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Services Producer Price Indices: Past, Present, and Future

June 30, 2006

Authors

Roslyn Swick
Deanna Bathgate
Michael Horrigan

U.S. Bureau of Labor Statistics
2 Massachusetts Avenue NE
Washington DC 20212

This paper has been prepared for presentation to the Conference on Research in Income and Wealth on July 17, 2006. It represents work in progress and does not represent any agency's final positions on issues addressed.

Table of Contents

1	Introduction	1
1.1	Defining PPI Services	1
1.2	PPI Services Historical Perspective	1
1.3	General PPI Principles and Guidelines for Services Expansion	3
2	General Methodology for Developing New Service Industry Indices	4
2.1	Research Phase	4
2.2	Frame/Sample Research and Development	8
2.3	Development of Collection Materials	8
2.4	Review of Data/Publication	8
2.5	Keeping the Service Indices Up to Date	9
3	Industry/Sector Methodologies and Challenges	11
3.1	Finance and Insurance	11
3.1.1	Banking	11
3.1.1.1	Output Measurement	11
3.1.1.2	Service/Pricing Characteristics	13
3.1.1.3	Sample Unit Identification and Frame and Sampling Issues	13
3.1.2	Insurance	15
3.1.2.1	Output Measurement	15
3.1.2.2	Service/Pricing Characteristics	18
3.1.2.3	Sample Unit Identification and Frame and Sampling Issues	21
3.2	Real Estate and Rental	21
3.2.1	Lessors of Nonresidential Buildings	21
3.2.1.1	Output Measurement	21
3.2.1.2	Service/Pricing Characteristics	25
3.2.1.3	Sample Unit Identification and Frame and Sampling Issues	26
3.2.2	Offices of Real Estate Agents and Brokers	27
3.2.2.1	Output Measurement	27
3.2.2.2	Service/Pricing Characteristics	27
3.2.2.3	Sample Unit Identification and Frame and Sampling Issues	28
3.2.3	Passenger Car Rental	29
3.2.3.1	Output Measurement	29
3.2.3.2	Service/Pricing Characteristics	29
3.2.3.3	Sample Unit Identification and Frame and Sampling Issues	29
3.3	Health Services	30
3.3.1	Hospitals	30
3.3.1.1	Output Measurement	30
3.3.1.2	Service/Pricing Characteristics	31
3.3.1.3	Sample Unit Identification and Frame and Sampling Issues	32
3.3.2	Nursing Care Facilities	32
3.3.2.1	Output Measurement	32
3.3.2.2	Service/Pricing Characteristics	33
3.3.2.3	Sample Unit Identification and Frame and Sampling Issues	34

3.3.3	Offices of Physicians.....	34
3.3.3.1	Output Measurement.....	34
3.3.3.2	Service/Pricing Characteristics.....	36
3.3.3.3	Sample Unit Identification and Frame and Sampling Issues.....	37
3.4	Retail and Wholesale Trade.....	37
3.4.1	Retail Trade.....	37
3.4.1.1	Output Measurement.....	37
3.4.1.2	Service/Pricing Characteristics.....	39
3.4.1.3	Sample Unit Identification and Frame and Sampling Issues.....	40
3.4.2	Wholesale Trade.....	40
3.4.2.1	Output Measurement.....	40
3.4.2.2	Service/Pricing Characteristics.....	42
3.4.2.3	Sample Unit Identification and Frame and Sampling Issues.....	43
3.5	Information and Communication.....	43
3.5.1	Newspaper and Periodical Publishing.....	43
3.5.1.1	Output Measurement.....	43
3.5.1.2	Service/Pricing Characteristics.....	44
3.5.1.3	Sample Unit Identification and Frame and Sampling Issues.....	45
3.5.2	Software Publishing.....	46
3.5.2.1	Output Measurement.....	46
3.5.2.2	Service/Pricing Characteristics.....	48
3.5.2.3	Sample Unit Identification and Frame and Sampling Issues.....	50
3.5.3	Television Broadcasting.....	50
3.5.3.1	Output Measurement.....	50
3.5.3.2	Service/Pricing Characteristics.....	51
3.5.3.3	Sample Unit Identification and Frame and Sampling Issues.....	52
3.5.4	Cellular and Other Wireless Telecommunications.....	52
3.5.4.1	Output Measurement.....	52
3.5.4.2	Service/Pricing Characteristics.....	53
3.5.4.3	Sample Unit Identification and Frame and Sampling Issues.....	54
3.5.5	ISPs and Web Search Portals.....	55
3.5.5.1	Output Measurement.....	55
3.5.5.2	Service/Pricing Characteristics.....	56
3.5.5.3	Sample Unit Identification and Frame and Sampling Issues.....	57
3.6	Professional Services.....	58
3.6.1	Output Measurement.....	58
3.6.2	Service/Pricing Characteristics.....	59
3.6.3	Sample Unit Identification and Frame and Sampling Issues.....	60
3.7	Administrative Services.....	60
3.7.1	Temporary Help Services.....	60
3.7.1.1	Output Measurement.....	60
3.7.1.2	Service/Pricing Characteristics.....	60
3.7.1.3	Sample Unit Identification and Frame and Sampling Issues.....	61
3.7.2	Employment Agencies.....	61
3.7.2.1	Output Measurement.....	61
3.7.2.2	Service/Pricing Characteristics.....	61
3.7.2.3	Sample Unit Identification and Frame and Sampling Issues.....	62
3.7.3	Janitorial Services.....	62

3.7.3.1	Output Measurement.....	62
3.7.3.2	Service/Pricing Characteristics.....	63
3.7.3.3	Sample Unit Identification and Frame and Sampling Issues.....	63
3.8	Transportation.....	64
3.8.1	Passenger Air Transportation.....	64
3.8.1.1	Output Measurement.....	64
3.8.1.2	Service/Pricing Characteristics.....	64
3.8.1.3	Sample Unit Identification and Frame and Sampling Issues.....	65
4	Where Does the PPI Go from Here?.....	65
4.1	What Aggregation Strategies Should Be Considered to Include Services?.....	65
4.1.1	Industry and Commodity Strategies.....	65
4.1.2	Special Aggregate Indices.....	66
4.1.3	Future Developments.....	67
4.2	What are the Gaps?.....	68
4.3	What Principles Should Be Used to Determine where PPI Should Be Expanded?.....	74
4.4	Concluding Remarks.....	83
Addendum A - Data Analysis.....		84
Addendum B - SPPI Thesaurus.....		104
Addendum C - PPI Quality Assessment Procedures.....		112
Addendum D - List of Six-digit NAICS Industries by PPI Index Publication Status		117
Addendum E - “Fitness of Use Criteria for Price Index Deflators in National Income Accounting A Case Study: Mutual Stock Fund Management”		
Addendum F - “Plans for New PPI Service Sector Aggregation Indexes”		
References.....		113

1 Introduction

Since its publication of its first service sector industry in 1985, Railroad Line Haul Operations, the Producer Price Index (PPI) Program of the Bureau of Labor Statistics has introduced 135 service industry price indexes, with plans to introduce 6 more over the next two years. This ambitious and complex undertaking has helped close a significant gap in U.S. national statistics by publishing price indexes in industries that represent over 77 percent of in-scope service sector output. One principal purpose of this paper is to document the history of this important expansion. A second principal objective is to identify the gaps that remain both in service sector and overall industry coverage, and to suggest strategic approaches, both quantitative and qualitative, for prioritizing the closing of these gaps in the future.

There are four sections to this paper. In the first section, the general guidelines and principles for developing any price index, including service industry ones, are laid out along with a timeline of the significant publication and funding milestones reached in the expansion of service sector coverage in the PPI program. The second section of the paper provides a more detailed discussion of the steps that are taken by BLS to develop a price index for any service industry, from initial research on how to define output and the identification of price determining characteristics to sampling, data collection and on through to final publication. The third section of the paper discusses the methodological approaches and challenges to developing and maintaining high quality price indices for a select group of service providing industries. The industries selected provide a spectrum of the major pricing methodologies that were used in the overall service sector expansion. The fourth and final section of the paper explores future directions for the PPI Program. Two separate themes are explored. The first is to examine the potential that the service sector expansion has for creating new aggregation price indices that may include both the service providing and goods producing sectors. The second explores the remaining gaps in PPI coverage for the service-providing sectors and in the good-producing sectors. In particular, this section discusses and requests input on the criteria that are being developed to help determine the priorities in closing the gaps and where the emphasis should be for future PPI expansion efforts.

1.1 Defining PPI Services

The mission of the Producer Price Index (PPI) program is to measure the average change in output prices received by domestic producers of goods and services. The PPI universe consists of the output from all industries that provide US domestic, marketed goods and services. Excluded from the PPI universe are output generating activities with no observable prices. In the services sectors, examples of such excluded service industries are Social Assistance and Funds and Trusts.

1.2 PPI Services Historical Perspective

In the late 1960's and early 1970's, the PPI program researched and developed three services commodity indices: rail freight transportation, postal rates, and telephone services. These experimental series were developed using nonstandard PPI forms and data collection. Also, the PPI computer systems were not used to calculate these indices. These indices were developed and calculated as commodity indices because at that time the PPI was based on commodity indices. However, in 1978, the focus of the PPI program changed, owing to concerns over the multiple counting of price changes by the All Commodities and other aggregate commodity indices. To alleviate this concern, the

emphasis of the PPI program changed to the Finished Goods index. At this time, the PPI program began producing industry based indices. Probability sampling for selections of sample units and items was also begun that included a larger sample of producers and items. The scope of the PPI was also expanded to include the entire US marketed, domestic economy. The expansion also included different data collection techniques. This expansion began with the mining and manufacturing sectors.

Research into the development of the service sector industry indices began in the mid 1980s. From the early efforts on the service commodity indices, the PPI learned that it was necessary to use the standard PPI forms and computer systems. As noted above, the first service sector industry index, Railroad, Line Haul Operations, was published in January 1985. In the late 1980s, several service industries in the transportation sector were developed and published. Although the publication of these industries represented a major developmental milestone in terms of publishing service industry PPIs, the pricing methodologies for these initial industries were very straightforward, with significant similarities to manufacturing sector industries.

While continuing to achieve success in the development and publication of the transportation sector industries into the early 1990s, the PPI program also undertook research on more complex service industries, such as hospitals, physicians, employment agencies, and telephone communication. This work was aided by the receipt of additional funding over 1990 to 1994 from the Initiative to Improve the Quality of Economic Statistics, or the so-called Boskin Initiative. These industries required development of new, revolutionary pricing concepts and methodologies. Success in these complex service industry developments was first achieved in January 1993 with the publication of the producer price indices for the three hospital industries, General Medical and Surgical Hospitals, Psychiatric and Substance Abuse Hospitals and Other Specialty Hospitals. The PPI service industry indices for Offices of Physicians and Employment Agencies followed with publication in 1994.

By the mid 1990s, PPI was regularly developing and publishing new indices for services industries. Some of the notable industries developed during this time include a variety of Professional services, such as Lawyers, Architects, and Accountants, Real Estate services, Prepackaged Software, and Property and Casualty and Life Insurance. In 2000, the PPI program achieved another significant milestone with the publication of the first Retail Trade industry indices, for Grocery Stores. Developing services price indices to measure the output for retail trade industries presented many new challenges. In 2001, after a long period of research and development, PPI service industry indices were published for Security Brokers and Dealers.

By 2001, the PPI program had introduced price indices for industries that represented 50% coverage of the in-scope services sectors as measured by 1992 GDP. In FY 2001, PPI received additional resources to continue the ongoing expansion of the PPI coverage of the services sectors.

Funding received in FY 2001 permitted continued expansion of service sector coverage and maintenance of indices already developed and in publication. In early 2000, in anticipation of the additional resources for services expansion in the PPI, research began on producing services price indices for the banking industries, the wholesale trade sector, and additional information technology industries. In 2005, another major milestone was achieved when industry indices for the banking industries and the wholesale trade sector

were published. Also published in 2005 were indices for Internet Service Providers and Web Search Portals.

To date, the US PPI Program's publication of Service-Providing Producer Price Indices (SPPI) includes 100 service industry indices and 124 wholesale and retail trade indices within the Service-Providing Sector as defined by the 2002 North American Industrial Classification System (NAICS). Currently, the SPPI covers approximately 76% of in-scope service industries based on 1992 GDP.

1.3 General PPI Principles and Guidelines for Services Expansion

The U.S. PPI services expansion followed the same basic principles found in the mining and manufacturing PPIs. The same Laspeyres pricing formula was used with the same goal of monthly pricing for services. The same methods were used to collect the initial data and the continuous monthly data updates. Initial prices along with detailed price determining characteristics of sampled services are collected by field economists conducting in-person visits with the appropriate company officials. These in-person visits allow for detailed sampling methodologies to be employed to select the services to price over time. The selected services are repriced monthly by mail or fax.

As with traditional manufacturing PPI pricing, service PPIs measure the net return to the service establishment for providing a specified service to a specified buyer under specified transaction terms for a specified time.

