

Use of PPIs for service industries as deflators in an index of services production

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Abstract

1. One of the main priorities for the OECD Short-Term Indicators for Services Task Force (STISTF) is to provide methodological guidance on, and coordinate the development of, monthly indices of services production. Consequently, the STISTF recognises that the development of PPIs for service industries is essential to support this initiative. This paper is intended to facilitate discussion by the Voorburg Group on the fitness for use of PPIs for service industries in the construction of a monthly index of services production. The paper focuses on the link between the regular collection of service industry turnover statistics as value indicators, and PPIs for services as deflators. Thus, it seeks the views of the Voorburg Group on issues related to: the use of PPIs with lower frequencies to deflate value variables with higher frequency; the use of PPIs as proxy deflators and; national practices with PPIs for the services sector. The paper also seeks to raise awareness of the work of STISTF, and that it should be considered an important user of the output of the Voorburg Group.

Introduction

2. At present only a limited number of OECD Member countries appear to regularly compile monthly indices for services production (ISP). The Republic of Korea (Korea) and the United Kingdom (UK) publish separate indices every month. Canada and Finland publish them as a part of their monthly GDP. Japan produces a monthly indicator for tertiary industry, which covers both industry and services sectors. The OECD Short-Term Indicators for Services Task Force (STISTF) was formed to facilitate Members' statistical activities in the services sectors, especially the compilation of monthly ISP.

3. The method of deflating value data seems to be popular for compiling monthly ISP. This is due mainly to the extensive use of turnover data as the primary source of basic information to measure the value of production activities for various services sectors. Consequently, the STISTF recognises that the development of good deflators, i.e. PPIs, for the service sector is essential to support the initiative of STISTF. This paper considers the link between regular collection of service industry turnover statistics as value indicators, and PPIs for services as deflators and seeks to address the following issues:

- current experience by countries in the use of their PPIs for services as deflators for the construction of an index of services production;
- the possibility of using lagged quarterly PPIs for services to deflate monthly values;
- the possibility of using PPIs for services as proxy deflators for related industries where no price index currently exists, in comparison to other alternatives (e.g. wages, CPI).

4. This paper is intended to facilitate discussion by the Voorburg Group on how maximum use of PPIs for service industries could be made in the construction of a monthly index of services production, focusing on the issues outlined in paragraph 3. In order to assist participants for their discussions, this paper presents current practices of Korea and the UK in the compilation of their monthly ISP. The paper also seeks to raise awareness of the work of STISTF, who should be considered an important user of the output of the Voorburg Group.

Experiences of OECD Member countries in the use of PPIS for their ISP: cases for Korea and UK

5. This section reviews the experiences of Korea and the UK in their use of PPIs for services (PPIS) in compilation of their monthly ISP. Some of the materials are borrowed from a paper presented in the 2003 STESEG meeting [see Arnaud, Hery, Hong and Parrot (2003)]. Information from Korea and the UK are used in this paper as they supplied the most detailed information on their methods for compiling monthly ISP which facilitates the analysis presented in this paper. However it must be emphasised that the aim of the paper is to highlight general issues relevant to the use of PPIS rather than to comment specifically on the practices of Korea and UK, even though their practices are used as examples to illustrate certain points.

Variables collected to construct ISP

6. Two types of variables, value and volume, i.e. data with constant prices, generally represent the basic information for services production activities. Korea makes no use of volume data and collects all the necessary information from value data, which then requires deflating to convert it to constant prices. The UK collects a great deal of information from value data, but also makes extensive use of volume data. Volume data used by the UK are illustrated below in Table 1, for example the volume of letters and parcels delivered, employment, numbers of general dental practitioners, number of hotel and motel rooms adjusted for vacancy rate, etc.. The most popular value data used by both countries is turnover. Loans outstanding or total liability is also used for financial intermediation services, and Korea also uses operating revenues, value of budget outlays or gross value of work completed.

