Destruction of data from any data carrier
- Private investigation activity

Over the past decade, the services of the industry have been developing strongly especially due to advancements in technological solutions, which the large companies in the industry have been able to exploit efficiently and thereby make considerably better progress than the small operators in the field have been capable of. A good example of this is the emergency call centre services with extensive geographic coverage that are offered by the largest companies in the industry. Small and local operators are unable to provide services of similar scale because of the substantial fixed costs involved. Partly precisely for this reason many small companies in the industry have concentrated on their own, narrow areas of competence, thus gaining a competitive edge through their special expertise or geographic location. The development of the services offered by the industry has focused on reinforcing its own strengths. Consequently, it has caused no classification problems thus far, as the competing has not extended to other industries.

As co-operation between central governments and security companies intensifies, the services offered by the security companies have been increasingly approaching the traditional tasks of the police. However, this has not yet caused problems in the classification of the services, but the kind of future situation is well foreseeable in which some of the services of the companies get classified into categories traditionally associated with the tasks of the police. Yet, even in such situation the share of the services concerned is likely to remain minor, with no bearing on the classification of enterprises into different industries.

Companies engaged in investigation and security service activities can be adequately and exhaustively classified according to ISIC. It is the most frequently used classification, which many countries have adapted and improved to suit the special national characteristics of different industries. These national adaptations

must always be thoroughly taken into account in the compiling and reviewing of a price index for the industry.

In Finland, security service activities have been divided into five service types, on four of which price data are collected. The service types are:

- District guarding services
- Local guarding services
- Store guarding services
- Emergency call centre services
- Money transport services

Except for money transport services, price data are collected on all of these service types. No price data have been available for money transport services, as their collecting is problematic. The contracts selected for the index calculation have been grouped according to the types of services on which the enterprises drawn into the sample provide price data.

3. Sample design

The population of the companies engaged in investigation and security service activities is comprised of a large group of small companies and a few medium-size and large companies. The collection of price data from small companies is difficult in practice, which is why purposive cut-off sampling often has to be used to reduce the size of the sampling frame. An example of a commonly used cut-off threshold would be one per cent, that is, all the companies whose turnover falls short of one per cent of the total turnover of the industry are excluded from the frame. However, it should be noted here that the sample is then no longer representative of the entire industry. However, in practice, the inconsistency in the representation is not significant.

Nevertheless, among the small companies there may be some that are undergoing strong growth and are approaching the cut-off threshold. If it can be assumed that they will very soon be crossing the threshold they can be included in the population.

The sampling methods usually opted for are stratified sampling according to company size or PPS (Probability Proportional to Size) sampling. These sampling methods allow for differences in company sizes to be taken into consideration. The size of the sample is, in practice, determined either with statistical methods or according to available resources.

Purposive and statistical sampling methods can often be successfully combined. For example, if an industry is dominated by a couple of enterprises, these can be formed into their own stratum from which all units are selected into the sample with probability one. The remaining enterprises from the other strata are

selected using either PPS or random sampling. If necessary, a sampling design with more than one dimension can be resorted to. If, for example, regional differences are observed in a price change, the use of geographic area as a stratification variable can be considered.

Sampling can involve several levels, meaning that before actual data on a price are obtained, the price observation concerned may have gone through more than one sampling. For instance, a sample may have been drawn first of enterprises, then of representative services and finally of contracts. However, random, stratified or PPS sampling can be used at all levels of sampling.

In Finland the Business Register was used as a sampling frame. The enterprises were stratified into two strata depending on turnover. In this pilot stage the sample was realised only for the strata consisting large enterprises. The sample will be supplemented later on with smaller enterprises. The good geographical coverage was already obtained using only large enterprise strata. The actualised total sample size was 3 enterprises and 160 price quotations. The actual coverage rate in terms of turnover is approximately 42 %.

The selection of the contracts was made in co-operation with enterprises, but these can also be drawn using statistical sampling. The contracts were first divided into service categories and then further into two geographical areas (greater Helsinki area and rest of the country) and into 2 price categories that reflect the actual volume of the service. The sample size for each contract strata inside of the enterprise was proportional to group's weight according to information obtained from enterprise. The Enterprises selected representative contracts from each strata (one enterprise send their data into Statistics Finland were the selection was made using PPS) using either random sampling or judgement.

4. The pricing method used

The selection of the pricing method must take into account the special characteristics of pricing in the industry. Long-term contracts, tailored to customer needs and specifying in great detail the contents and the price of the service concerned for the whole contract duration, are typical in the investigation and security service industry. Such contracts are prevalent especially in the large companies of the industry, and their prices are arrived at after mutual negotiations between companies.

List prices if available are often the quickest and least labour-intensive way to obtain relevant service price data. In practice, however, the list prices published by companies do not represent the real prices customers pay for their services. Large customers may be able to plead their major customer potential and get lower prices than those published. By contrast, contracts with customers with only minor market power generally follow fairly closely published list prices.

The list prices are not easily available in Finland. The common practise is that enterprises encourage the potential customer to take the first contact by e-mail or phone. Based on negotiations with enterprises it was decided that contract prices are collected, from the companies. These prices show directly the real prices paid for the services and their periodic monitoring is also usually easy due to the length of the contracts.

5. Costs and benefits of the alternative pricing methods

When the contracts are well selected, the contract pricing gives an accurate picture of real transactions price movements. Under certain assumptions it is almost as effective as model pricing.

Perhaps the largest shortcoming of the contract pricing is that it requires considerable initial effort from the data supplier, in order to make sure that representative contracts become selected in a statistically correct and efficient manner. In addition, it has to be ensured that all the price determining characters are specified in the sample contracts. On the other hand, once the contracts have been selected and the initial effort made, pricing from contracts is quite a cost-effective method for collecting price data.