The lessons learned from producing manufacturing PPIs provided substantial insight into the pricing of service industries. A complete service that can be priced over time has to be selected. A detailed description of the selected service is required in order to accurately price that service over time. The complete service should be priced at the time the service is provided and not when the service was contracted or ordered. "Future" prices are never included in the PPI. Lagged prices are also generally not acceptable in the PPI. If there are no transactions of the exact service provided during the pricing period and that service is still offered, then, as in manufacturing, the price for the service may be estimated based on current transactions for similar services. In order for the company respondent to provide an accurate estimate of the price, there will have to have been transactions that were similar enough to the selected service that the company respondent has sufficient information to calculate a current price. As in manufacturing PPIs, when the price for the service cannot be accurately measured by a single transaction price, average price or unit value prices are sometimes employed. The average prices are for a homogeneous group of service transactions for which the average price incorporates various competitive pricing and discounts and therefore, providing a more accurate price measure.

Also as in manufacturing PPIs, when a service item that is being priced is discontinued and a replacement service is selected, quality adjusting the difference between the two services is preferred, using the difference in provider or resource costs for the quality adjustment. There are some service industries where hedonic modeling regression may be used to determine the value of quality change between the services. This hedonic quality adjustment method is also used in several manufacturing PPIs such as computers and printers. However, in general, explicit quality adjustment has not been possible for most service industries and, as a consequence, the difference in price between a discontinued service and its replacement must be ignored in producing the index. The PPI

program is continually researching to find alternative quality adjustment methods to use in service industries.

There are also some aspects to producing service PPIs that are completely different from manufacturing PPIs. In manufacturing, by following the same product over time constant quality is achieved. In some service industries, however, adjustments or updates have to be made to the service items over time in order to maintain the continuous pricing of the same constant quality of service. In some cases, the company respondents are able to update the service descriptions to keep the quality constant. In other cases, the data has to be adjusted using secondary sources in order to measure the same service over time. An example of these adjustments can be found in the homeowners' property and casualty indices. An actual policy for a specific home and homeowner is selected to price over time. The level of risk in the policy is held constant by updating the value of the home being insured. The Marshall & Swift/Boeckh Building Cost Index is used to make adjustments for the value of the home. This index is used by the insurance companies and relates to the construction costs of homes. Additional specific examples of these adjustments or updates are found in Section 3. The adjustments or updates vary considerably by service industry.

Finally, the identification of the establishment or profit maximizing center (PMC) is sometimes much more difficult for service industries than manufacturing industries. The PMC is the unit of a company within which prices are formed, products are marketed, and records are kept. In some industries, the business models used by national service companies have made identification of the PMC very challenging. In other industries, the state regulations or other government regulatory agencies have dictated the corporate or business structure for the service companies.

2 General Methodology for Developing New Service Industry Indices

Over the course of the past 20 years, a general methodology for researching and publishing new industry price indices, including those for service industries, has been developed. This model has been refined and updated over this time period. There are also some aspects of the development model or plan that are customized depending on the various characteristics of the industry, the current state of the economy, current level PPI resources, and a variety of other characteristics.

2.1 Research Phase

The first phase in the development process for developing a new PPI is the research phase. The goals of the research phase are to identify and define the output of the industry, develop a pricing methodology that accurately measures that output, identify the various service characteristics (both price-determining and non-price-determining) of the output, and develop a methodology that allows the service industry index to maintain constant quality over time.

A certain amount of library or reference research is required initially to enable the researcher to become familiar with the industry. Once the researcher is familiar enough with the industry that issues and strategies can be outlined, contacts with trade associations and other industry representatives can be made. It is critically important to get input from industry members themselves. One of the reasons for contacting members of the industry is to see how they view themselves and their activities. An additional important reason for contacting industry members

is to find out how the industry is structured, how record keeping is done in the industry, and how actual services are provided by that industry.

Depending on the results of the initial reference research, a plan is proposed for industry research that includes the contacts with industry members. For all interviews, a paper on goals and questions is developed and vetted internally, prior to the interviews. For very straightforward industries, one or two interviews may be sufficient. However, if the industry is very complex or has a large variety of different services, a larger number of interviews may be required. For complex industries, two or three initial interviews will be conducted and then the state of knowledge about the industry is evaluated, the goals and questions papers are revised prior to conducting further interviews. A report is prepared after each interview, outlining what was learned and what issues still require further research or interviews. At the conclusion of the research phase, a methodology paper is prepared that summarizes the results from all of the research. This paper also addresses all the issues that arose during research and defines the industry output, specifies how to measure that output, defines the service characteristics, and provides insight into how to maintain a constant quality price index for this industry.

A comprehensive definition of the output of the industry must be developed. One of the best sources for the output definition is the System of National Accounts. This is not the only source for information on the definition of output. Detailed statistics from BEA and Census are also reviewed. In addition, the information learned during the research phase and company and trade association visits are also used to formulate the PPI definition of output. In some cases, however, the definition in the SNA is not detailed enough for pricing an industry. Parameters that determine where the activity begins and ends are necessary to fully define the output of the service industry. In addition, the unit of measure corresponding to the defined output has to be identified.

Primary output is the ultimate service or product produced by an industry. With the exception of government operated or subsidized establishments, the output is generally the service or product that is traded on a market and has a price associated with it. For many industries, primary output is clear and easily defined. The trucking industries, for example, define their primary output as the transportation of goods from point A to point B. For the broadcasting industries, the output is not as clearly defined. Initially, it appears that stations produce a broadcast signal. However, this signal is delivered free of charge to the viewers and listeners, and therefore does not qualify as output according to PPI definition. What is bought and sold in these industries is access to an audience through the broadcast signal. This access is sold to advertisers through the sale of airtime. Retail trade and wholesale trade are sectors for which it is conceptually difficult to determine the primary output. After much research, PPI used the national accounts definition of trades. The output of the industries in these sectors is the provision of a marketing service, not the production of the good that is sold. The price of the good being sold is integral to the calculation of the price for the marketing service. However, since the service that is provided is marketing, the value of the good that is sold is not included in the net transaction price for this service. This is similar to the transportation industries where the value of the good being transported has a direct effect on the price charged for the transportation service but the value of the transported good is not included in the price of the transportation service.

As part of the research into the definitions of output and associated pricing methods, the PPI Program vets its work at conferences and at meetings with international and national groups such the Voorburg Group, the Brookings Conferences on Services Measurement, the FESAC (Federal Economic and Statistical Advisory Committee) and NBER (National Bureau of

Economic Research). Some of the industries that were discussed at these conferences included retail trade, insurance, banking and professional services. In the past, some of the most spirited debates on the most appropriate measures of output and pricing methodologies occurred at Brookings and FESAC. In general, PPI output definitions and pricing methods were accepted by most members of both groups but with some notable dissenting opinions. To give one example, in the trades sectors, there were some who felt that trades price measurement should be the value of the good sold and not the margin or commission. There was discussion that this margin or commission price was similar to that of real estate agents and mutual fund management where the dollar value of the commission is priced. In this view, the value of the goods sold was the price for trades, the price for real estate agents was the total sales price including the property, and the price for mutual funds management was the total value of the funds. The dissenting view held that for trades, real estate agents and mutual fund management the price was the commission or margin percentage (such as 20% margin or 6% real estate commission or 1% management fee). In this view, the dollar value of the asset (property, goods sold, or funds) are held constant and price changes are only shown when the rate or commission or margin percentage changes. Because of the PPIs use as a deflator, any other changes in dollar values received by the store, agent or manager, would be considered productivity changes. If the gross sales concept was used for any of these industries, changes in price would be overstated and changes in productivity would be understated. Exchanges such as these often led to undertaking additional research. For example, following meetings on the finance industry, PPI undertook a study of the mutual fund management industry to determine which output definition and associate pricing methodology would provide the correct deflator. For additional information on this study, please see Addendum E, for the paper entitled "Fitness of Use Criteria for Price Index Deflators in National Income Accounting A Case Study: Mutual Stock Fund Management" by Michael Holdway.

A pricing methodology must be developed that accurately measures the price changes over time for the defined output. As seen in the example of broadcasting, developing a methodology for pricing the defined output is not always straightforward. But developing the methodology is an important step. If a methodology for pricing the defined output cannot be developed, then the current output definition is called into question. For some industries, multiple pricing methodologies need to be developed to measure output, owing to the diverse services within the output definition, each of which requires different pricing. For other industries, different companies may keep records or provide the service in very diverse manners. In these cases, multiple pricing methodologies may be used to measure the same output.

Identifying the service characteristics of the industry is another important step in the research process. The major components of the service customarily associated with the output need to be identified. These detailed service characteristics are used to ensure that the same service is priced over time. However, care must be taken to distinguish between characteristics that are price determining and cost factors that are not. The identification of the cost components of providing a service does not necessarily result in knowing the precise service or the final price of that service. For instance, while the cost of fuel is a major price determinant in the airline industry, it is not a factor that uniquely identifies a particular service sold. For example, knowledge of the amount of fuel used does not result in knowing the price for a flight. In contrast, for the car rental industry, knowing how much fuel was purchased helps determine the fuel charge that is added to the base rate of the rental.

The final stage of the research phase is the analysis of the services provided by the industry to determine how to maintain a constant quality service over time. For the defined output of a service industry, a determination is made whether there is a need to use adjustments or

updates to the services to maintain constant quality. If the services are variable over time, an appropriate quality adjustment methodology is explored.

Note that in some cases the price calculation methodology that was chosen may produce a constant quality price index without the need for an explicit quality adjustment strategy. Examples of these constant quality pricing methodologies in the past have included the use of unit value pricing or average pricing. In addition, for some industries, certain variables are held constant over time or a model pricing methodology is used that greatly reduces the need for quality adjustments. For some industries, additional variables are collected to allow for quality adjustment over time. Whenever possible, a quality adjustment or constant quality strategy is identified prior to collection of the data in order to be able to collect data that fits with the selected strategy.

2.2 Frame/Sample Research and Development

Since revenue data are used as weights in the PPI, sampling by revenue is the ideal, implying that the ideal frame for sampling establishments would be Census Bureau's Business Register, which provides information on total revenues by establishment (also referred to as value of shipments or turnover). However, due to confidentiality limitations, the US Business Register is not available for use by the PPI program. The alternative frame most generally used for sampling, especially for Mining and Manufacturing industries, is the BLS Quarterly Census of Establishments and Workers (QCEW), which provides a count of employees by establishments. This database is compiled from the unemployment insurance data that are filed in each state for establishments that have employees. For mining and manufacturing industries, there is generally a strong positive correlation between the number of employees and revenue data. However, for most service industries, there is very little correlation between the number of employees and revenue data. Due to the lack of access to the Census US Business Register, the PPI program is faced with a continual challenge of finding alternative sources of frame data for sampling of service industries and uses the BLS QCEW only as a fallback. Trade associations and government agencies are sometimes the best sources for the most appropriate frames for some of the service industries. However, in a few industries, stratification and weighting of the establishments have had to occur after data collection because there was insufficient data to sample appropriately. Some alternative frames that are used do not have revenue data as a basis for sampling. In these industries, an alternative size measure data in the frame is selected that closely relates to the output of the industry. For example, in cable TV, the lack of revenue data resulted in the use of the number of subscribers as the relevant size measure.

Once the appropriate frame source has been selected for a service industry, frame refinement is conducted to locate and verify the establishment's location and industry classification. For each industry, the general location for collecting the data for the PMC is determined. This location may be a national headquarters, the local units or somewhere between these two. However, for many industries, frame refinement can only be done for the largest establishments in the industry since the frame contains so many establishments.

During the collection visit, sampling is done on the establishment revenue data in order to select representative services to price over time. The same probability-proportionate-to-size (PPS) sampling that is used in manufacturing industries is used in service industries. In a few industries, the items to be priced are selected from a national sample of services prior to the data collection visit. Item sampling prior to data collection is generally used when an industry has a large and diverse number of services and the PPS sampling would be very difficult to

complete with company data at the data collection interview. An example of an industry where items were selected prior to data collection is hospitals.

2.3 Development of Collection Materials

From the research that was done in the first phase of the development of the service industry, procedures for the collection of the service data are developed. These procedures detail how the prices are calculated for the various services provided by the industry and what data are required to perform the price calculation. These procedures may also include locating the appropriate establishment, identifying the most likely respondent in an establishment, assembling information on discounting or price variations and how to apply them, and developing information on the monthly pricing instructions to provide to the respondent.

Also developed from the research that was done in the first phase of the development of the service industry are data collection materials. These materials include a detailed paper that describes all the characteristics of the industry, the frame and sampling sources, and procedures and any other additional information about the service industry. A list of all price determining characteristics that were defined in the research phase is used for developing a checklist that describes the exact services selected. These checklists include all possible characteristics (including non-price determining) that a service may have and some 'all other' lines for recording more detailed descriptions.

After the collection procedures and materials for data collection have been developed, the final phase of the development process of the collection materials is the preparation of the training. This training is done in a variety of formats – in person, video, conference call or computer-based training. This training is given to all of the staff (field economists) that will be collecting data for a particular service industry and their supervisors. The development of the training materials also serves as an additional review of the procedures and materials. For many service industries, prior to the development of the training, selected field economists who will be collecting the data are asked to pretest the procedures and materials in order to determine if they meet the needs of the field economists, have covered all the procedures, and have properly defined all of the services and their characteristics.