Table 1: Variables in use for ISIC service industries

		Korea	United Kingdom
G	50	Gross turnover (value)	Gross turnover (value)
	51	Gross turnover (value)	Gross turnover (value)
	52	Gross turnover (value)	Deflated retail sales (constant prices)
H		Gross operating revenue (value)	Turnover (value); Gross turnover (value); Interpolation from annual estimates of net output (volume)
I	601	Gross operating revenue (value)	Ticket holders (passenger-km; volume); Coal and coke transported (tonne-km; volume); Mail and parcel receipts (value)
	602	Gross operating revenue (value)	Gross turnover (value); Turnover (value); Household expenditure on taxis (constant prices)
	603	<i>Not covered</i>	<i>No activity in UK</i>
	61	Gross operating revenue (value)	International passenger revenue (value); Tanker receipts (constant prices)
	62	Gross operating revenue (value)	Index of airline services (volume)
	63	Gross operating revenue (value)	Gross turnover (value); Imports and exports (volume) ¹ ; Freight moved (tonne-km; volume); Index of airport services (volume)
	64	Gross operating revenue (value)	Volume of letters and parcels delivered; Quantity of other transactions; Gross turnover (value)
J	651	Loan outstanding (value)	Number of employees, of clearings by GB banks, of advances outstanding, and of advances made (volume); Amount of loans and deposits (value); Total outstanding interest (volume); Total liabilities (value)
	652	NA	Output indices (volume); Loans and advances outstanding (value); Interpolation of end-year investment and unit trusts' net short-term assets and total investments; Investment and unit trusts' total purchases and total sales; Interpolation of end-year property unit trusts total net assets (volume)
	659	Credit card settlement (value)	NA
	66	Total assets (value); Insurance premium income (value)	Household final consumption expenditure (constant prices); Annual net premium income (value)

	67	Gross value of stock transaction (value); Gross operating revenue (value)	Number of stock broking transactions (volume); Household final consumption expenditure on the administrative costs of life assurance and pension funds (constant prices); Annual net premium income (value)
K	70	Gross operating revenue (value)	Investment property databank 'total return index' (volume); Number of employees ² (volume); Local authority non-trading capital consumption ³ (constant prices); Household final consumption expenditure on rent (constant prices) + Central government subsidies ³ + Local authorities' subsidies ³ + Imputed rent of owner occupied dwellings at 1995 prices - Housing repairs & maintenance (constant prices); Number of particulars delivered to Inland Revenue regarding property/land transfer (volume)
	71	Gross operating revenue (value)	Household final consumption expenditure on self-drive car hire (constant prices); Gross turnover (value)
	72	Gross operating revenue (value)	Gross turnover (value)
	73	Budget outlays (value)	Gross turnover (value)
	74	Gross operating revenue (value)	Gross turnover; Number of employees (volume)
L	NA		Number of civil servant and employees ⁴ (volume); Indices of output for social security (volume), for agricultural services (volume) and for justice services (volume); Non-trading capital consumptions (constant prices); Number of staff employed (volume); Pay of armed force (constant prices)
M		Gross operating revenue (value)	Index of output for public sector and NPISH (volume); Number of employees (volume)
N		Gross revenue from medical treatment (value)	Index of output for public sector and NPISH (volume); Number of employees adjusted for changes in productivity; Number of general dental practitioners; Number of employees ² ; Probation service output (volume); Non-trading capital consumption (constant prices)
O	90	Gross operating revenue (value)	Gross turnover (value); Number of employees ² (volume); Non-trading capital consumption (constant prices)
	91	Value of budget outlays (value)	Number of employees adjusted for changes in productivity (volume)
	92	Gross value of work completed (value); Gross operating revenue (value); Budget outlays (value); Gross ticket sales (value)	Turnover (value); Number of employees ² (volume); Non-trading capital consumption (constant prices); Household final consumption expenditure on recreational and cultural services: other admissions (constant prices); Household final consumption expenditure on betting and gaming (constant prices)
	93	Gross operating revenue (value)	Gross turnover (value); Turnover (value)
P	NA		Household final consumption expenditure on domestic service (constant prices)

Note:

- 1: Volume of imports and exports benchmarked to an annual series related more specifically to water transport.
 - 2: Number of employees adjusted to take account of trend in local authority wages and salaries at constant prices.
 - 3: Adjusted to take account of movements in wages and salaries to give constant price series.
 - 4: Numbers of civil servants and employees adjusted to take account of trends in civil service salaries and in local authorities wages and salaries, respectively (constant prices).
- NA: not applicable.