Timeliness of the price data is a problem in pricing from contracts, in other words changes in prices do not necessarily show in contracts as quickly as they do in list prices. The price change of a new contract may not be of the same magnitude as that of an old contract. It might be necessary to update some proportion (e.g. 2 %) of the contracts in the sample on continuous bases.

Quality changes caused by dissimilarities in renewed contracts contents might also cause some potential problems (this might also be problem in case that part of the sample is continuously renewed). To make sure that the contents of the contract is unchanged is time consuming and requires familiarity with the price determining character of the contracts. Substituting contracts may be difficult to find, which is why changes in quality are not easy to follow.

6. How to deal with quality issues

In the investigation and security service industry, changes in quality mainly arise from variations in the compositions of the agreed services. Changes in quality must always be dealt with and decisions made as to whether they require any adjustments in the compilation of the index. In practice, minor changes can be ignored, but the goal that should always be striven for within the available resources is not to weaken the quality of the index because of these changes, otherwise its representativeness suffers and price changes can no longer be regarded as reliable.

Of course the ideal alternative would be to substitute a changed contract with a new one with identical contents. The price of the substituting contract would have

to fluctuate in the same way as the price of the replaced contract would have done. Substitutes with identical contents can usually be found for standard contracts. However, quite often contracts, especially major ones, contain such detailed specifications that finding substitutes for them may be difficult or even impossible.

It may also be possible to quantify a change in the quality of a service. In this case, use of the changed contract in the index could be continued, but the quality change would have to be allowed for continuously in the compilation of the index. In practice, however, a quality change cannot often be quantified and a substituting service is not available until a quality change occurs.

7. Collection of the information

The most important thing when information is being collected from data suppliers is to make sure it is correct and appropriate. The information must describe well the services of the industry and thus represent as well and as diversely as possible the price development in the industry. In order to achieve this, it has to be ensured from experts in the industry that the collected information is relevant and sufficient. The experts representing the industry must be from upper management of companies, commanding a broad overview of the services concerned and of the industry as a whole. This will ensure high quality and representativeness of the index for the industry.

In an ideal situation, besides price data, the following information should be collected about services:

- Type of service
- Customer details
- Possible quality changes
- Special conditions of contracts

In practice, however, the target companies cannot be overburdened with data supply obligations, as this would endanger the quality of the data. This is why all the desired data are often not received from the target companies. Decisions about which data are the most central and crucial in a given situation must be made case-by-case, and efforts should then be focused on getting these data.

Special efforts in the data collection should be made to ensure that the contents of the data remain unchanged from one collection round to the next, in other words the supplying companies must be consulted to make sure that a service has not changed in terms of its contents since the previous collection round. If there has been a change in contents, a price change no longer measures directly the desired price, and steps have to be taken to allow for a change in quality.

In Finland, price data are collected on the four service types already mentioned, on which the data are requested from companies operating in the industry. Customer details are obtained in the form of customer numbers in

connection with the reporting of price data. In addition, the companies supplying the data are requested to inform about any possible quality changes in the context of price data reporting, so that these can be reacted to and the quality of the index kept high. The questionnaires are sent quarterly to the enterprises by e-mail. The contract prices with identification number and quality change comment are received in excel-format. The price collection was started during the summer 2003.

8. Specific aspects

The industry is highly concentrated, that is, a few large companies account for a considerable proportion of the total turnover of the whole industry. Small companies are numerous, but their shares of the total turnover of the industry are negligible. For this reason, major contracts go to just a couple of the largest companies in the industry, because other companies are unable to offer sufficiently exhaustive services. Long-term contracts are also characteristic in this industry. The duration of the contracts entered into with customers is usually comparatively long, because the quality of the services stays stable for a long time and the demand for the services is continuous.

The largest single cost item in investigation and security service activities is labour costs. Therefore, labour costs are also the main determinant of the prices of the services. Wages and salaries are rigid and change seldom, often only once a year. For this reason contract prices also often only change once a year as a result of pay reviews. The changes in the prices of old contracts follow chiefly the development in labour costs. The bases on which the prices of the contracts to be newly drawn up are determined may differ slightly from those on which the prices in old contracts were settled, so it is important to also monitor new contracts so that changes in contract prices can be generalised to concern the whole industry.

9. Overview of national methods

In Finland, data on real contract prices are collected from the largest companies in the industry whose combined coverage of the whole industry is considerable. These companies primarily offer only guarding services. The prices of the services of the industry are monitored quarterly and the index is calculated as a Laspeyres type of chain index. The index is at the testing phase, and has not been published yet.

The Czech Republic collects contract prices from approximately 30 data suppliers. The index calculated from these contract prices is published monthly. At the moment price data for the calculation of the index are only collected on one service, which thus represents the whole industry. Changes in quality are monitored against estimates obtained from the data suppliers, who are asked to estimate what proportion of a change in the price of the service is caused by a change in quality and what proportion represents a genuine price change.

Japan calculates an index for the industry from service contract prices. The collected service prices are inclusive of an excise duty. The index is published monthly and calculated as a Laspeyres index. Quality changes are taken into account case-by-case using the method most appropriate for the situation.

Slovakia has conducted a pilot project on the compilation of an index for the industry, and has started to calculate an index on the strength of its results. The index is calculated monthly.

Great Britain, Portugal, France, New Zealand, Mexico and Australia also calculate a price index for the investigation and security service industry. Contract prices are used in the collecting of data in France, New Zealand and Australia, whereas Mexico uses mark-up pricing. Great Britain collects both contract and list prices. The index is calculated quarterly in all other countries except Mexico, the Czech Republic, Japan and Slovakia where it is done monthly.

4.20 Industrial cleaning

1. Description of the sector

Cleaning services are a typical example of outsourcing. Consequently, the level of outsourcing of cleaning differs per country and thereby determines whether this industry is large. In some countries outsourcing is small and cleaning personnel are employed by the owner of the property that has to be cleaned. Then the separate industry and market service provision is small.