2.4 Review of Data/Publication

After the data has been collected from the establishment by the field economists, they are reviewed and monthly repricing begins. In a few industries repricing is conducted less frequently than monthly, consistent with observed market pricing mechanisms. For example, portfolio managers are only paid on a quarterly basis. Automobile insurance is a highly regulated industry and premiums for each automobile insurance policy is fixed for at least six months and so the policies are repriced when the premium is updated.

Calculation of test indices usually begins within 6 months after the start of repricing. Review of test indices and their underlying micro data help to identify outliers and any specific, and in some cases, systemic problems with the pricing of certain services. Communication with respondents is critical during this phase to resolve specific measurement and interpretation issues, educate them on reporting requirements and, as appropriate, the need for additional information in order to ensure that the same constant quality service is priced over time. The data in the test indices are also analyzed to determine if the correct price movement over time is being shown in the indices. If the correct output definition was used with the correct pricing

methodology, then the index data should show a predictable price movement over time. Analysis of the time series data is used to validate the output definition and pricing methodology. In determining whether or not the output definition, pricing methodology, and quality adjustment strategy are appropriate for an industry, the national income accounts are also utilized to examine the performance of the test index as a deflator.

After the test indices are reviewed and determined to be of sufficient quality, publication of the data is planned. If there were changes made to the pricing methodology during the test index phase, then the data series has to be rebased or started over and test data are not published. If the test index data did not require any changes to the pricing methodology and there was sufficient coverage for the entire test period, then the test index data can be published when the service industry indices are published. Also during the preparation for publication phase, a short article describing the pricing methodology and announcing the publication of a new service industry is prepared. This short article will appear in the PPI Detailed Report and on the PPI website.

2.5 Keeping the Service Indices Up to Date

A constant challenge for the PPI program that occurs in both services and manufacturing PPI is keeping the services price indices up to date. The PPI is a modified Laspeyres index based on the fixed input output price index concept, or FIOPI (see Robert B. Archibald, "On the Theory of Industrial Price Measurement: Output Price Indexes," *Annals of Economic and Social Measurement*, winter 1977). While adhering to the FIOPI model is conceptually correct for the PPI, there is a danger that the services being priced will no longer represent current market conditions. In order to ensure that the indices are representative, several strategies have been developed to reduce or eliminate new item bias. New item bias could occur in industries where there is rapid service or product development that cannot be captured by the usual resampling process. In the US PPI, resampling occurs roughly every seven years. When a new sample replaces the old sample, it is important that comparable items are priced in both samples lest the new item bias be created.

One of the methods used to ensure that there is no new item bias in the PPI is referred to as directed substitution. New item bias would occur if the service or items being priced in the index were no longer reflective of the current mix of services or items in the market place. A procedure is used to verify that there is no new item bias or to direct the researcher to substitute to items to ensure that there is no new item basis for the industry. The researcher contacts the current respondents in the PPI sample for an industry and obtains data about the distribution of their items by revenue. If the new distribution of revenue for items deviates significantly from the items currently being priced, a sampling technique is used to select new items to price. If the new distribution of revenue for items does not deviate from the distribution of the current items being priced, then no substitution is necessary. Therefore, the procedures used during the review of monthly price data have kept the items being priced current and no new item bias exists. This procedure was used every year in the late 1990s and every other year since then for the PPI Software Publishing industry. This procedure ensured that the software priced in the PPI is representative of the market for software. This directed substitution is used when the new items or new services are provided or produced by currently sampled establishments. Directed substitution is performed as needed for all industries, including services, in the PPI sample. This procedure does not materially increase the reporting burden for the establishments that are currently reporting data to the PPI.

Another procedure that is used to keep the PPI service indices up to date is sample augmentation. Sample augmentation is used when there are industries with rapid changes in services being provided. Sample augmentation may be performed to add additional items to current establishments. In order to incorporate the newest services, additional service items are requested from establishments that are currently providing data for that industry. This method is used selectively due to the increase in establishment burden. Sample augmentation is also used to add additional establishments to an industry. Many times the newest services are being provided by new entrants into the industry. New establishments are selected and new services from those establishments are added to the current PPI index, thereby, ensuring the index is up to date.

Another method for keeping the index up to date is the use of quality adjustment. Quality adjustments are used to maintain constant quality price indices where the services provided have changed. When price-determining characteristics change (change in output), the FIOPI concept is violated. The corresponding input changes are utilized to disentangle price changes from changes in the production function. The preferred quality adjustment method for PPI is to use the production or provider cost difference between the old items and the new items. The production or provider cost differences are used to net out the price differences between the items and have the index reflected only pure price change. For example, in the cable TV industry, provider cost is usually available to quality adjust for changes in the channels provided to customers. In some service industries, there is limited information on providers' costs to use for quality adjustment.

In some industries, the pricing method selected removes the need for quality adjustments. For example, in the cellular telephone industry, unit value pricing methods are used to collect monthly price data. Using this method all plans are included in the pricing so that when plans change there is no need to quality adjust. One of the reasons that this pricing method was selected was that establishments in the cellular telephone industry tend to change plans frequently.

Hedonic models have been used to determine a value of quality adjustment if there are sufficient item data available. For retail trade industries, hedonic models have been attempted for several industries. Retail trade was selected to try hedonic modeling for quality adjustment because of the unique characteristics of the industry. The output of the industry is marketing and is measured by margins. Products are selected to determine the margin, but quality adjustment would not be based on the products themselves. Quality adjustment would be required for retail trade establishments when the service characteristics performed by the establishment change. Therefore, hedonics can be used to quantify the changes in the characteristics such as hours of operation, number of checkouts and other similar features. A hedonic model for quality adjustment was unsuccessfully attempted for grocery stores. The model was not successful because the dispersion of the margins on the different products was too diverse. A successful hedonic model for quality adjustment has been developed and is currently in use for liquor stores. The hedonic model for liquor stores was successful because the margins and products were very homogenous.

Additional alternative quality adjustment methods have been implemented for several service industries. An example of alternative quality adjustment is nursing care facilities. A methodology for quality adjusting nursing care facilities was instituted utilizing government inspection data on staff hours in conjunction with wage data on health care jobs.

In addition to the new item basis research, additional industry research on the quality of the index is done prior to resampling for an industry. One of the goals of this research is to ensure that the current methodology is accurately measuring the industry. A regression analysis is conducted on the price movements over the past years against other industry data. If there is a low correlation, then additional research is done to determine why and what can be done to improve the index. During this research, all aspects of the index are reviewed and evaluated.

3 Industry/Sector Methodologies and Challenges

This section highlights the methodologies implemented for a selection of service industries and sectors. Specifically included are discussions of output measurement, pricing characteristics, sample unit identification, and frame and sampling issues. The industries and sectors selected best illustrate the challenges faced in developing pricing methodologies for service industries.

3.1 Finance and Insurance

3.1.1 Banking

3.1.1.1 Output Measurement

Output definition

The primary output of the banking industry is the provision of financial services including financial intermediation. For this industry, financial intermediation can be defined as the assumption of risk that arises from taking money from depositors and lending it to borrowers.

The output can be further defined by the specific types of services provided by banks. The major service lines follow:

- *Loans* – Loans are assets of a bank defined as funds advanced to a borrower to be repaid at a later date, usually with interest. Included in the loan category are residential real estate, nonresidential real estate, home equity, commercial and industrial, agricultural, new and used auto, and credit card loans.
- *Deposits* - liabilities of a bank defined as funds placed with a bank in an account subject to withdrawal. Included in the deposit category are demand, time, and savings accounts.
- *Trust services* - Trust activities involve the bank's acting in a fiduciary capacity for an individual or a legal entity, such as a corporation or an individual's estate. This typically involves holding and managing trust assets for the benefit of a third party.
- *Other banking services* – These services include standby letters of credit, correspondent banking, sale of securities, cash management and other miscellaneous services.

Pricing methodologies

One of the primary challenges in this industry is to measure financial intermediation services indirectly measured or *FISIM*. Banks often provide services for which they do not explicitly charge by paying or charging different rates of interest to lenders and borrowers. They pay

lower rates of interest than would otherwise be the case to those who lend them money and charge higher rates of interest to those who borrow from them. The resulting net revenues of interest are used to defray their expenses and provide an operating surplus. This scheme of interest rates avoids the need to charge customers individually for services provided and leads to the pattern of interest rates observed in practice¹.

Thus, it is necessary to develop a methodology that not only captures directly priced services but also reflects services priced indirectly. This methodology must allow interest to be allocated between loans and deposits.

The user cost methodology is implemented in the PPI. The user cost for a financial service is the difference between its revenue and the sum of its implicit and explicit costs. To measure these implicit costs, interest is allocated between loans and deposits by means of a "reference rate." The reference rate is the opportunity cost rate of money from which the risk premium is eliminated to the greatest extent possible and which does not include any intermediation services². In theory, the price of a loan is equal to the asset holding rate less a reference rate. The asset holding rate is the interest received plus service charges. For deposits, the price is equal to a reference rate less the liability holding cost rate. The liability holding cost rate is the interest paid to depositors less service charges.

In measuring the prices for both loans and deposits, the same reference rate is used. Using two different rates could result in double counting, which would overstate price movement, or part of the output price could be missed, which would understate price movement. Currently, the reference rate is the weighted average of all banks' holdings of U.S. Treasury securities.

In practice, the price of these services can be expressed as shown below. Again, both services are priced at the portfolio level.

$$\text{Loan Price} = \left[\left(\frac{\text{Earned interest income} + \text{Fees}}{\text{Average loan balance}} \right) - \text{Reference rate} \right] * \$1000$$

Earned interest income includes all interest actually received in a given month for the portfolio of loans being priced. This includes interest earned on both old and new loans. The average loan balance is calculated by averaging the ending daily balances of the loans in the portfolio over the month.

$$\text{Deposit Price} = \left[\text{Reference rate} - \left(\frac{\text{Interest payments} - \text{Earned fees}}{\text{Average deposit balance}} \right) \right] * \$1000$$

Interest payments include all interest actually paid to depositors on the funds held in the portfolio in a given month. Earned fees should include all fees, such as those for ATM withdrawals or insufficient funds, that are actually collected by the bank. Again, the deposit balance is calculated by taking the average of the ending daily balances of the portfolio.

¹ 1993 System of National Accounts

² Ibid.

For both equations, the calculation within the outer brackets results in a rate. This rate is multiplied by \$1000 to convert the rate to the dollar value used in index calculation. When the price is positive, the service will be considered on output. However, whenever the price is negative, the service will be considered an input and the price will be excluded from index calculation until it becomes positive.

For trust and all other banking services, the price is equal to the actual fee charged for performing the service. These fees can be a percentage of assets or a flat fee.

3.1.1.2 Service/Pricing Characteristics

For loans and deposits, the unique item to be priced is represented by a homogeneous portfolio of accounts (e.g. all 15-year fixed rate residential mortgages or all 1-year certificates of deposit). Trusts and other banking services are priced by selecting an individual transaction.

Once the actual service is selected, its price determining characteristics are identified to permit monthly repricing of the same unique item. The following characteristics are common for most services:

- Type of service (e.g. mortgage loans, money market savings account, trust)
- Term of service (e.g. 15-year loan, 5-year certificate of deposit)
- Type of fees (e.g. late payment, automatic teller machine, early withdrawal penalty)

Constant quality measurement issues

A fundamental issue in pricing banking services is the ability to maintain constant quality. Particular to these services is the need to keep monetary values stated in terms of constant dollars. Periodically, certain values included in the price calculations are to be adjusted by the GDP chain-type price index to account for the time value of money. It is the \$1000 conversion factor that is to be adjusted for loans and deposits. For other services for which the price is based on the value of assets, such as trust services, the assets will be adjusted.

3.1.1.3 Sample Unit Identification and Frame and Sampling Issues

The sample was divided into two tiers: small banks and large banks.

Small Banks

The sample unit is the bank's headquarters. It may be the case that a sample unit operates both as the bank's headquarters as well as the bank's branch. This may be the case for small rural banks. There will also be instances where the bank's holding company may be located in the same building as the bank's headquarters

The "small" banks were sampled as the "whole" bank. That is, all output of the banks was given a chance of selection

Large Banks

The "large" banks were sampled by department. Keep in mind that these are BLS-created departments. That is, they may not match the actual department structure of the sample unit. There are seven department designations:

- Mortgage Loans
- Agricultural Loans
- Commercial Loans
- Consumer and Other Loan Services
- Retail
- Trust services
- Other banking services

The retail department refers to “deposits.” Only the output of the sampled department is eligible for selection

The frame used for the banking industries was a file provided by the Federal Deposit Insurance Corporation. This file provided a comprehensive list of commercial banks and savings institutions and revenue for each entity. However, the file did not provide departmental data necessary for sampling the larger banks. Therefore, departments were created and given an equal chance of selection within each of these banks.

The sample for this industry was drawn in two stages. For the first stage sample, banks were chosen by probability proportionate-to-size sampling based on revenue. For the second stage sample, selections were made from the set of BLS defined departments for each bank in the top half of the sample. This created multiple sample units for a single bank in most cases.

The services to be priced were pre-selected. For loans and deposits, the unique item to be priced is represented by a homogeneous group of accounts (e.g. all 15-year fixed rate residential mortgages or all 1-year certificates of deposit). Trusts and other banking services are priced by selecting an individual transaction.