7. The remainder of this paper will focus only on ISIC industries I (Transport, Storage and Communications) and K (Real Estate, Renting and Business Activities), as these are the industries where the majority of attention is focused by the Voorburg Group in developing PPIS.

PPIS available in Korea and the UK, and their use as deflators in the monthly ISP

8. The Bank of Korea has compiled PPIS every month since January 1995, except Special Telecommunications which became available from January 2000. As can be seen from table 2, coverage of ISIC divisions I and K are extensive. The UK PPIS (referred to as 'Corporate Services Price Indexes' in the UK) cover a large part of ISIC divisions I and K and are produced quarterly, most with time series extending back until 1995. The table below indicates whether PPIS exist for the various industry segments (columns 2 & 3) and whether they are used as deflators in the production of each countries monthly ISP (columns 4 & 5).

Table 2: PPIS available in Korea and UK, and their use as deflators in the monthly ISP

ISIC 3 digit level for divisions I and K	PPIS Coverage		Use as deflators in ISP?	
	Korea	UK	Korea	UK
601 Railway transport	Passengers & freight	Passengers & freight	PPIS used	PPIS not used. Quarterly data from the Strategic Rail Authority covering Ticket holders (passenger-km; volume); Coal and coke transported (tonne-km; volume) is used as a volume indicator.
602 Other land transport (principally road)	Passengers & freight	Freight, Coach hire	PPIS used	PPIS used to deflate monthly values.
611 Sea & coastal water transport	Passengers & freight	Commercial vehicle ferries & sea freight	PPIS used	PPIS not used. Quarterly data on tanker receipts in current prices and volume data direct from the Balance of Payments is used.
612 Inland water transport	Passenger & freight	Not available	PPIS used	Yearly data on the volume of inland water traffic from Department of Transport is used.
620 Air transport	Passenger & freight	Business airfares	PPIS used	PPIS not used. Index from Civil Aviation authority which weights together passenger kilometres and cargo-tonne kilometres.
631 Cargo handling & storage	Warehousing & cargo handling	Not available	PPIS used	Household expenditure deflator is used to deflate monthly values.
632 Other supporting transport activities	Range of indices available	Freight forwarding	PPIS used	PPIS not used. Combination of above indices used as a proxy and benchmarking to an annual source from department of transport
633 Travel agents	Not available	Not available	CPI used	Household expenditure deflator is used to deflate monthly values.
634 Activities of other transport agencies	Not available	Not available	CPI used	Household expenditure deflator is used to deflate monthly values.
641 Post and courier services	One aggregate index	Separate indices for each activity	PPIS used	PPIS not used for National Post, where quarterly volume data from Post Office is preferred. PPI for Courier Services is used to deflate monthly values.
642 Telecommunications	Range of indices	Business use	PPIS used	PPIS used to deflate monthly values.
702 Letting of own property	Real estate rents	Property rents	PPIS used	PPIS not used. Quarterly data from the Investment property databank 'total return index' (volume) is used.
703 Real estate activities on a fee or contract basis	Real estate agents	Real estate agents	PPIS used	PPIS not used. Quarterly data on the number of particulars delivered to Inland Revenue regarding property/land transfer (volume)
711 Renting of automobiles	Not available	Car contract hire	Not covered in Korean ISP	PPIS not used. Deflated HH consumption data is preferred.
712 Renting of other transport equipment	Not available	Not available	Not covered in Korean ISP	Manufacturing PPI is used to deflate monthly values.
713 Renting of other machinery & equipment	Index produced	Index only for Construction equip	PPIS used	PPIS used only to deflate the monthly value of construction equipment (class 7132). Manufacturing PPIs used as a proxy for other components.
721 Computer hardware consultancy	Broad computer services index	Not available	PPIS used	Average Earnings Index & Retail Price Index is used to deflate monthly values.
723 Data processing	Broad computer services index	Not available	PPIS used	Average Earnings Index & Retail Price Index is used to deflate monthly values.
724 Data base activities	Broad computer services index	Not available	PPIS used	Average Earnings Index & Retail Price Index is used to deflate monthly values.