Industry structure can further differ by country in typical sizes of cleaning firms, and the level of subcontracting.

Another aspect of different country situations is the kind of labour input: in some countries personnel is mostly hired by cleaning firms directly, while in other countries a large share of staff are hired from temporary work agencies.

In many countries the industry has seen increases in professionalism and organisation over the last decade(s). For instance, industry organisations have been founded. The products of the cleaning industry are transparent and simple compared to other business services. This has led to standards, norms and professional codes, including advanced quality assessment and control systems.

The transparency and competition in the market puts a continuous push for efficiency and productivity on the providers. Technical developments, including chemical, have influenced the industry. For example, a recent innovation is the use of micro fibres, in combination with very exactly dosed water and less cleaning agents.

The market is mostly competitive and free, with occasional exceptions. For instance, the Dutch Department for Education sets rates for cleaning of all public schools. This leads to a potential different price and different price change in this submarket.

For larger companies that need cleaning, cleaning brokers can help phrase demands and select a service provider for a long term contract. Long term contracts with occasional escalation (renegotiation) of the price are the main pricing mechanism.

Biggest share of costs are the labour costs. Less important cost factors are materials, work clothes, equipment, and (less directly linked to specific outputs,) costs for instruction of personnel, supervision, risk and profit.

The price determining factors are the objects to be cleaned (e.g. measured in square meters), the quality demanded, type of client, the moment of billing compared to delivery, and the length of the contract.

A large share of production concerns buildings, including many offices: large clients are banks and business service providers, hotels, restaurants and bars, education, and government.

The Voorburg Group has not treated cleaning, nor is it planned for the 2005 meeting.

2. Classification aspects and scope of the survey

The United Nations' ISIC has one entry for cleaning:

7493 Building cleaning activities

The United Nations' CPC recognises the following product categories:

853 Cleaning services

8531 Disinfecting and exterminating services

8532 Window cleaning services

8533 General cleaning services

8534 Specialized cleaning services

The European Classification of Products by Activity (CPA) recognises 'Industrial cleaning services'. The remarkable name is used to distinguish it from services provided to households. Industrial cleaning services are a 3-digit category which remains unsplit up to the 6th digit:

74.7 Industrial cleaning services⁶⁶

⁶⁶ Concordant with the variety of the EU of the ISIC: the NACE.

74.70.11 Disinfecting and exterminating services

This subcategory includes:

- services consisting in disinfecting dwellings and other buildings
- exterminating insects, rodents and other pests
- fumigation services and pest control services

74.70.12 Window cleaning services

This subcategory includes:

- services consisting in cleaning windows in dwellings and other buildings. Included here are cleaning services for exterior windows using swing stages

74.70.13 Traditional cleaning services

This subcategory includes:

- services consisting in cleaning and maintaining dwellings and other commercial, administrative and industrial buildings
- floor cleaning and waxing
- interior wall cleaning
- furniture polishing
- other traditional cleaning services

74.70.14 Specialized cleaning services

This subcategory includes:

- cleaning services for hospitals
- cleaning services for computer rooms
- specialised cleaning services of reservoirs and tanks, these being parts of either industrial sites or transport equipment
- decontamination services
- cleaning services of heat and air-ducts
- sterilisation of objects or premises (operating rooms)
- cleaning of industrial machinery
- bottle cleaning

74.70.15 Furnace and chimney cleaning services

74.70.16 Other cleaning services

This subcategory includes:

- non-specialised cleaning services of:
 - buses, underground and other trains, planes, ships and other transport equipment
 - other cleaning services not elsewhere classified

Australia and New Zealand use the Australian and New Zealand Standard Commodity Classification (ANZSCC) and the Australian and New Zealand Standard Industrial Classification (ANZSIC) for their SPPIs. ANZSCC is based on the international CPC and ANZSIC is based on ISIC.

ANZSCC 874: Building Cleaning Services (including pest control)

ANZSIC 7866: Units mainly engaged in providing window, building, telephone cleaning or similar cleaning services (except carpet cleaning or shampooing services, steam cleaning, or sand blasting of building exteriors).

Exclusions/References

Units mainly engaged in

- a) the cleaning of building exteriors (including steam cleaning, sand or other abrasive blasting) are excluded; and
- b) cleaning or shampooing carpets, drapes or curtains are excluded.

Primary activities include:

- Building cleaning service
- Cleaning service nec
- Office cleaning service
- Chimney cleaning service
- House cleaning service
- Telephone cleaning service

Usually, the scope of a PPI coincides well with all cleaning in any classification used.

Potentially some building cleaning is included in the CPI, for instance cleaning of communal areas of larger apartment buildings, and window and chimney cleaning. But traditional household cleaning which is included in most CPIs, is not included in this service industry. Consequently, cooperation with the CPI (in for instance joint surveying) is probably not feasible or only to a limited degree.

3. Sample design

On the one hand, relatively small samples sizes can suffice because the market is comparatively transparent and competitive. On the other hand, different submarkets exist with potentially different price development and in some countries, many small companies have a large market share.

An explicit choice may have to be made whether to include subcontracting, if it is a large share of production.

A specific issue is that the specialisation of firms may make it necessary to sample by submarket to assure inclusion of respondents from all niches.

4. Main pricing methods

The main pricing methods are contract pricing and model pricing. Contract pricing uses real transaction prices and is therefore the method of choice. See paragraph 9 on the implementation of pricing methods in different countries.

5. Costs and benefits of the alternative pricing methods

Occasionally, hourly rates are surveyed. Contract pricing with due consideration of both new long term contracts, and new prices for older long term contracts, uses real transaction prices. It thereby approximates transaction pricing closer than model pricing and hourly rates methods. Only if respondents have very moving reasons of their own to prefer model pricing or hourly rates, these methods can be accepted. Still, the results of these less apt methods can be plausible and close to contract pricing.