Government Regulations

Because of its close association to the economic stability of the U.S., the banking industry will always be under close watch by regulators. The operation of the banking system is essential to the economic well being of a nation. Therefore, the banking system cannot be subjected to fail. Before failure is eminent, banks try to control expenses by mergers and consolidations.

Much of this profuse regulation stemmed from the 1929 depression when the banking industry collapsed. The first of many regulations that followed is the Glass-Steagall Act of 1933, which prohibits payments of interest on demand deposits, establishes the FDIC, establishes interest rate ceilings on savings and time deposits, and most importantly separates banking from investment banking.

This separation of banking activities from other financial services allows the PPI to accurately define the profit maximizing center for all units in the sample frame.

3.1.2 Insurance

3.1.2.1 Output Measurement

Output definition

The primary output of the insurance sector is the assumption of risk (transfer of risk from the policyholder) and financial intermediation. In these industries, financial intermediation is the investing of someone else's money with the goal of partially offsetting the size of the premium payment.

The policy underwritten by the insurer represents the unique output. The policy lists the coverages for which restitution would be made to the policyholder to cover claims. The amount of risk being transferred to the insurer is clearly stated in terms of covered benefits (and benefits not covered) and it obligates the insurer to pay claims for all such occurrences. So, the output is the transfer of the risk of financial loss from the policyholder to the insurance company.

Pricing methodologies

General methodology

The operational definition of assumption of risk plus financial intermediation is premium plus rate of return on investment. Investment income is crucially important to the industry and greatly affects their pricing decisions and its inclusion should yield a smoother statistic that would facilitate the regulatory decision-making process. Companies may well reduce premiums when the rate of return increased in response to competitive pressures, as well as raise premiums when the rate of return is lower.

Thus, the price can be expressed as

$$\text{Price} = \text{Premium} (1 + r)$$

where r is the annual return on the invested portion of the premium for the particular type of insurance that is being priced. This rate is stated as a percentage of all premiums paid.

There are mutual companies whose policyholders are also the stockholders of the company. These companies typically pay out a dividend rebate to the policyholders on an annual basis. In such cases, the dividend would be subtracted from the premium to obtain a net transaction price. This price can be expressed as

$$\text{Price} = \text{Premium} (1 + r) - \text{Dividend}$$

To track premium movement in the property and casualty industry, companies provide estimated premiums for model policies. This is an actual policy selected by probability where the premium determining characteristics are held constant while the policy is repriced on a monthly basis. The insurance company estimates the current premium for this model policy by using current charges applied to the policy characteristics of the actual policy. This premium remains unchanged until the policy is priced again the following year.

The major difference in repricing a model policy versus repricing an actual policy is that the insured may modify the policy over time. For example, an auto policyholder could add a teenage driver in year two of the policy, increase the liability, or reduce the deductible. Such a change in the repriced item violates the Laspeyres assumption of fixed quality. By holding the policy characteristics constant, the fixed quality assumption is realized.

In order to hold inflation-sensitive characteristics constant, periodic adjustments are made to account for inflation. For homeowners insurance, the dollar limit of coverage is adjusted annually to account for construction price inflation. The assumption is that the policyholder is insuring to secure a constant flow of services from the insured property. If there is price inflation affecting the cost of repair or replacement of the damaged property, the coverage limit should be escalated to reflect this increase. This adjustment is made annually on the anniversary date of the policy. This reflects what actually occurs – where the company makes these coverage adjustments at the time of policy renewal. As the index is tracking several thousand policies selected on a probability basis, there is a spread of policy anniversary dates throughout the year. This yields a smoother behaving index than making this adjustment for all repriced items at one time.

The source to be used for the escalation is dependent upon the insurance company. If the company cannot make a recommendation as to how the inflation-sensitive policy characteristics should be adjusted, PPI decides the appropriate index to use. For example, the E. H. Boeckh Building Cost Index is used to escalate the coverage limit for homeowners insurance. A different procedure will be used for Workers Compensation Insurance. The workforce in the group is held constant (same number of people in the same jobs), but the wage rates are adjusted to account for general wage inflation. In this case, the Bureau of Labor Statistics' Employment Cost Index is used.

The investment rate of return is calculated by all insurance companies as a percentage of the premium. An annual report is prepared by all companies which includes this calculation. The report provides the investment rate of return by insurance line calculated as a percent of premium. As with the inflation-sensitive policy characteristics, the rate of return is updated annually for each priced item on the policy anniversary date.

Life insurance

In general, the premiums for life insurance policies are level and correspond to the age and sex of the policyholder as well as the duration of the policy. For whole life, the premium is one that allows the policy to endow at the age of 95 or 100. That is, we obtain the premium that allows the cash value to equal the death benefit when the insured reaches 95 or 100 years of age.

However, for universal and variable products, premiums are not level as they are for term and whole life. These premiums vary at the discretion of the policyholder making them an inaccurate measure of output. For these particular products, policyholders may pay whatever premium they wish as long as they pay the minimum required to keep the policy in force. The policyholder bears some of the risk and, in return, the policyholder gets to capitalize on the potential for increased saving or increased death benefits using the policy as an investment vehicle. Since the death benefit is held constant, the premium varies when the policyholder adjusts the amount of money they are saving or investing. These additional or increased premiums, which increase the savings, should not be reflected in the index as price increases. Therefore, pricing of premiums for universal, variable, and variable universal life insurance would be a meaningless way to measure price change.

Instead of measuring premiums, extracting the various fees charged to administer the policy measures the output of these policies, taking the total fees as the price. While this seems to be the ideal way to measure the price, much as the formula suggests, this can only be done for the variable and universal products. Therefore, type of price for these policies is a combination of the various fees assessed for the provision of the policy. These total fees represent the expenses or costs listed on the right side of this equation:

$$\text{Premium} (1 + r) = \text{MC} + \text{EXP} + \text{P} + \text{C}$$

where r = earned rate on investments, MC = mortality costs, EXP = expenses, P = profits, and C = contingency allowances.

Annuities

Although companies receive a consideration, or premium, for provision of an annuity, they only retain a portion of it. The other portion is invested on behalf of the annuitant. The price to be collected is the same for both individual and group annuities. All money invested, net of any fees and/or interest retained by the insurance company, is intended to be returned to the annuitant. The outputs from annuities are measured by fees and/or interest.

For variable deferred annuities, the fee methodology used for universal and variable insurance was adapted to measure the output of these annuities. Fees charged for provision of these annuities are generally some percentage of the account value. These fees cover expenses, mortality risks, and investment management.

- *Mortality and expense risk charge* - charge for mortality and expense risks. It is typically a percentage of the account value and can be expressed in terms of an annual percentage.
- *Administrative charge* - annual fee is deducted from the annuity account value for the costs of administering the annuity.
- *Investment advisory fee* - fee assessed for advisory services provided in association with the annuity portfolio.

Therefore, the total fees are the PPI "price". The earned rate on investments will be used to adjust the account values for repricing purposes. This rate will not be added to the 'price'.

For fixed-rate annuities, companies only earn revenue from the difference in the interest that they earn and interest that they credit to the annuitant. The difference is applied to the account value. In addition to this interest spread, companies may charge a flat administrative fee.

Immediate annuities seemed more difficult to price due to concerns with mortality costs. Companies say that the best measure for price change is their actuarial rate. This is the rate at which they derive the premium or consideration. It is calculated as the present value of the payment of one dollar every month for the expected duration of the annuity. It can be obtained by dividing the premium paid by the monthly payout or by taking the reciprocal of the payout rate per \$1000. Companies say that this rate is loaded with expected expenses, profits, and mortality costs. An example is the sale of an annuity with a payout to the annuitant of \$12 per \$1000 of premium. The "price" paid by the annuitant to purchase the annuity is \$83.33 per \$1 of benefit ($=\$1000/\12).

Companies can also earn an interest spread as they do for fixed-rate annuities. Another option is to price the front-end load earned on the premium. This is typically a small percentage of the total premium.

3.1.2.2 Service/Pricing Characteristics

Actual policies were chosen by probability proportionate-to-size sampling based on certain price determining characteristics of the policies. Once an actual policy is selected, its price determining characteristics are identified to permit repricing of the same unique item. The following policy characteristics are common:

Property and casualty insurance

- *Type of property or risk* - provides the characteristics of the insured property.
- *Type of coverage* - includes physical damage coverage and liability coverage.
- *Dollar limit of coverage* - maximum amount of money the insurer is legally obligated to pay in the event of a claim.
- *Coinsurance clause* - percent of the value of the property to be reimbursed by the insurer.
- *Deductible* - insured bears the first part of any loss covered by the policy up to a specified amount.
- *Length of policy period* - time frame for which the policy is in effect.
- *Perils covered* - specific risks that the insurer assumes.
- *Location of the insured property* - risks vary by geographic location.
- *Past loss experience* - premiums generally are lower if the insured has a past record of making fewer claims.
- *Valuation of insured property* - either the actual cash value of the property, which adjusts for depreciation, or the replacement cost.
- *Valuation of risk exposure* - valuation for liability coverage.

Life insurance

- *Type of policy* - whether the policy is term, whole life, universal, etc. will have an effect on the premium amount. Premiums for term tend to be lower.
- *Age of insured* - the older the insured, the higher premiums will be due to increasing.
- *Sex of insured* - premiums tend to be higher for males than for females since males.
- *Face amount of policy* - premiums will increase as the amount of coverage increases in order to cover potential claims.

- *Smoker/non-smoker* - premiums tend to be higher for people who smoke due to health risks which increase mortality.
- *Health of insured* - the healthier the insured, the lower the premiums will be since chance of premature death is expected to be lower.
- *Duration of the policy* - the nth year of the policy (i.e. 1st year, 5th year, etc.). Premiums or fees may change depending on how long the policy has been in force.
- *Riders* - policy may have a provision for additional coverage called a rider. These riders may provide additional coverage for spouse or children of the insured. Riders will increase the premium otherwise payable.

Health insurance

- *Type of coverage* - underwriters will require different information in order to provide prices for medical service plans, long-term care, and other services.
- *Amount of coverage (richness of benefits)* – includes the number of covered services, the dollar amount of coverage for each service, and the maximum dollar amount of coverage.
- *Census class* - prices for the same service within the same group will differ according to the rate or census class. Generally, families will pay a higher premium than an individual within the same group plan.
- *Voluntary vs. non-voluntary (contributory vs. non-contributory)* - voluntary (contributory) group policies will be defined as policies for which the employee pays 100% of the premium. Non-voluntary (non-contributory) group policies will be defined as policies whereby the employer pays 100% of the premium. The percentage contribution of the employer or the employee can vary anywhere between 0.0 and 100.0%.
- *Group composition* - the combination of gender and age ranges is an important factor in determining the premium. Therefore, companies require the age and gender of each person covered by the policy, including spouses and children.
- *Medical history* - previously healthy people will generally pay lower premiums than those who have a record of health care utilization.
- *Occupation* - people employed in dangerous occupations will generally pay more than those in sedentary, low risk occupations. The classification code (NAICS or SIC) of the industry is usually used for underwriting purposes.
- *Geographic location* - people who live in areas in which natural disasters often occur and/or pollution is a problem will generally pay higher premiums than those who do not. The zip code (usually the first three digits) is used for underwriting purposes. For large groups, or small groups which are geographically dispersed, several zip codes/geographic regions may apply. However, a national rate may be used if a group is very well dispersed throughout the nation.

- *Earnings* - As incomes rise, utilization rates tend to increase. Thus, premiums tend to increase as income increases as well. Earnings will be most important in determining a price for accident insurance. Maximum benefits paid are usually based on income.
- *Smoking Status* - Smokers generally pay higher premiums than non-smokers.

Constant quality measurement issues

The fundamental issue in pricing insurance services over time is the ability to identify and adjust for changes in risk. For changes in explicitly endogenous risk factors such as changes in coverage or deductibles, companies have suitable cost data to allow for meaningful cost based quality adjustment. However, for changes in exogenous risk factors that go beyond the scope of policy negotiations, such as an increased incidence of theft or a severe hurricane season, company specific data would not be sufficient to definitively quantify risk. Only outside data sources will be able to identify short-term vs. long-term changes in risk.

Such an outside data source is used in the quality adjustment of private passenger auto insurance where risk changes occur even though the age of the insured auto remains the same. To keep the age constant, the model year of the auto is updated once a year to the next model year. For example, a 1996 Honda Accord is changed to a 1997 model. However, changing the model year can also move the auto into a different risk category known as a symbol group. Insurance companies are unable to assess this risk change on their own, but a valuation can be obtained from Insurance Services Office (ISO). This organization pools risk information industry-wide, producing data which is broader in scope than any that one company could gather on its own. The ISO assigns autos to symbol groups based on their risk characteristics. For PPI purposes, the ISO provides the value of risk change for every auto included in the index. The ISO monitors the symbol group that is assigned to an auto and the particular risk associated with that symbol group. When an auto moves into a different symbol group, ISO assigns a value to the risk change that occurs. This value is then used to explicitly quality adjust the premium used in the PPI. Therefore, the risk changes are not reflected in the index as price changes.