725 Maintenance & repair of office machinery & computers	Broad computer services index	Not available	PPIS used	Average Earnings Index & Retail Price Index is used to deflate monthly values.
741 Legal, accounting & market research activities	Legal & Accounting indices	Market research & marketing indices	PPIS used	PPIS not used. Average Earnings Index & Retail Price Index is used to deflate monthly values.
742 Architectural engineering technical consultancy	Indices for Engineering & Construction services	Not available	PPIS used	Average Earnings Index & Retail Price Index is used to deflate monthly values.
743 Technical testing and analysis		Technical testing series	PPI for other services (excludes this activity) is used as a proxy	PPIS not used. Average Earnings Index & Retail Price Index is used to deflate monthly values.
744 Advertising	Index produced	Not available	PPIS	Average Earnings Index & Retail Price Index is used to deflate monthly values.
745 Labour recruitment	Not available	Employment agencies index	PPI for other services (excludes this activity) is used as a proxy	PPIS not used. Average Earnings Index & Retail Price Index is used to deflate monthly values.
746 Investigation & security services	Guard services index	Security services index	PPIS	PPIS used
747 Industrial cleaning	Cleaning services	Index produced	PPIS	PPIS used
748 Other business activities	Not available	Indices for film processing, packaging, translation & secretarial	PPI for other services (excludes these activities) is used as a proxy	PPIS only used for commercial film processing component, other components monthly values are deflated by monthly AEI & RPI.

9. Table 2 shows extensive use of PPIS as deflators of value data in Korea. For the UK, only 8 of 24 PPIS available in divisions I and K are used as deflators in the production of their monthly ISP. In the UK, there appears to be a preference to use volume data available on a quarterly basis from administrative sources rather than deflating value data using available quarterly PPIS. For example, this occurs in the Rail Freight, Postal Services & Real Estate Agencies industries (note, however, this could be due to the non existence of value data for these industries).

Use of quarterly PPIS to deflate monthly values

10. Korea is in the ideal situation of producing monthly PPIS to deflate monthly value data. Consequently extensive use of their PPIS is made in constructing their monthly ISP. Resource and other constraints have led to most countries developing quarterly PPIS, as is the case in the UK. The use of quarterly PPIS to deflate monthly values implies the use of either a lagged index (e.g. using an index from the June quarter to deflate monthly values for July and August), or extrapolating a monthly index from the quarterly and forecasting data for the missing months using time series techniques.

11. The UK is currently using quarterly PPIS to deflate monthly values in a number of industries, for example the Road Freight (602), Telecommunications (642), Investigative & Security Services (746) and Cleaning Services (747) industries. However there are also a number of examples where the monthly Average Earnings Index (AEI) is preferred over the quarterly PPIS, for example in the Labour Recruitment (745) and Technical Testing (743) industries. Also, for industries where output is split fairly evenly between business and consumer expenditure, there appears to be a preference in the UK to use a consumer based deflator for the entire value. For example, monthly value data in the Travel Agent (633) and Renting of Automobiles (711) industries are deflated using the household expenditure deflator. A similar practice is being adopted by Korea, i.e. CPI is in use to deflate Travel Agent (633) and Activities of Other Transport Agencies (634).

12. It is not the purpose of this paper to comment on the methods used in Korea and the UK, but to make observations on the current use of PPIS and identify relevant discussion issues for the Voorburg group, in relation to assessing the fitness for use of quarterly PPIS as deflators of monthly values in the development of monthly ISP. Consequently, the following types of analysis could be useful.

- The stability of PPIS could be assessed by extrapolating monthly indices from quarterly indices, forecasting the next two months values using time series techniques, and then comparing these forecasts to the revised values of the extrapolated series once the quarterly value is available.
- Seasonality of PPIS could be assessed. The fact that industry based PPIs are generally not seasonally adjusted by National Statistical Organisations (NSOs) is not really an indicator that seasonal adjustment would not be required for PPIS, as pricing strategies and external influences on prices in service industries can be differ significantly to those in industry.
- Studies comparing price evolution in PPIS, which are output price indexes, to wage based indices for specific industries could be undertaken. If significant differences are found, then large biases may exist where NSOs continue to use wage based indices as proxies for output price indices when deflating value data in service industries (e.g. in the national accounts or construction of ISP).