6. Quality issues

In good contract pricing, items are clearly specified in terms of the transacted service themselves.

Quality change in the sense that specifications of the repeated service change, should be caught by close contact with respondents who have to inform about any such changes. If such changes occur, explicit quality adjustment methods are feasible in contact with respondents.

If contract are discontinued, a substitution is needed. New items can enter the index in this case with simple methods like targeted mean imputation.

If hourly rates are surveyed, changes in efficiency (if any) are not captured in the index. This is a standard issue with hourly rates.

7. Collection of information and specification of the services

When prices in real long lasting contracts are followed, it is in theory enough to specify exactly which contract is followed, for instance with a client or contract number. But as soon as a question about the price, the service content or an item substitution arises, it is necessary for the price statistician to be able to enter well prepared and well informed into a discussion with the respondent. Therefore, besides identifying information on the contract, price determining aspects have to be recorded in the item description (see also paragraph 1): objects to be cleaned, the quality demanded, type of client, the moment of billing compared to delivery, and the length of the contract.

8. Specific aspects

Specific aspects have been largely treated in other paragraphs.

Exports are not very relevant for cleaning services. Potentially, large international firms have cleaning 'outlets' on a national level.

An interesting recent development is the emergence of companies that provide full service for building maintenance, including security, cleaning and simple other upkeep services.

Eurostat's Handbook on Price and Volume Measures in National Accounts is quite limited in its recommendation. It states that services are standard and a price index well feasible.

The products are more transparent than the more complex products of business services of professionals like engineers and lawyers. It is easier for clients to compare tenders leading to tougher competition. For example, a client can exactly compare on a yearly basis the tenders for having its offices cleaned. It is much harder to make an exact comparison between different accountants for the yearly auditing. There is therefore a higher pressure to increase productivity in these simpler industries; a cleaning firm will try to deliver a service in as few hours work as

possible, whereas professionals may simply try to sell as many billable hours as possible.

9. Overview of national methods

Twelve countries have so far endeavoured into PPI compilation. Hereunder the experience of four countries is highlighted.

France

INSEE in France has an index running since 1999 with 1995 = 100. The index includes specialised cleaning in agriculture, unlike the usual classifications. The following submarkets are distinguished of which the PPI comprises items 2, 3, 4 and 6:

1. Industrial disinfection, rat control, insect control
2. Windows
3. Cleaning of buildings
4. Specialised cleaning (agriculture, manufacturing industry)
5. Chimney sweeping
6. Other cleaning (like transport vehicles)

The PPI is based on prices of representative contracts. The panel of firms is based on a stratified sample. The stratification is based on turnover. The panel comprises 130 companies, which render 917 prices periodically.

It was concluded from research that it is hard for companies to price a representative model contract; they prefer submitting the price of an existing contract. The moment of billing compared to delivery is also a price determining factor; prices have shown change because of the moment of payment. A specific price determining factor is the negotiation about new contracts with prospective clients in times of tough competition. Companies offer possibly down to 20% under the market price to acquire the contract. Once the client is in, the price rises stepwise towards the market price. This effect makes PPI compilation difficult.

It is hard for a cleaning company during the first year to estimate how much service the client will need.

29/08/2005

Contracts are split in categories by type of client and by type of object. This distinction is made because the industry suspects that besides price differences, price change can differ:

Client

- Cleaning in public sector
- Cleaning in private sector

Object

- Offices
 - public
 - private
- Manufacturing
 - Manufacturing equipment
 - Manufacturing, standard
 - Manufacturing, sensitive areas
- Commercial property
- Public space
- Communal areas in dwellings
- Transport vehicles

Price observation

INSEE collect transaction prices of long running contracts. The contracts are distinguished according to the above specified objects. It turns out to be well possible for companies to distinguish between changes in prices and service.

Weighting

The types of cleaning contract get different weights. Company weights are based on turnover figures that are acquired by separate survey.

United Kingdom

In the United Kingdom the following family tree is used for cleaning:

1. Cleaning

- a. Commercial
 - i. Plants
 - ii. Offices
 - iii. Shops
- b. Non-commercial
 - i. Hospitals
 - ii. Government
 - iii. Other

There is no main distinction between cleaning of buildings and other cleaning.

Price observation

The pricing method is contract pricing. Prices pertain to: a reduced or not reduced fee for a transaction or a periodic payment for one quarter under a continuous contract. Respondents are asked to indicate whether the quality of the services, the type of client, the quantity, the speed, the conditions for payment or length of the contract have changed.

Finland

In Finland, a pilot runs since the third quarter of 2003. 20 to 30 contract prices per cleaning company are surveyed. Contracts vary in size of the area to be cleaned and moment of cleaning; daytime, evenings or the weekend. Distinguished objects are: building, office, plant, fitness room, a bank and a shop.

Price observation

The pricing method is an hourly rate method: the monthly fee is divided by the (planned) number of hours worked per month. If the contract changes, it is suspended from the index.

New Zealand

New Zealand uses the Australian and New Zealand Standard Industrial Classification (ANZSIC). The split is based on the following objects:

1. Cleaning of buildings
2. Cleaning n.e.c.

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3. Office cleaning
4. Chimney sweeping
5. Residential cleaning
6. Telephone cleaning

Cleaning of buildings contains also pest control. Nine of 25 items in the survey refer to pest control. The variables distinguished in the 16 other items are:

1. Commercial spaces – non-commercial spaces
2. Schools
 - Window cleaning
 - Offices
 - Chimney sweeping
 - Septic tank cleaning.
3. A regional component

Pricing methods

The pricing method is a combination of model prices, list prices and hourly rates. Building cleaning is survey with model prices. Cleaning of septic tanks uses list prices.