However, it is not always clear that we would know when a shift in underlying risk truly occurred. Over the past few years, claims for mold damage have increased significantly. Has the climate changed such that there is increased risk of mold? Are policyholders just making more claims against their homeowner's policy? Decisions must be made in real time, and sufficient data simply may not be available in the current month to identify and quantify the effect of these changes. Mold has always existed, but until 2001, mold was not a factor in the homeowner's insurance market. However, public anxiety over major lawsuits in Texas and California have led to an increase in claims due to water damage (mold was only covered by policies if it was related to a covered peril such as a burst pipe). As a result, the increase in costs has driven premiums upward. Do we quality adjust these premium increases that occurred to help cover the higher claims since 2001? In the PPI, it has been treated as an increase in utilization as there has been no observable shift in weather patterns to indicate a change in risk.

Another issue is the new item bias that can be present in both repricing methodologies. However, this bias may be especially problematic when pricing a frozen policy. Over time, this policy may no longer be representative. Mandated coverages may change or new insurance products may be introduced. Although bias may not be as prevalent when following an actual policy, it can occur if the general population has changed their preferences for the type of

insurance product that they purchase or if the policy represents a smaller portion of the company's business.

The PPI program has developed a "directed substitution" procedure to reduce new item bias. This procedure captures evolutionary changes to a current product or service that did not exist when the sample was selected. Periodically, each company will be contacted in order to review the insurance products included in the sample. The existence of these evolutionary changes in the industry will be identified and disaggregation will be performed to determine if a substitution should be made from the current product to an evolutionary product or to add the new feature to the description of the current product. Producer cost based quality adjustment will then be attempted to adjust for these changes.

3.1.2.3 Sample Unit Identification and Frame and Sampling Issues

Most insurance companies are affiliated with an insurance group. The sample unit location for these companies is the group headquarters. For single establishments with no group affiliation, the sample unit is the company headquarters.

Many companies may operate in more than one insurance industry. Therefore, it was necessary to create separate profit maximizing centers (PMC) for each type of insurance within each company. For property and casualty insurance, the PMC was further broken down by line of insurance.

The A.M. Best Company's Key Rating Guide was the frame source for all insurance industries. This frame provided the necessary information to create the appropriate PMCs for each industry. In addition, premium revenue was provided as a measure of size.

Government Regulations

Each state regulates the insurance companies operating within its boundaries. All companies are required to file an annual statement with the state insurance commission. In addition there are three separate filings for property and casualty, life, and health insurance business activities. Thus, PPI can divide the frame units into the appropriate PMCs for each insurance industry.

3.2 Real Estate and Rental

3.2.1 Lessors of Nonresidential Buildings

3.2.1.1 Output Measurement

Output definition

Two primary outputs can be measured for this industry. The first is providing the physical space and the second is management of the property (Note: this usually does not apply to pier and dock owners). Physical space can vary in size and functionality depending upon the needs of the tenant. Owners provide some degree of management of the rented space. This management can consist of any service necessary to keep a rented property in operation.

The provision of the physical space is typically not difficult to identify. Space is measured by the square footage of floor space. However, the management aspect can be difficult to identify. The management aspect is considered part of this industry if it is paid for, or provided by the owner. If the tenant reimburses the owner for a service, then it, too, is considered part of the output of this industry. In general, all management services that the owner provides to the tenant whether directly or indirectly through an outside contractor, are to be considered part of the output of this industry. For example, if an owner provides the daily cleaning to a rented office space, the service is considered provision of the space as well as the cleaning. If an owner provides utilities to a rented space (i.e. pays the utility bills), then the service output consists of provision of space and utilities.

Pricing methodologies

General methodology

The type of price collected for retail, office and industrial buildings is an average gross rent per **occupied square foot**. This price will measure what tenants in a particular building pay on average for their rented space. It is to be used when collecting prices for retail, office, and industrial buildings.

Average gross rent per occupied square foot was chosen as the type of price to collect because it eliminates the measurement of revenue fluctuations caused solely by changes in occupancy within a building. For example, in retail, anchors may not pay as much rent per square foot as other stores. If an anchor vacates a retail building then the price per *occupied* square foot could actually increase. This increase is an accurate reflection of price change. If the price per building, or gross leasable area (GLA) were to be collected instead, then there would be a decline in revenue or price. PPI should not reflect price changes simply due to changes in occupancy. Therefore, the rent per gross leasable area is not collected.

Average gross rent per occupied square foot is to be calculated in the following manner:

First, a building's gross rent for the month must be totaled. Gross rent is made up of a combination of all or any of the following rent components:

- *All base rents* - This is the fixed amount that tenants are required to pay for the renting of property. It is independent of any other expenses, and usually remains constant throughout the length of the lease.
- *All percentage rents* - This is a variable amount that retail tenants pay in addition to their base rent. Percentage rent is contingent upon retail sales, in that it is a percentage of a tenant's gross sales. The value to be included here is all percentage rents paid in the current month. This is not necessarily the same as all percentage rents earned in the current month (there is often a two month lag between when this type of rent is earned and when it is paid).
- *All storage rents* - These are any additional rents that tenants pay for the use of storage facilities within a building.
- *All parking garage rents* - These are rents that an owner receives from a tenant who rents a building's parking garage. This value is not to include any revenue that an owner receives from renting out individual parking spaces. Rather, it is to include only revenue derived from the renting of the entire facility to a tenant who then uses the facility to rent out individual

spaces. If the owner is involved in running the parking facility in any way, these rents are treated as miscellaneous receipts for Automobile Parking.

- *All escalations* - These are any adjustments made to base rents due to changes in the inflation rate or changes in the CPI index.
- *All operating expenses billed to the tenants by the owner* - This includes all operating expenses that tenants pay separately to the building owner (not an outside provider), and that are not included in the base rent. This total also includes those operating expenses that are "pass-throughs", whereby the tenant reimburses the owner for an expense. For example, if an owner is charged for utilities by a power company, but passes this expense along to the tenants, the amount that is passed on is to be included as operating expense revenue (provided the owner includes the operating expense revenue as revenue or income and deducts utilities as expenses). Examples of operating expenses may include any or all of the following: utilities, taxes, insurance, routine maintenance and repairs, and common area expenses.

Next, sum all rents, escalations, and operating expenses listed above and deduct the value of all concessions offered during the month. Concessions, or rental abatements, are inducements offered to tenants that directly or indirectly lower the actual rent. They are often offered when owners are prohibited from lowering rents due to the terms and conditions of a mortgage loan. Some common concessions include:

- *Signing bonus* - a tenant is given a sum of cash in reward for signing a lease with an owner. A tenant may receive \$5,000 as an incentive to sign a lease with an owner.
- *Moving allowances* - an owner reduces the burden of moving costs for a new tenant. This is done when an owner finances a portion of a tenant's moving expenses. For example, an owner may pay for the moving company when a tenant is ready to move into the owner's building.
- *Lease buy-out* - an owner assumes a tenant's unexpired lease. This is contingent on the tenant renting space in the owner's building. For example, an owner may pay off the rest of a tenant's lease in another building in order for that tenant to move into the owner's building as soon as possible.
- *Tenant improvements (TIs)* - an owner agrees to upgrade a space being rented by making a physical change to it. This is often necessary to meet the customized needs of a nonresidential building tenant.
- *Free rent* - a tenant receives a certain number of free months rent from the owner. This can be taken up front or spread out over the course of the lease. Free rent should already be accounted for in the total for all base rents because it is rent not received. Therefore, avoid double counting, and do not include free rent under concessions when it is already accounted for in the base rent. In cases where free rent is not accounted for in the base rent or in any other rent component, however, deduct its value along with the value of all other concessions offered during the month.

Finally, the building's total rent revenue (gross rent + operating expenses - concessions) is to be divided by the total occupied square footage in the building ("occupied" meaning rented). The resulting quotient will be the average gross rent per occupied square foot.

Example: In one month, building A collects \$300,000 in base rents, \$15,000 in percentage rents and \$45,000 in operating expenses for a total of \$360,000. In the same month, the owner of building A offers \$70,000 worth of concessions to the tenants in building A. The concession value is subtracted from the \$360,000 to obtain a net rent total of \$290,000. If the occupied square footage is 150,000 square feet, the average rent is \$1.93 per occupied square foot (\$290,000 divided by 150,000 occupied sq. ft.).

Auditoriums, theaters, and convention centers

Average gross rent per occupied square foot pricing strategy does not work well with auditoriums, theaters and convention centers. Since the quantity and type of tenants renting these buildings varies each month, and each with a completely different income and cost structure, it would be misleading to collect an average price that includes all tenants. Instead, collect the average gross rent per performance for these types of buildings.

To get this average gross rent per performance, one type of event must also be selected. Then, collect the value of all rent derived that month from all performances that are categorized as this type of event selected. Then, with these collected rents, an average price for this type of production can be tracked. For example, if the type of event selected is a rock concert, rent for rock concert performances would be collected. Then, with these rock concert rents, an average gross rent for rock concert performances would be calculated (the calculation would be as follows: total rents derived from rock concerts that month divided by the number of rock concert performances that month).

In getting this average price, however, recurring leases must be selected. These leases cannot be for one-time events. They must be for events that take place often enough to be repriceable, (i.e., at least once a year). Also these leases must have similar cost factors and pricing arrangements with other performances under the same event. Preferably, it is the same event that comes back at least every year, such as an auto show, Ice Capades, Ringling Brothers Circus or the NBA's Boston Celtics. For plays and musicals, look not only for similarity in costs, but also similarity in popularity.

Once selected, these leases must be priced. In other words, "gross rents" must be determined for these leases. Gross rents are the prices needed in order to come up with an average price for a particular type of performance. A gross rent for this property type is the sum of the following components:

- ***Base rent*** - The base rent is the fixed amount that a tenant is required to pay for renting the property. This amount is independent of any operating expenses and other variables, and usually remains constant throughout the length of the lease (it may, however, be adjusted in accordance with the CPI).
- ***Operating expenses*** - Operating expenses, or "house costs", refer to those costs to which the owner looks to the tenant for reimbursement. They are costs associated with the operation and production of an event, and that are paid by the tenant to the owner. Also known as "pass-throughs" (costs that are passed directly from the owner to the tenant), operating expenses usually generate no profit to the owner, but still are considered income

to the owner and part of the total rent. The tenant's responsibility in paying operating expenses is contingent upon what is previously negotiated in the lease.

- *Percentage of gross box office* - This refers to the portion of rent that is contingent upon box office sales. Under this arrangement, the tenant must pay a percentage of its gross box office revenue as part of its rent. The percentage charge will vary greatly, depending upon a tenant's base rent, past and/or expected gross box office volume and negotiations.

Example: In one month, the XYZ Theater leases its building for five musicals. From these musicals, this theater collects \$45,000 in base rents, \$18,000 in operating expenses, and \$9,000 as a percentage of the gross box office. The total rent collected from this event (i.e. musical) is \$72,000 for the month. Dividing the total rent derived from musicals by the number of musical performances gives the average gross rent per performance. This quotient is \$14,400. This means that the average gross rent per musical performance is \$14,400.

Piers and Docks

The type of price collected for piers and docks is the gross rent per acre. This price, unlike the previous two types of prices, is to represent just one tenant. Hence, it is not an "average" gross rent.

The gross rent represents the flat rental fee and the fee based on the amount of cargo throughput (that is, level of cargo tonnage handled) that is paid by a single tenant. To calculate the gross rent per acre, total both rent components (flat rental fee plus fees based on cargo throughput) and divide by the number of acres rented. The quotient is the gross rent per acre.

Example: In one month, the owner of pier A collects a \$150,000 flat rental fee from its tenant. In addition, this owner collects \$20,000 in fees based on the tenant's handling of 40 tons of cargo (\$500 per ton). The gross rent total is \$170,000. If the number of acres is four, the gross rent per acre is \$42,500.

3.2.1.2 Service/Pricing Characteristics

The following outlines price determining characteristics for all nonresidential buildings in this industry:

- *Location* - Nonresidential buildings located in areas conducive to their occupants' line of business generally receive higher average rents than their counterparts. Retail buildings, for example, located in heavily populated urban areas tend to receive higher average rents than retail buildings located in sparsely populated rural areas.
- *Quality of property* - Nonresidential buildings are classified according to their physical condition, amenities, and age. Classifications include Class A, B, and C with A being the highest classification, followed by B and then C.
- *Management intensity* - As the quality and/or quantity of services available to all tenants in a building increases, the average rent of a building increases as well. These services may include, among others, the following: security, elevator availability, and interior/exterior cleaning.

The following outlines additional price determining characteristics for specific property types in this industry:

- *Number of anchors (retail property)* - The average rent in a retail building (i.e. mall) is dependent upon the number of anchor tenants it houses. Anchor tenants are tenants that attract customers to a shopping center, and usually own the space they occupy. Because of these two factors, most anchors pay little or no rent, only common area maintenance and other operating expenses.
- *Level of sales (retail property)* -Retail tenants typically pay a percentage of their gross sales revenue as part of their rent.
- *Percentage of seats made available (theater/auditorium)* - Theater and auditorium property owners generally receive, as part of the rent, a percentage of a tenant's gross sales.
- *Number of berths (pier/dock)* - A berth refers to the space allotted to a single ship or vessel on a pier or dock. The number of berths measures how many vessels or ships can be present at one pier/dock at any one time. It is a measure of size.
- *Cargo throughput (pier/dock property)* - Rent for piers and docks is often dependent on the amount of cargo handled by the tenant.