The use of existing PPIS as proxy deflators for related industries where no price index currently exists, in comparison to other alternatives

13. Much of the demand to establish PPIS within NSOs has come from national accounts areas wanting to replace inappropriate methods (e.g. wage based methods) for deflating value data or remove the reliance on unsuitable volume indicators (e.g. employment) for service industries with an ever increasing share of GDP. However the intended users of PPIS (e.g. national accounts & compilers of monthly ISP) can be slow to implement PPIS as deflators once they are developed, often waiting until a substantial time series has been established to enable historical revisions to be made or to assess the stability and /or seasonality of the new series. In the mean time historical methodologies, which may often be inappropriate, continue to be used. In addition to the analysis suggested in paragraph 12, the following investigations may also lead to greater use being made of existing PPIS.

- Studies to assess the correlation or relationship (or expected relationship) between PPIS for certain industries. This could be done by analysing data from countries who have established time series, or by documenting expert knowledge on the similarities in industry structures and pricing influences for different PPIS (e.g. where a PPIS for a particular industry under development exhibits similarities to an already established PPIS).
- Where it is thought that a PPIS for a particular industry could be suitable as a proxy for another industry, a comparison could be made between the proposed proxy PPIS index and alternative deflators (i.e. wage based indexes, manufacturing PPIs, CPI etc.). If large differences are found, it may lead to closer attention being paid by the users on what is the most appropriate series to use.

14. Korea uses a broad index of 'PPIs for other services' as a proxy deflator in the Technical Testing (743), Labour Recruitment (745) and Other Business Services (748) industries. There are no examples of PPIS being used as proxy deflators in the UK ISP. However, to illustrate the points raised above, the following is an example of the type of issues which could be considered:

- the PPIS for business airfares in the UK could be considered as a proxy deflator for the portion of Travel Agencies revenue generated from business sales;
- an average of the PPIS for Car Contract Hire and Construction Equipment Hire could be assessed as an alternative series to the Manufacturing PPI currently used as a proxy to deflate industry 712: Renting of Other Transport Equipment.

Concluding remarks

15. Considerable effort has gone into the development of PPIS within National Statistical Organisations in recent years. The Voorburg group has played a significant role in this development, in particular as a forum for establishing best practice on appropriate methodologies. However, the group now recognises that issues associated with quality and fitness for use of established PPIS requires its attention.

16. This paper has suggested some analysis which if undertaken could lead to more extensive use of PPIS, in particular within the development of monthly indices of services production. If the Voorburg group were to sponsor / encourage these kinds of analyses, it could raise the profile of work in this field and capture the attention of other influential groups (e.g. national accounts expert groups). Such evaluation could also result in the identification of possible methodological improvements which may benefit ongoing development and review of new and existing PPIS.

References

Arnaud, Benoit., Anne Hery, Eun-Pyo Hong and Frederic Parrot, 2003, "Review of Indices of Service Production for OECD Member Countries", STD/STES(2003)6, presented at meeting of the *2003 Short-term Economic Statistics Expert Group, Paris, 26-27 June 2003*, Paris, available from <http://www.oecd.org/dataoecd/3/9/2956983.pdf> [Accessed 20 August 2003].

Bank of Korea, 2003, Producer Price Indexes (Basic Groups, 2000=100), Statistics Database of the Bank of Korea, available from <http://www.bok.or.kr> [Accessed 20 August 2003].

Fenton, Trevor and Rob Pike, 2002, "Methodology of the Experimental Monthly Index of Services", Documentation published in the Economic Statistics section of the National Statistics internet site, ONS.

National Statistical Office of Korea, 1999, "Compilation and utilisation of Service Production Index", manuscript in Korean.

_____, "Service Industry Activity Index", the Monthly Press Release from the KNSO in Korean and in English.

OECD, 2003, a manuscript based on "A reply on the questionnaire from KNSO".

_____, 2003, a manuscript based on "A reply on the questionnaire from ONS".