Weighting

Objects are weighted in the index based on revenue. These data are derived from a yearly Business Survey.

The Netherlands

During pilot visits to firms, it turned out that there is a difference between firms specialised in cleaning buildings on the one hand and those specialised in cleaning transport equipment and other cleaning on the other hand. This last submarket consists of very heterogeneous services.

Cleaning firms specialised in cleaning buildings seemed to be able to provide data according to a number of different pricing methods. Also, their preferences for

pricing method differed. The following pricing methods were tried during the pilot survey (late 2004-early 2005):

- Model prices – contracts
- Model prices – tenders
- List prices
- Standard hourly rates
- Realised hourly rates
- Contract pricing

Unfortunately, no firms submitted trial data for contract pricing. The two model prices methods work well for most firms. Firms provide in addition to model prices an hourly rate related to the model, as well as a model related square meter fee.

List pricing is meant to be additional to one of the other methods. Almost all firms have price lists, but they are never representative for all production.

Standard hourly rates and realised hourly rates are considered less apt methods. One large firm is presently only providing these.

Cleaning firms specialised in cleaning transport equipment and other cleaning are very diverse. Three were visited during the pilot, of which two provide trial data. Both supplied model prices. The firms considered all other pricing methods impossible. These models are based on hourly rates for a combination of a vehicle with two cleaning experts. On top of this, hourly rates are calculated for clients of different sales' sizes. It is yet unclear whether such models are possible for other firms in this submarket.

Norway

Norway has made a feasibility study, which was finished in February 2005. From this study it was decided only to include traditional cleaning services (74.70.12) and window cleaning (74.70.13) in the output price index in the first place. The index survey does not distinguish between private and public sector. This decision is based on interviews with enterprises within the industry.

Price observation

- Window cleaning
 - The survey distinguishes between window cleaning inside and outside. Price per square meter is collected for both categories.

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- Traditional cleaning services
 - Cleaning of interior walls and ceilings
Price per square meter is collected.
 - Waxing and scrubbing
Price per square meter is collected
 - Daily cleaning services
Prices of representative long running contracts are collected. In the survey the respondents are asked to give information about any changes in the following factors in the contract: Total number of square meters, number of square meters that require especially good cleaning (e.g. toilets) and the INSTA 8000 level on the service (Nordic quality standard). This information will be tried to be used for quality adjustment in the contract price.

Weighting

The different services are weighted in the index based on revenue. This information is collected once a year.

Glossary

This Glossary uses the SNA 93 as the main reference.

“STS Manual” refers to “Methodology of short-term business statistics. Interpretation and guidelines”, Eurostat, Edition 2002, ISBN 92-894-4762-1.

PPI Manual refers to the glossary of the Producer price index manual.

OECD refers to *the OECD Glossary of Statistical Terms*:
(<http://cs3-hq.oecd.org/scripts/stats/glossary/index.htm>)

CODED is the Eurostat concepts and definitions database
(<http://forum.europa.eu.int/irc/dsis/coded/info/data/coded/en.htm>)

Webster corresponds to the Merriam-Webster online dictionary (<http://www.m-w.com>).

Accrual accounting

Accrual accounting records flows at the time economic value is created, transformed, exchanged, transferred or extinguished; this means that services are recorded in the system when they are provided.

Some services are special in the sense that they are characteristically supplied on a continuous basis. Examples are operating leasing, insurance and housing services (including those of owner-occupied dwellings). These services are recorded as provided continuously over the whole period the contract lasts or the dwelling is available. (see section **Virhe. Viitteen lähde ei löytynyt.**)

The base period generally is understood to be the period with which other periods are compared and whose values provide the weights for a price index. However, the concept of the “base period” is not a precise one and may be used to mean rather different things. Three types of base periods may be distinguished:

- i. *The price reference period*, that is, the period whose prices appear in the denominators of the price relatives used to calculate the index, *or*
- ii. *The weight reference period*, that is, the period usually a year, whose values serve as weights for the index. However, when hybrid expenditure weights are used in which the quantities of one period are valued at the prices of some other period, there is no unique weight reference period, *or*

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- iii. The *index reference period*, that is, the period for which the index is set equal to 100.

The three reference periods may coincide but frequently do not. (PPI Manual)

Basic price

The basic price reflects revenue received by the producer, for a unit of service produces as output, minus any taxes on services, and plus any subsidies received by the producer. The basic price includes any applicable discounts, rebates, surcharges, etc. that may apply to customers.

Chain indices

Chain indices are obtained by linking price (or volume) indices for consecutive periods; the short-term movements which are linked are calculated using weighting patterns appropriate to the periods concerned.

Charge-out rate

Charge-out rate is the average billing rate (e.g. hourly rate) designed to recover all costs of providing the service.

Component pricing

With the component pricing method, the service is divided into components for which prices can be observed or made up. Prices of these components are based on truly transacted services.

Computer software

Computer software is an asset consisting of computer programs, program descriptions and supporting materials for both systems and applications software; included are purchased software and software developed on own account, if the expenditure is large. (Webster)

Contract pricing

Contract pricing is used to price a single transaction representing a repeated delivery of the same or very similar service over time.

Domestic production

GDP (Gross Domestic Production) is intended to be a measure of the value created by the productive activity of resident institutional units. Although for the kinds of technical reasons just given, it may not be identical with the sum of the gross values added of resident producers it nevertheless consists mainly of the latter.