Constant quality measurement issues

In general, the methodology of pricing the average gross rent per occupied square foot provides a constant quality measurement over time that does not need further adjustments. Adjustments are only necessary if there are major improvements or changes to the building. These types of changes would require quality adjustment, but are rare. These changes would include major renovations or remodeling of a building or shopping center.

3.2.1.3 Sample Unit Identification and Frame and Sampling Issues

Office and industrial buildings and retail shopping centers

For office and industrial buildings, and retail shopping centers, the leasing agents were clustered by leasing company and then leasing companies were sampled. Then the leasing agents were selected within the leasing companies. Then buildings were selected for the sampled leasing agents. Therefore, the sample unit is the leasing agent.

For all types of properties, disaggregation was performed to select the actual building(s) (or shopping center, etc.) for which data were to be collected. If part of the selected building is owner-occupied, that portion is not included in this industry and was excluded from collection.

The frame source for office and industrial buildings was a database provided by CoStar, one of the leading suppliers of real estate information in the industry. This frame was subsampled twice and clustered by leasing agent, who was the initial contact. Each cluster member is an individual building. The number of items assigned to the sample unit equaled the number of buildings.

For retail buildings, the frame source was the 2001 edition of the *Shopping Center Directory*. This frame was also subsampled twice and clustered by leasing agent. Each cluster member is

an individual retail shopping center. The number of items assigned to the sample unit equals the number of shopping centers

Theaters, auditoriums, piers, and docks

For theaters and auditoriums and piers and docks, buildings or structures were sampled. If the sample unit has only one building and that building has a different owner or leasing agent then, the building can be collected from the new owner or agent

The frame source for theatres and auditoriums was the QCEW. For piers and docks, the frame source was a dataset provided by the American Association of Port Authorities. This frame was not clustered and each port authority was given an individual chance of selection.

3.2.2 Offices of Real Estate Agents and Brokers

3.2.2.1 Output Measurement

Output definition

The primary output for real estate agents and brokers is the service of aiding a customer in the sale, purchase, or lease/rental of a property.

Pricing methodologies

The price collected is the dollar value of the commission computed as a percentage of the total selling price or total lease value of a residential or commercial property. The commission is specified in the listing agreement or in some other contract with the principal. It is also possible for the broker to receive a commission stated in terms of dollar(s) per square foot.

Initially, the sampled companies provide an actual sale price or lease value of a property recently sold or leased and the commission value. In subsequent months, using their expert knowledge of the current property market, these companies estimate what the price would be if the property was sold or leased in that current month.

If a broker is unable to estimate the value of the property, it is acceptable to report the commission for a comparable property sold during the current pricing period. This is not a substitution; it is just another method for estimating the price.

A flat fee will be collected for a discount broker. This is typically a list price.

3.2.2.2 Service/Pricing Characteristics

The service to be priced is the sale or leasing of a property. Since the value of the property along with the commission rate determines the commission received by a broker, it is important to capture the price determining characteristics of the property. These characteristics include:

Residential property

- Type of dwelling – single family detached house, townhouse, apartment, etc.
- Property description – number of rooms, amenities, etc.
- Lot size
- Age of dwelling
- Utilities available – water, sewage disposal, etc.
- Garage
- Location –urban vs. suburban, proximity to schools and public transportation
- Improvements –new additions, significant repairs

Commercial property

- Square footage
- Type of building – office, retail, etc.
- Number of floors
- Location – central business district, etc.
- Location within building
- Amenities –health facilities, cafeteria, etc.
- Appurtenances – Rights to common areas, driveway easements, etc.

Land

- Size of lot
- Location –urban vs. rural areas
- Zoning – commercial vs. residential
- Development of lot – raw vs. finished
- Environmental features – lakes, timber, etc.

Farms

- Land use – crops, cattle, poultry, etc.
- Soil type
- Specialized facilities – dairy equipment, etc

Constant quality measurement issues

A primary concern in pricing brokerage is that the same property is not sold every month. Therefore, companies are asked to estimate the current property value given the current real estate market conditions. Real estate agents and brokers are considered the industry experts for providing current estimates of property value; therefore, a secondary source is not used.

Hedonic modeling is not possible due to the subjectivity of many of the pricing variables.

3.2.2.3 Sample Unit Identification and Frame and Sampling Issues

Many real estate companies tend to be national or regional with franchise or branch offices located around the country or region. Since pricing is tied to the local real estate market, each office was given a separate chance of selection as opposed to sampling the headquarters for all locations of a particular company.

The QCEW and a database provided by the Axiom Corporation were combined to form a frame for this industry. The sample was drawn by using Wage figures as a size measure for the

UI-based LDB strata, and by using estimated Revenue figures as a size measure for the Axiom strata.

3.2.3 Passenger Car Rental

3.2.3.1 Output Measurement

Output definition

The primary output for the passenger car rental industry is the provision of various types of passenger cars, without drivers, on demand, for a short period of time, i.e. less than one year. The rental equipment is made available for use by individuals, corporations and the government for leisure, business and car replacement (insurance) purposes. The passenger cars are typically contracted for use on an hourly, daily, weekend, weekly and monthly basis.

Pricing methodologies

The type of price collected is the rental rate based on the duration of the car rental. Time based units of measure are expressed as per hour, per day, per weekend, per week and per month depending on the car rental company.

3.2.3.2 Service/Pricing Characteristics

The transaction that is priced is a single rental. Car rental agencies tend to design unique rate structures that are targeted at specific market segments. The following transaction characteristics are captured and held constant:

- Type of rate plan (e.g. standard, Internet, government, military)
- Duration of rental period (e.g. day, week)
- Class of rental vehicle (e.g. economy, compact, full size)
- Model of rental vehicle (includes model year, model, passenger count)
- Type of car rental Rate (e.g. hourly, daily, weekend)
- Type of car rental (e.g. local, one-way)
- Mileage terms (e.g. unlimited, flat fee per mile)
- Type of fuel plan (e.g. flat rate fuel charge, fuel purchase option)
- Additional/optional charges (e.g. additional driver, underage driver, late charge)

It is important to note that these pricing variables may not be exhaustive and/or universally applied.

Constant quality measurement issues

The characteristics of the rental transaction are held fixed allowing constant quality to be maintained over time.

3.2.3.3 Sample Unit Identification and Frame and Sampling Issues

The sample unit is either the headquarters of a national car rental company, a franchise, or independent rental company. The frame was the QCEW, which was stratified by type of

company. Identifying the national companies was not problematic. However, it was somewhat difficult to isolate the actual number of franchises.

3.3 Health Services

3.3.1 Hospitals

3.3.1.1 Output Measurement

Output definition

The measurable output of the hospital industry is the total service package that a patient receives during their entire length of stay (i.e. admission to discharge). For an inpatient, these services may include room, board, medical supplies, drug treatments, medical & surgical procedures, and/or ancillary services. As for an outpatient, there would not be an actual admission to the hospital (i.e. length of stay is zero), therefore, the services an outpatient would receive would occur on a single visit to the hospital. Outpatient services may include treatments for minor injuries, minor surgical procedures, and/or ancillary services.

Hospital services are not consumed in a piecemeal fashion. Each piece is part of the total service bundle. Thus, our unit of measure is the entire length of stay. The hospital's output will be represented by the entire content of a patient's bill. Any items and/or services that are included on the patient bill are treated as part of the output and will be included in our repricing effort.

Pricing methodologies

The PPI program is interested in what a hospital actually receives (reimbursement) for their services not what they charge (price). The PPI's primary purpose is to capture reimbursement as the net transaction price. For the hospital industry, the PPI uses the word 'price' synonymously with the term reimbursement. The terms will be used interchangeably throughout this document. It should be understood that when the term "price" is used, what is actually being referred to is reimbursement.

The major types of reimbursement for hospitals are Diagnosis Related Group (DRG) case rates, per diem rates, and total billed charges (or a percentage of TBC). Capitation is currently not very prevalent among hospital reimbursement. We will collect a per member per month rate as well as the copayment amount and the number of visits per month (to measure utilization) for these contracts. In these cases, we will be repricing a population rather than a single patient treatment.

The simplest reimbursement method for a hospital is total billed charges. But it is also the least common. Most of the time, a percentage discount on total billed charges is paid. This percentage is negotiated between the hospital and the insurance provider before services are rendered and is often in effect for a year or more for a given covered population. In markets with heavy managed care penetration this form of reimbursement is not as likely.

Per diem rates are used frequently and are very easy to reprice. This type of reimbursement involves a per day payment for each day of stay in the hospital, regardless of actual charges or costs incurred. This per day rate depends on a number of factors. The two main factors are

number and mix of cases. Many times, multiple sets of per diem rates will be negotiated based on service type (e.g. medical-surgical, obstetrics, intensive care, neonatal intensive care, rehabilitation, etc.).

Originally DRG based reimbursement was for Medicare. It has since spread to the private sector. Today, DRG rates are widely used. There are publications of DRG categories, criteria, outliers, and trim points (i.e. the cost or length of stay that causes the DRG payment to be supplemented or supplanted by another payment mechanism) to enable the plan to negotiate a payment mechanism with the hospital for DRGs based on Medicare rates or in some cases, state regulated rates. Ultimately, the hospital and the insurance plan negotiate a rate (based on whatever criteria they choose) for each DRG they perform in that hospital.

Straight charges are the only exception to the reimbursement methodology. Basically, this is hospitals' list price for the service package provided. However, the actual amount that appears on a patient bill is rarely what a hospital will receive as payment. In some cases, a hospital will receive the list price as its reimbursement. In these instances, this is what we will collect as our net transaction price.

3.3.1.2 Service/Pricing Characteristics

The major price-determining characteristics for hospitals include:

- Diagnosis Related Group, or DRG (inpatients only)
- Principal diagnosis
- Principal procedure
- Type of payer
- Length of stay, or LOS (inpatients only)

These characteristics are the main components of the total service package that a patient receives during their entire length of stay (i.e. admission to discharge). The two most important are the DRG and the type of payer. The DRG is the basis for repricing in general medical and surgical hospitals, whereas the principal diagnosis is used for psychiatric hospitals and most specialty hospitals. The type of payer, depending on whether it is Medicare, Medicaid, private third party, or self-pay, dictates the payment arrangement (type of reimbursement).

Initially, for general hospitals and children's hospitals, random sets of DRGs are pre-selected for collection at each individual hospital. These DRGs are listed on an item assignment sheet (IAS). This lists the unique combination of DRGs to be collected at each hospital. The IAS will also list several alternative DRGs that can be used if one of the targeted DRGs is not available at a particular hospital. Within each DRG, there are ICD-9-CM codes that pertain to diagnoses and procedures; this is where the principal diagnosis and principal procedure fall. The principal diagnosis refers to the condition that is chiefly responsible for causing the admission of the patient to the hospital for care. The principal procedure is the procedure that was performed for definitive treatment rather than one performed for diagnostic or exploratory purposes or was necessary to take care of a complication.

Constant quality measurement issues

A concern in pricing hospitals is the change in treatments over time. Improvements in medical technology, new procedures, or new drugs can impact treatments in terms of the length of hospital stay, the types or amount of drugs administered, or treatment outcome. It is difficult to

determine when such a change is a change in quality or a pure price change. A price change associated with a change in treatment that results in the same outcome would be treated as a pure price change. However, if a new treatment is developed with substantial differences in outcome, a quality adjustment may be warranted. An example is replacing a surgical treatment with a drug treatment that produces a different outcome.

Currently, the PPI is researching potential quality adjustment methods similar to those described below for nursing care facilities.

3.3.1.3 Sample Unit Identification and Frame and Sampling Issues

The types of hospitals sampled include general medical and surgical, psychiatric, and specialty hospitals. The sample unit is a single hospital, not a hospital system. Hospitals within a system were given separate chances of selection.

The source for the frame for hospitals was the American Hospital Association. The data is from the 1998 release of the Healthcare QuickDisc database, which uses data from the 1997 Annual Survey of Hospitals.

According to the industry definition, all federal hospitals should be included in these industries. However, since no measurable economic transaction occurs in these hospitals, all federal hospitals have been excluded from the frame. Hospital units of institutions have also been excluded from the frame because they are part of other industries.

Revenue was not available at the hospital level, so admissions were chosen as the measure of size for all three industries. It is believed that total facility expenses are a good proxy for revenue, as a majority of hospitals are non-profit. However, the response rate for this variable was only 78 percent. Since total facility expense is highly correlated with admissions, and the response rate for admissions was 86 percent, it was chosen as the measure of size. Because a value for total beds was available for each record, the missing admission values were estimated using average admissions per bed and number of beds.

3.3.2 Nursing Care Facilities

3.3.2.1 Output Measurement

Output definition

The primary output for establishments in this industry is defined as all care and services that are provided to the resident by the nursing home. Care is usually classified in three general levels, from minimal nursing care (perhaps just administration of medication) to more intense nursing services, such as round-the-clock monitoring. Medical care typically consists of nursing care; physical, speech or occupational therapy; drugs; blood; medical supplies such as splints or casts; and the use of durable medical equipment. Other incidental medical services would include dental, social, dietary, or psychiatric services. Also included in the output would be the cost of meals, and other "convenience items" such as use of the telephone, laundry services, newspaper, or television.