It should be noted, however, that GDP is not intended to measure the production taking place within the geographical boundary of the economic territory. Some of the production of a resident producer may take place abroad, while some of the production taking place within the geographical boundary of the economy may be carried out by non-resident producer units. For example, a resident producer may have teams of employees working abroad temporarily on the installation, repair or servicing of equipment. This output is an export of a resident producer and the productive activity does not contribute to the GDP of the country in which it takes place. Thus, the distinction between resident and non-resident institutional units is crucial to the definition and coverage of GDP. In practice, of course, most of the productive activity of resident producers takes place within the country in which they are resident. However, producers in service industries which typically have to deliver their outputs directly to their clients wherever they are located are increasingly tending to engage in production in more than one country, a practice which is encouraged by rapid transportation and instantaneous communication facilities. Geographical boundaries between adjacent countries are becoming less significant for mobile service producers, especially in small countries bordered by several other countries. (SNA, par. 6.238 and 6.239)

Enterprise

The enterprise is the smallest combination of legal units that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit. The enterprise thus defined is an economic entity which can therefore, under certain circumstances, correspond to a grouping of several legal units. (STS Manual)

Establishment

An establishment is an enterprise or part of an enterprise that is situated in a single location and in which only a single (non-ancillary) productive activity is carried out or in which the principal productive activity accounts for most of the value added.

Evolutionary services

They are services similar to existing services. It is possible, at least in theory, to adjust for any quality differences between an evolutionary service and an existing service.

Exports

Exports of goods and services consist of sales, barter, or gifts or grants, of goods and services from residents to non-residents. The treatment of exports and imports in the SNA is generally identical with that in the balance of payments accounts as described in the Balance of Payments Manual. (OECD)

Hedonic method

The hedonic method is a regression technique used to estimate the prices of qualities or models that are not available on the market in particular periods, but whose prices in those periods are needed in order to be able to construct price relatives; it is based on the hypothesis that the prices of different models on sale on the market at the same time are functions of certain measurable characteristics such as size, weight, power, speed, etc and so regression methods can be used to estimate by how much the price varies in relation to each of the characteristics. (OECD)

Imports

Imports of goods and services consist of purchases, barter, or receipts of gifts or grants, of goods and services by residents from non- residents. The treatment of exports and imports in the System of National Accounts is generally identical with that in the balance of payments accounts as described in the Balance of Payments Manual. (OECD)

Industry SPPIs

A SPPI for an industry is compiled based on prices of outputs in establishments belonging to the industry concerned. It covers also prices of secondary production.

Institutional unit

An institutional unit is an economic entity that is capable, in its own right, of owning assets, incurring liabilities and engaging in economic activities and in transactions with other entities. Enterprises are institutional units. Other kinds of units include households and governments. (PPI Manual)

Intra-enterprise transfer price

The value assigned on a per unit or per shipment basis to goods transferred from one establishment of an enterprise to another. It may or may not be economically significant. However, it is not a market price since ownership of the good does not change hands. (PPI Manual)

Kind-of-activity unit

A kind-of-activity unit is an enterprise, or a part of an enterprise, which engages in only one kind of (non-ancillary) productive activity or in which the principal productive activity accounts for most of the value added.

The kind-of-activity unit (KAU) groups all the parts of an enterprise contributing to the performance of an activity at class level (four digits) of NACE Rev. 1 and corresponds to one or more operational sub- divisions of the enterprise. The enterprise's information system must be capable of indicating or calculating for each KAU at least the value of production, intermediate consumption, manpower costs, the operating surplus and employment and gross fixed capital formation.

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KAUs falling within a particular heading in the statistical classification of economic activities in the European Community (NACE REV 1) can produce products outside the homogeneous group, on account of secondary activities connected with them which cannot be separately identified from available accounting documents. The enterprise and the KAU are identical when it proves impossible for an enterprise to indicate or calculate information on all of the variables listed in this recital for one or more operational subdivisions. (Manual)

Laspeyres price index

A Laspeyres price index is a weighted arithmetic average of price relatives using the values of the earlier period as weights.

Local kind of activity unit (LKAU)

See “establishment”.

Local unit

A local unit is an enterprise, or a part of an enterprise, which engages in productive activity at or from one location.

Margin (trade)

A trade margin is the difference between the actual or imputed price realised on a good purchased for resale (either wholesale or retail) and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of.

Margin (transport)

A transport margin consists of those transport charges paid separately by the purchaser in taking delivery of the goods at the required time and place.

Market prices

Market prices for transactions are the amounts of money willing buyers pay to acquire something from willing sellers.

Mark-up

The mark-up is an amount added to the cost price to determine the selling price.

Model pricing

The model pricing method aims to price a virtual service whose specifications are held constant from the previous period.

Non-probability sampling

The selection of a sample of producers and products is non random but based on expert knowledge of judgment. Non-probability sampling is also known as “non-random sampling”, “purposive sampling” and “judgmental sampling”. (PPI Manual)

Non-resident

A unit is non-resident if its centre of economic interest is not in the economic territory of a country.

Observation

The price collected or reported for a sampled product or item. (PPI Manual)

Output (services output)

Services output is produced by an establishment or local kind of activity units. The services output is provided for all uses, intermediate and final consumption, and for exports.

Output PPI

Output producers price indices seek to measure the change in the trading price of products sold by domestic producers on the domestic market and the non-domestic market. (Manual)

Paasche price index

A Paasche price index is the harmonic average of price relatives using the values of the later period as weights.

Percentage fee method

This method follows the development of both the percentage rate and the price/value of associated product.

Period prices

Period prices are an estimate of the price across the period and so is an average price for the period. (PPI Manual)

Point-in-time prices

Point-in-time prices prevail on a particular day of the month. (PPI Manual)

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PPI

PPI is a measure of the change in the prices of goods and services either as they leave their place of production or as they enter the production process. (PPI Manual)

PPS

Probability proportional to size is a sampling procedure whereby each unit in the universe has a probability of selection proportional to the size of some known relevant variable. In the case of establishments, size is usually defined in terms of employment or output. (PPI Manual)

Price

The price of a good or service is the value of one unit of that good or service.

Price index

The price index is a measure reflecting the average of the proportionate changes in the prices of the specified set of goods and services between two periods of time.

Price reference period

It is the period of which prices are compared with the prices of the current period. See also "base period".

Principal activity

The principal activity of a producer unit is the activity whose value added exceeds that of any other activity carried out within the same unit (the output of the principal activity must consist of goods or services that are capable of being delivered to other units even though they may be used for own consumption or own capital formation).

The "principal activity" is identified by the "top-down" method as the activity which contributes most to the total value added of the entity under consideration. (Manual)

Probability sampling

The random selection of a sample of producers and products from a universe of industrial activity in which each producer and product has a known non-zero probability of selection.

Producer's price

A producer's price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any VAT, or similar deductible tax, invoiced to the purchaser; it excludes any transport charges invoiced separately by the producer.

Product SPPIs

A SPPI is compiled for product groups based on prices of outputs in all economy independently whether services are produced as principal or secondary production. The SPPI is typically published by industry classification.

Productivity

Productivity is understood as a change in working time in the provision of the same service product in two periods. Change in productivity may be a result of improved labour or capital productivity or of the switch in the use of labour and capital

Products

Products, also called “goods and services”, are the result of production; they are exchanged and used for various purposes: as inputs in the production of other goods and services, as final consumption or for investment.

Product specification

The product/service specification is a detailed list of the characteristics that identify an individual sampled product. Its purpose is to ensure the consistency of the price collection through time. The specifications cover both the product/service and the transaction.

Quality adjustment

See specific section before

The process - or the result of the process - of estimating what the market price of a replacement product would be if it had the characteristics of the product it replaces and with whose price its price is to be compared. The adjustment is made so that the price comparison between the two products reflects “pure” price change only.

Reference period

See “price reference period”.

Representative item

A representative item is a product/service selected for pricing within an elementary aggregate because of his significance in terms of turnover.

Resident

An institutional unit is resident in a country when it has a centre of economic interest in the economic territory of that country.

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Revenue

The value of output sold. The value of invoiced sales of goods or services supplied to third parties during the reference period. The term is often used interchangeably with “sales” and “turnover”. (PPI Manual)

Revolutionary services

These services are significantly different from existing services. It is virtually impossible, both in theory and in practice, to adjust for any quality differences between a revolutionary service and any existing service. (see footnote **Virhe. Kirjanmerkkiä ei ole määritetty.**)

Re-weighting

It is the introducing a new set of weights into the index.

Sampling frame

The sampling frame is the list of the units (producers of services) in the universe from which a sample of units is to be selected. The sampling frame provides the details required to pick the sample, such as turnover, size, and main industry. The business register is the main sampling frame used in SPPIs completed sometimes by other sources as structural surveys or trade organisations information.

Secondary activity

A secondary activity is an activity carried out within a single producer unit in addition to the principal activity and whose output, like that of the principal activity, must be suitable for delivery outside the producer unit.

Service industry

The terms service industry(ies), service sector(s) or simply service(s) are generally used to refer to economic activities covered by Sections G to K and M to O of NACE Rev. 1, and the units that carry out those activities. (CODED)

Services

Services are outputs produced to order and which cannot be traded separately from their production; ownership rights cannot be established over services and by the time their production is completed they must have been provided to the consumers; however as an exception to this rule there is a group of industries, generally classified as service industries, some of whose outputs have characteristics of goods, i.e. those concerned with the provision, storage, communication and dissemination of information, advice and entertainment in the broadest sense of those terms; the products of these industries, where ownership rights can be established, may be classified either as goods or services depending on the medium by which these outputs are supplied. (PPI Manual)

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Sub-contractor

One who takes a portion of a contract, as for work, from the principal contractor.
(Webster)

Subsidy on product

A subsidy on a product is a subsidy payable per unit of a good or service produced, either as a specific amount of money per unit of quantity of a good or service or as a specified percentage of the price per unit; it may also be calculated as the difference between a specified target price and the market price actually paid by a buyer.

Tax on product

A tax on a product is a tax that is payable per unit of some good or service, either as a specified amount of money per unit of quantity or as a specified percentage of the price per unit or value of the good or service transacted.

Time-based method

The price of a service is defined in terms of prices of working time used in the service provision.

Time of acquisition

The time at which goods and services are acquired is when the change of ownership occurs or the delivery of the services is completed.

Transaction

A transaction is an economic flow that is an interaction between institutional units by mutual agreement or an action within an institutional unit that it is analytically useful to treat like a transaction, often because the unit is operating in two different capacities.

Transfer price

A price adopted for bookkeeping purposes used to value transactions between affiliated enterprises integrated under the same management at artificially high or low levels in order to effect an unspecified income payment or capital transfer between those enterprises. (PPI Manual)

In the case of trade between a unit and another unit abroad of the same enterprise group, the invoiced price may well be a transfer or disposal price whose evolution may not always reflect the price changes for a client not within the same enterprise group (Manual)

UMTS

UMTS stands for Universal Mobile Telecommunications Systems. UMTS represents systems with large capacity, data speeds and new service capabilities for mobile network.

Unit value method

The prices are estimated by dividing the value of service outputs by the corresponding output quantities. Using this method implies a strong assumption that the services output priced are homogenous.

Value added at factor costs

Value added at factor cost⁶⁷ can be calculated from turnover (excluding VAT and other similar deductible taxes directly linked to turnover), plus capitalised production, plus other operating income plus or minus the changes in stocks, minus the purchases of goods and services, minus other taxes on products which are linked to turnover but not deductible, minus the duties and taxes linked to production.

Value added – gross

Gross value added is the value of output less the value of intermediate consumption; it is a measure of the contribution to GDP made by an individual producer, industry or sector; gross value added is the source from which the primary incomes of the SNA are generated and is therefore carried forward into the primary distribution of income account.