Nursing homes may also provide social services such as social work services, recreational activities, beautician or barber services, and chapel services. Nursing homes may contract out

for physical therapy, occupational therapy, oxygen supply, beautician services, etc. Any services provided by and reimbursed to specialists on contract with the facility are not to be included in primary services. Most nursing homes have contracts with outside pharmacies to supply medications. However, if the establishment does operate a pharmacy, the pharmacy activity is not included as output.

Nursing homes typically bill for services on a per diem or daily rate basis. Depending on the facility, different items are included in the per diem charge. For example, some facilities may include the price of a private television in the per diem rate, while others may bill for it separately. The items that may be billed separately can range from specialized nursing care (such as hand feeding), to basic care like a visit by the beautician. A private room may have a different per diem rate than a semi-private room. 24-hour on-call service from a physician may elicit an additional fee or may be included in the per diem rate. However, if the resident's physician conducts an examination or other medical service at the nursing home, the physician will bill for this service on his/her own. This would represent revenue for this industry.

Pricing methodologies

The type of price in a nursing home will be collected on the bill. That bill may be for the entire episode within the nursing home, or an interim bill of monthly services (for those patients needing continuing care). In either case, the bill will contain their daily rate applied to their number of days in the facility, and additional charges not included in the daily rate. The daily rate is called the per diem rate. While this is the industry standard, items and services included in the per diem rate can vary by facility and payer type.

Medicare, Medicaid, and private insurance reimburse using the per diem structure. However, it is possible that the rate charged to out-of-pocket payers could be a measure other than daily (for example: an hourly rate). In addition, the facility may have a billing period that is weekly rather than monthly. The price that represents the entire stay or the interim billing period, whichever is shorter, is collected to measure the output of this industry. In the case that an interim billing period is a week, the per diem rate times the number of days in the facility and any additional line item charges for that week would be collected. As with all rates, the services and items that are included in the rate, as well as services and items that are not included, must be provided.

When information is collected at the corporate setting, patient bills may not be accessible, and collection may be limited to only the per diem rate. Other acceptable prices include an hourly or monthly rate, total billed charges, or an estimated net price. Current average prices are not acceptable because they cannot represent one unique patient and treatment path.

3.3.2.2 Service/Pricing Characteristics

The nursing home industry has its service lines best defined by the payer of services. The two major types of payers are public payers and private payers.

Public payers can be separated into two main categories, Medicare and Medicaid. Medicare is a federally funded program for persons over age 65. It pays for short stay visits in a nursing home where the patient receives rehabilitation and expects full recovery and discharge. Medicare does not pay for nursing home residents who do not expect discharge from the facility. Medicaid is a State administered, jointly funded (Federal and State) program for the indigent. Medicaid is designed to pay for the care of long-term patients (those not expected to recover

enough to leave the facility) that have exhausted their personal income. There are other public payers that represent a small portion of the industry.

Private payers can be separated into two main categories, private insurance and out-of-pocket. When the patient has private insurance, or long-term-care (LTC) insurance, it pays a portion of their nursing home expenses. This type of insurance is becoming more common, since health care costs have risen. Out-of-pocket payers, as the name describes, are the patients or families of the patients making direct payment for the care. Philanthropic or charitable payers are other types of private payers, but represent very small portions of the industry.

Constant quality measurement issues

The PPI Program currently adjusts items in the nursing care facilities industry based on one of the quality indicators published by the Department of Health and Human Services for that industry. The quality indicator measures changes in nurse staffing levels for each nursing home. A positive correlation between nurse staffing levels and the quality of services provided by nursing homes was demonstrated before any steps were taken to quality adjust the nursing care facilities index. While nurse staffing is only one of many complex factors that impact the quality of nursing care facilities services, analyses by the Institute of Medicine (IOM), the Centers for Medicare and Medicaid Services (CMS), and the General Accounting Office (GAO) point to nurse staffing as a key factor in determining the quality of nursing care facilities care. A dollar value can be assigned to changes in nurse staffing levels using BLS wage data.

3.3.2.3 Sample Unit Identification and Frame and Sampling Issues

An individual nursing care facility is the sample unit for this industry. The QCEW was used as the sampling frame.

3.3.3 Offices of Physicians

3.3.3.1 Output Measurement

Output definition

The output of this industry is the medical services and treatments provided by a physician. When the buyer is purchasing the services one at a time, the buyer reimburses the provider on a fee-for-service basis. The output of this industry, in a fee-for-service setting, begins when a patient enters the establishment, and ends once medical services are provided. If a buyer pre-purchases care for a group of persons the type of payment is called capitation. The output of this industry, on a capitated basis, begins when a person chooses to be a member of a physician's population, and continues until the person is no longer a member, and is no longer the treatment responsibility of the physician.

Pricing methodologies

There are currently three different types of reimbursement for providers (i.e. prices). They are total billed charges (i.e. fee-for-service), discounted fee-for-service, and the capitated rate. Discounted fee-for-service arrangements can be presented as the contracted reimbursement or the expected reimbursement (anticipating a later payment). Fee-for-service, as the name suggests, is a reimbursement for the charges of services that have already been rendered. This

method of reimbursement is associated with indemnity insurance including Blue Cross/Blue Shield. Discounted fee-for-service falls under the same definition with a contracted reduction of the original charges. This type of discount is either a percentage reduction of the charges or a negotiated fee. These types of contracted arrangements are usually associated with Medicare Fee Schedule payments or Managed Care Organizations. When the reimbursement to the physician does not involve any type of third party payer, total billed charges will be the type of price with self-pay being the type of payer. Finally, capitation is the prepayment, by the Managed Care Organization (typically an HMO), for the average monthly services of a group of plan members (population). Capitation is the pre-purchase of a month's worth of health provider services.

A net transaction price will be the preferred price to collect for all methods of reimbursement except capitation. That is, the actual billed price on the patient's bill less any discounts offered to that patient. A net transaction price for this industry may be a combination of many fees incurred during a patient's visit. Most often, a payer will have negotiated a fee schedule (which would qualify as a negotiated contract price) with the physician or the clinic and the fee on that schedule for the service provided will be level of reimbursement or price for that service. If the physician has agreed to accept this fee as payment in full, then that is our net transaction price. In this case, some type of contract identifier will be used so that the same contract can be repriced over time.

In the case of fee-for-service arrangements, the actual billed charges will be the net transaction price. The total billed charges listed on a patient's bill acts as the list price. This price is acceptable if the patient is responsible for payment (no other payers, discounts, or other fees apply, i.e. self-pay), or the insurance, which has no contractually negotiated discounts, pays its portion, with the remainder balance billed to the patient. In either way the total charges are not discounted.

Global fees are also a type of price or reimbursement that may be encountered. These types of fees, generally surgical, include services from some time before the procedure itself is performed until some time afterward.

Capitation, as a type of global fee, is a prepayment for services instead of a reimbursement. The price that will be collected for capitation will be the per member per month (PMPM) rate. This price will represent a unit of the total transaction (which can change due to the population size). In addition, the copayment per visit will be captured and factored into the price by multiplying it by the number of monthly visits at the time of collection divided by the member population. This equation for the copayment surcharge is shown below.

$$\text{Copayment surcharge} = \frac{\text{Copayment per visit} \times \text{Number of monthly visits}}{\text{Number of members in plan associated with practice}}$$

Other elements that help to explain the price are the professional and technical components (i.e. especially in radiology and anatomic pathology procedures). The technical component is for the actual procedure that was done and the professional component is a fee charged by the physician.

Outpatient care facilities especially, may provide prices that include both a professional fee for the actual treatment and a facility charge. Again, these should be added to produce the net transaction price.

Average prices for physician services are not acceptable because an average could incorporate many different types of payers. Also, an average price in an industry where no two services are alike (because every patient is inherently different and, in most cases, services provided to those patients will never be exactly alike) would not be repriceable because the service bundle would change every time a price was reported.

3.3.3.2 Service/Pricing Characteristics

Initially, a patient's bill for treatment is collected and items included in that bill are held constant over time. The amount of care may be a complete treatment, including more than one office visit, diagnosis, or procedure. In the case of a treatment whose price is a global fee, all procedures and treatments must be included in the fee (i.e. an initial office visit, a diagnosis, a surgical procedure, and a follow up visit could all be included in the fee). All of the services involved must be listed if a global fee is listed as the net transaction price. In addition, the treatment being collected does not necessarily have to be performed on the premises of the collected establishment. Some doctors perform surgery in places other than the establishment with which they are financially affiliated (e.g. hospital). Some may even visit a patient in a nursing home facility. Revenues generated in this manner will be included in the total revenue of the collected establishment.

In the case of a fee-for-service arrangement, both the patient's bill (collection of all of the individual line items included on a patient's bill even if we cannot obtain a copy of the actual bill) for the treatment he or she received and any other fees that were incurred during the patient's treatment will be collected. One example of this type of fee would be a facility charge for the use of the facilities within an ambulatory care center. In order to accurately measure what was actually done to the patient, all procedure (Current Procedural Terminology 4th edition - CPT-4) and diagnosis (International Classification of Diseases 9th revision - ICD-9) codes that apply to the patient will also be collected.

For capitation, the contract (which describes the expected utilization using specific procedure codes and population characteristics) will be collected as a single global fee. The capitated fee (plus any additional fees, copayments, which might go along with a particular treatment) will represent the revenue generated in offices and clinics of doctors of medicine.

Constant quality measurement issues

As stated previously, a patient's bill is collected and held constant over time. With all types of health services, there are inherent problems with this methodology. First, treatment is never the same between two patients with the same condition. However, the standardization of procedural terminology allows for consistency of billed services. Therefore, substitutions should only be necessary if new procedures replace current procedures to increase effectiveness. This type of adjustment is not likely.

Substitutions are more likely to occur when a particular insurance or health plan is no longer accepted by the provider. This requires a link to show no change to account for differences in the prices of the different health plans. However, during such substitutions it is recommended to substitute using a health plan with the same method of reimbursement. Otherwise method of reimbursement should remain constant.

Changes across payer type should not be common. In fact, they should only occur when a contract is completely terminated. For instance, a physician may decide to stop accepting

Medicaid patients so an attempt would be made to collect the same treatment with a different type of payer.

According to the Health Insurance Association of America (HIAA), payer contract changes occur approximately once a year. These changes are most often the result of private insurance companies' annual renegotiations. In addition, Medicare updates its fee schedule every January.

Although the specialty of the physician is a price determining characteristic, the specialty of the physician is unlikely to change. Physicians rarely change specialties and they also rarely change geographic location. Because of this, these two price determining characteristics should not be the cause of service substitution or quality adjustment. In fact, the Medicare Fee Schedule includes no differences in the fee schedule across most specialties.

The health outcomes of physician's patients will not be assessed. For the BLS, "quality" will refer only to the (producer) cost of providing the selected service bundle to the patient. Differences in quality and competence among physicians are extremely difficult (if not impossible) to measure accurately, so these measures will also not be included in the index computation.

3.3.3.3 Sample Unit Identification and Frame and Sampling Issues

The sample unit is a solo or group practice.

The AMA Physician's Masterfile and the Group Practice File were combined as the sample frame. These files were chosen because they are more complete than the QCEW, and they include number of physicians, which is a better proxy for revenue than is total employment. In addition, each record identifies the primary specialty of the solo physician practice or group practice.

The Masterfile, consisting of solo practices, was explicitly stratified into the eight single specialty categories. In addition, a stratum was formed to include physician records for which a primary specialty was not identified.

The Group Practice File was explicitly stratified into seven single specialty and one multispecialty categories. Doctors of Osteopathy were not available in the Group Practice File. As with the Masterfile, an additional stratum was created for group practice records with no primary single specialty indicated. In addition, a stratum was formed for records for which the specialty composition was not indicated (i.e., single or multispecialty).

3.4 Retail and Wholesale Trade

3.4.1 Retail Trade

3.4.1.1 Output Measurement

Output definition

The primary output of retail trade industries is the provision of the marketing functions necessary to allow consumers access to purchase various goods. In contrast to wholesale trade

industries, customers are able to make unit purchases of items (i.e. not required to buy in bulk), that are generally packaged in some manner. Basic functions involved in the marketing process include standardization or grading, storage and transportation, buying, risk bearing, financing, selling and product planning. The selling function is probably the most obvious one seen by the consumer. Selling includes the pricing of the product and the presentation. Presentation includes activities such as tagging, packaging, display, space allocation, advertising, and promotion.

Retail establishments are classified into a specific industry by kind of business according to the principal lines of commodities sold (groceries, hardware, etc.), or the usual trade designation (drug store, cigar store, etc.). Once the industry classification is determined for an establishment, the sale of any margin product (goods bought by the retail store and resold to a household consumer) is considered primary production to the establishment. This is because industry classification is determined by type of store and the exact same product can be found in establishments classified in a number of retail industries. This is an exception to the general rule of classification of products found in the PPI. However, since what is being measured in retail trade industries is the service in delivering these goods to the public, this procedure is appropriate. A retail store may also sell goods to businesses, but as long as an establishment markets itself to the general public, it is classified in retail trade. This guideline holds even if the majority of the establishment's sales receipts are from wholesale transactions. It is generally recognized that if a store considers itself a retail establishment, then the retail activity carries over to intermediate users as well as final consumers. In addition, services incidental to the sale of goods (e.g. delivery of groceries) are considered primary production of the establishment.