Value added – net

Net value added is the value of output less the values of both intermediate consumption and consumption of fixed capital.

Value added tax (VAT)

A value added tax (VAT) is a tax on products collected in stages by enterprises; it is a wide-ranging tax usually designed to cover most or all goods and services but producers are obliged to pay to government only the difference between the VAT on their sales and the VAT on their purchases for intermediate consumption or capital formation, while VAT is not usually charged on sales to non-residents (i.e. exports).

Weights

Weights are a set of numbers used to weight price relatives, or elementary price indices, when these are averaged to obtain price indices or higher-level indices.

⁶⁷ National accounts have introduced the concept of 'value added at basic prices'. In comparison to value added at factor costs, it includes taxes linked to production, but operating subsidies on production are excluded. The alignment with the national accounts may introduce some advantages, so Member States may use the concept of value added at basic prices as a proxy for value added at factor costs.

Abbreviations

ANZSIC	Australian and New Zealand Standard Industrial Classification
CPA	Classification of Products by Activity (Eurostat)
CPC	Central Product Classification
CPI	Consumer price index
ESA	European system of accounts
EU	European Union
Eurostat	Statistical Office of the European Communities
GDP	Gross domestic product
INSEE	Institut National de la Statistique et des Etudes
ISIC	International Standard Industrial Classification of all Economic Activities
KAU	Kind of activity unit
LKAU	Local kind of activity unit
NA	National accounts
NACE	General Industrial Classification of Economic Activities within the European Communities
NAICS	North American Industrial Classification System
NAPCS	North American Product Classification System
NPI	Non-profit institution
NSI	National Statistical Institute
OECD	Organisation for Economic Co-operation and Development
PPS	Probability proportional to size
SPPI	Producer price index
SNA	System of National Accounts
SPPI	Services producer price index
STS-R	Short-term Statistics regulation (for EU Member states)

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UMTS Universal Mobile Telecommunications Systems

UN United Nations

VAT Value-added tax

Bibliography

An important source of information is the websites of the Voorburg Group), which contain descriptions on countries' experiences in the compilation of SPPIs for various services. The addresses of the websites are <http://stds.statcan.ca/english/voorburg/index.htm> (meeting papers up to year 2003) and <http://www4.statcan.ca/english/voorburg/> (papers of the last meeting, 2004). The list of bibliography below covers only documents that cannot be found on these websites.

- [1] <http://stds.statcan.ca/english/voorburg/index.htm>
- [2] <http://www4.statcan.ca/english/voorburg/>
- [3] Albrecht A.J. , "Measuring application development productivity." in Proc. IBM Applications Development Symp., GUIDE Int. and SHARE Inc., IBM Corp., Monterey, CA, Oct. 14-17, 1979, p. 83
- [4] Cerda, Merja, "Service Price Index for Legal Services Industry description for SE-SIC 92 group 74.11"; TPI project report no. 5; 2003, Statistics Sweden
<http://www.scb.se/statistik/PR/PR0801/report5.pdf>
- [5] Deuchars G., Moriya K., Price Indices for Telecommunication Services, paper from the 16th Voorburg Group Meeting, Sweden, September 2001, available from internet URL
<http://www.voorburg.scb.se/sessions.asp>.
- [6] Eurostat (1996) European System of Accounts, ESA 95, Luxembourg. Council Regulation (EC) No 2223/96 of 25 June 1996 on the European system of national and regional accounts in the Community Official Journal L 310 , 30/11/1996, p. 469
- [7] Eurostat (2001), "Handbook on price and volume measures in national accounts", Luxembourg. ISBN 92-894-2000-6
- [8] Germany (2004), "Development of Producer Price Indices for Legal Activity, Tax Consultancy, Auditing Services", Final report of Germany for Eurostat, December 2004.
- [9] International Monetary Fund, « Producer Price Index Manual: Theory and Practice », IMF, 2004. ISBN 1-58906-304-X
- [10] McKenzie R., "Producer Price Indices for the Legal Services Industry", 2001 Voorburg Group conference paper, Australian Bureau of Statistics,
http://www.voorburg.scb.se/Australia_Voorburg01_Legal.pdf
- [11] Montella M., Mostacci F., Zanolini G., Consumer Price Indexes for Telecommunication Services in Italy: Work in Progress, paper from the Sixth meeting of the International Working Group on Price Indices, Australia, April 2001, available from internet URL
<http://www.abs.gov.au/websitedbs/D3110122.NSF/0/c027e5af56cd6470ca2569b9000211d4?OpenDocument>

29/08/2005

- [12] Moriya K., Kunihiro J., “Corporate Service Price Index (CSPI): Telecommunications Services” October 2001, Bank of Japan, <http://www.boj.or.jp/en/ronbun/01/cwp01e19.htm>
- [13] Ottawa Group, International Conference on Price Indices, www.ottawagroup.org
- [14] Perkovic I., Palmer N., Corporate Services Price Index (CSPI) for Business Telecommunications: The latest developments, paper at the 18th Voorburg Group meeting, Tokyo, available at internet URL <http://www.stat.go.jp/english/info/meetings/voorburg/session.htm>.
- [15] Statistics Sweden, Services Producer Price Index (SPPI) Project Reports, http://www.scb.se/templates/Standard____29560.asp
- [16] System of National Accounts 1993, ISBN 92-1-161352-3, <http://unstats.un.org/unsd/sna1993/foreword.asp>
- [17] US Bureau of Transportation Statistics, “Air Travel Price Index (ATPI)“, http://products.bts.gov/publications_statistics_annual_report/2004/html/shapter_02/air_travel_price_index.html
- [18] United Nations Statistics Division, <http://unstats.un.org/unsd/default.htm>