Pricing methodologies

The type of price collected in retail trade industries is a margin price (with the exception noted below). The margin price is calculated by taking the selling price and subtracting the purchase price of the last shipment received (less all rebates and allowances) for a specific good. National income accounting conventions also define the output of retail trade as the margin. The Bureau of Economic Analysis defines this as the selling price of a good in the retail market less the cost of replacing the good in the store's stock. This definition is difficult to operationalize because it requires collecting the replacement cost of the item. It is far easier to use a Last In First Out (LIFO) accounting methodology, that is, using the last shipment received for pricing the acquisition cost of the sold item.

Two approaches have been used in the margin pricing methodology. The preferred approach is to collect the average margin value of a relatively homogeneous grouping of products. In this case, while store characteristics may better explain changes in margin, the concern with this approach is that the grouping may be affected by product mix. The other approach is to collect the margin price of a unique product. This "sample of goods" approach is used to represent the output of the entire store. One concern with this approach is that the marketing of the selected sample of goods may not always be representative of the marketing of other goods sold in the store. Using this approach, changes in store characteristics may not explain changes in margin for the selected sample of products

An exception to the margin price methodology occurs in some limited cases. Certain transactions are priced using the total retail sale price of the good sold. This is mostly due to the large value added to the product in preparation for sale or a fee for a service where the customer is clearly paying for something incidental to the sale of goods. Examples include

sales from in-store restaurants run by the retail establishment, alterations of purchased goods, and delivery charges incidental to the purchase of a good.

3.4.1.2 Service/Pricing Characteristics

There are a variety of price determining components that are applicable in the retail trade industries. They include the type of product, size/weight, and often, material composition. In addition store characteristics associated with providing the service are also collected or assigned to sample units based on secondary source data. These can include characteristics such as the store area, number of available choices of products, the existence of scanners for processing customers and age of scanner software, and the hours of operation.

Constant quality measurement issues

A fundamental issue in pricing retail trade industries is quality adjusting changes in store characteristics. If store characteristics change, all items being priced from that location have to be adjusted to account for changes in the service provided that are related to a change in store characteristics. Hedonic models should be able to quantify the correlation that exists between store margins and store characteristics.

Store characteristics collected by BLS include:

- Total store area
- Selling area
- Checkout scanners
- Age of scanner software
- Number of stock keeping units
- Number of full-time-equivalent employees
- Type and location of store
- Hours of operation
- Total sales volume
- Time since last renovation

Although the above characteristics are often readily available from sample units, a transformation of data elements may increase the precision of measure in hedonic models. An example is a ratio of checkouts to store traffic (more checkouts per customer indicate better or faster service all else equal).

Other ratios to include:

- Checkouts/sales
- Employees/sales
- Stock keeping units/store area
- Employees/store area
- Checkouts/store area

A retail store is considered to be providing the same service activity when slight modifications are made to the product.

3.4.1.3 Sample Unit Identification and Frame and Sampling Issues

First stage sampling (sample unit selection) is based on sales data which is most often available for large retail trade industries or when sales data are not available, on employment size which is most often the case for small industries. Both measures are used as a proxy for margin revenue in a probability-proportionate-to size sample. The sample unit is the headquarters location.

Second stage sampling (item selection) is based on margin dollars.

3.4.2 Wholesale Trade

3.4.2.1 Output Measurement

Output definition

Wholesale output can be defined as the efficient transfer of goods from the manufacturer to another party for the strict intention of resale. Sample units that produce this output have two primary functions including 1/ the creation of utility (or efficiency) and 2/ a channeling function. The utility function mentioned above has several parts to it including the creation of time and place utility and making products available when and where customers are likely to find them. Wholesalers also create possession utility, allowing their customers to take ownership of products as needed. Finally, wholesalers also provide information utility, providing details about the products that they sell.

The above definition also includes a channeling component, which is not as easy to describe. The channeling function has many parts to it whereby the wholesaler performs one or more of the following functions:

- *Selling and promoting* - wholesalers' sales force help manufacturers reach small customers at a low cost. In this channeling function, the wholesaler has more contacts and is more often trusted by the buyer than the distant manufacturer.
- *Buying and assortment building* - wholesalers can select items and build assortments needed by their customers, thereby providing a "one stop shop" for a buyer.
- *Bulk breaking* - wholesalers save their customers money by buying in carloads and breaking these large lots into smaller quantities.
- *Warehousing* - wholesalers hold inventory, thereby reducing the inventory costs and risks of suppliers and customers.
- *Transportation* - wholesalers typically provide quicker delivery to buyers because they are closer to the buyers than the manufacturer.
- *Risk bearing* - wholesalers absorb risk by taking title and bearing the cost of theft, damage, spoilage, and obsolescence.
- *Market Information* - wholesalers give information to suppliers and customers about competition, new products, and price developments.

- *Management services and advice* - wholesalers often help customers train their sales clerks, improve store layouts, and displays, and set up accounting and inventory control systems.

Wholesalers also may perform installation services, equipment repair work, as well as warranty repair work for the manufacturer. All of these services are not considered to be part of this industry, are generally not bundled with the wholesaling function and if selected during disaggregation, should be collected as an other receipt.

Pricing methodologies

Margin prices are the most prevalent type of price for merchant wholesalers. Dollar value of commission based on a percent of sales is the most prevalent type of price for agents and brokers and for manufacturers' sales and branch offices that do not take title to a good.

Margin prices (merchant wholesalers)

The type of price collected in goods merchant wholesale is typically an unlagged average margin price. Margin is a combination of two different parts; one is the incoming acquisition price from the manufacturer and the other is the selling price to the next level buyer; the difference between these two prices is called the gross margin. The first part of the price, the acquisition price, represents how much the wholesaler paid for an item from the supplier. This acquisition price represents the direct cost of the wholesaled goods and should exclude freight whenever possible (freight should be FOB or if delivered based on a minimum). The price should include point-of-sale incentives (taken as discounts) that may be applied to the merchandise whenever possible.

There are five different margin prices in this industry. They are prioritized below.

1. Average gross margin per unit for a comparable customer class and/or supplier class for all sales within a comparable product line.
2. Average gross margin per unit for all customers and/or suppliers for a comparable product line.
3. Average gross margin per unit for a particular customer class and/or supplier class for all sales of a particular product.
4. Average gross margin per unit for all customers and/or suppliers for all sales of a particular product.
5. Gross margin for a single specific product transaction.

Agents and brokers and manufacturers' sales or branch offices that take title to a good can also have margin price transactions.

Dollar value of commission prices (manufacturers' sales and branch offices)

Agents and brokers and manufacturer's sales and branch offices typically receive a commission fee for their service. The commission is the amount of money that the sales office receives (not an individual agent) for performing the service. Five percent of the per unit sales prices is a

typical sales office commission percentage, although this can vary. Since revenue figures are typically recorded in terms of sales dollars for this industry, the total dollar value of commissions is a result of multiplying total sales dollars by the average commission percentage.

There are also five different types of dollar value of commission prices prioritized below.

1. Average dollar value of commission per unit for a comparable customer class for all sales within a comparable product line.
2. Average dollar value of commission per unit for all customers for a comparable product line.
3. Average dollar value of commission per unit for a particular customer class for all sales of a particular product.
4. Average dollar value of commission per unit for all customers for all sales of a particular product.
5. Dollar value of commission for a single specific product transaction.

Merchant wholesalers, agents and brokers, and manufacturers' sales and branch offices do not typically price their services based on a flat fee commission price. However, in the event that they do, a *flat fee for a single specific transaction* is collected.

3.4.2.2 Service/Pricing Characteristics

There are a variety of price-determining components that are applicable in all of the wholesale trade industries and they include:

- *Product Information* - The type of product purchased is one of the largest price determining components. Products differ by cost, size, color, as well as many other category differences. Products also differ by demand, which can be a large price determining component when similar products are sold. Products also might differ by the amount of additional services that are added to the product while on the premises of the wholesaler. They are generally considered incidental to the wholesaling operation and do not change the function of the product.
- *Buyer Sales Information/ Supply Source Incentive Information* -This price-determining component is also important on both ends of a wholesaler's transactions because price breaks from supplier to wholesaler and from wholesaler to the next level buyer are frequently based on volume. Consequently it is important to identify the sales volume where these price breaks occur.

Constant quality measurement issues

By pricing average margins, constant quality is maintained and no further adjustments are necessary.

3.4.2.3 Sample Unit Identification and Frame and Sampling Issues

The QCEW was used to sample these industries. For first-stage sampling, the three-digit NAICS level was used due to problems with the NAICS treatment of wholesale trade. Second-stage sampling was based on margin dollars.

3.5 Information and Communication

3.5.1 Newspaper and Periodical Publishing

3.5.1.1 Output Measurement

Output definition

The output of the newspaper publishing is the publication of intellectual content in the form of a newspaper. A newspaper is a regularly issued publication printed on newsprint and containing news, commentary, feature articles, photographs, and/or advertising of interest to the general public

The primary output of the periodical publishers is intellectual content delivered in set intervals at least once a year. The most common formats for periodicals are magazines, newsletters, abstracts, and journals, either in hard copy form or online.

Pricing methodologies

The output of both industries can be measured in two ways; through the direct sale of the publication through subscriptions and single copy sales, and indirectly through the sale of space in the periodical to advertisers who want to reach the audience of readers.

Subscriptions

The preferred price for subscriptions is an average price. The item selected should reflect a specific duration of subscription (such as 52 week, 26 week, 13 week) and frequency of delivery (daily, weekly, etc.). The revenue for all newly transacted subscriptions of the selected duration and frequency will be divided by the number of these units delivered. This number of units delivered is not necessarily the same as the number of subscriptions sold because it can include free and/or promotional copies.

If it is not possible to get an average as stated above, it is acceptable to collect an average percent discount if this figure is tracked by the respondent. The average discount is calculated by comparing the actual revenue received for subscription transactions to the revenue that would have been received if every subscription was sold at list price. If this is selected, the average discount will be applied to the list price for the subscription chosen and the price will still be noted as an average price.

If average prices cannot be provided at all, it is acceptable to collect an actual transaction price for a single subscription.

Single copy sales

An estimated transaction price is the only price for a single-copy sale. Each single-copy sale transaction represents a unique deal with a specific wholesaler or distributor. One such transaction should be selected. In the ensuing months, the features of the contract should remain fixed, and the respondent should estimate the price that would be received if a similar deal were to be transacted in the current month.

Advertising

The preferred price for virtually all advertising is an average price. This average price should always refer to the ads of a specific type and size that appeared in the publication during the pricing period. Depending on the respondent's preference, the pricing period may be the most recent week or another defined period. Advertising average prices may be collected with an average discount, or by dividing the revenue collected from the sale of all ads of the specified type and size by the number of these ads that were published during the defined time period. The average discount is calculated by comparing the actual revenue received for sales of advertisements of the selected type and size to the revenue that would have been received if each of these advertisements were sold at the listed rate card price. The average discount should be applied to the rate card price to get the final price to be tracked.

Lagged average prices are not acceptable. The collected average should refer to ads published during the pricing month. If average prices cannot be provided at all, it is acceptable to collect an actual transaction price.

For newspapers insert ads, the preferred price is an actual transaction price.

3.5.1.2 Service/Pricing Characteristics

The two primary services to be priced are circulation and advertising.

Circulation

Circulation can be classified into two categories, subscriptions and single-copy sales.

Subscription prices depend on the frequency of delivery (e.g. daily, daily and Sunday, monthly, quarterly) and the duration of the subscription (13 weeks, 26 weeks, 52 weeks).

For periodicals, the term 'single-copy sales' is misleading because virtually all publisher revenues in this area do not derive from sales of single issues. For publishers, this service area refers instead to the publishers' sale of bulk amount of periodicals to wholesalers and distributors who resell these items to retailers (primarily newsstands, bookstores, and grocery stores). In some cases, a publisher may bypass these middlemen and sell their products directly to the retailers, but this is fairly uncommon.

Advertising

Newspaper advertisements account can be classified into four categories:

- *Display ads* – These ads are generally purchased by companies rather than individuals. Their price is determined based on the amount of space in column inches, the type of

graphics, and the number of colors used.

- *Classified ads* - These ads appear in smaller typeface and are frequently called the “want ads”. These ads are purchased by companies and individuals. Color is generally not an option when printing classified ads, so the size of the ad is the main price determining characteristic. The sizes of these ads are measured in terms of their line count.
- *Insert ads* - These ads are printed apart from the regular press run and then inserted among the regular newspaper sections. They are purchased mostly by national chain stores and the price is determined by the number of pages, the quality of the paper, the quality of the graphics, and the number of colors used in printing.
- *Internet ads* - These ads appear in the online version of the newspaper only. They are generally purchased by companies rather than individuals. Their price is determined based on the height and width of the ad (typically measured in pixels), the type of graphics/fonts, display time, and the position of the ad on the screen (i.e. top banner, side banner, etc.).

Constant quality measurement issues

Quality adjustment may be needed for subscription transactions when the frequency of delivery changes. Quality adjustment may also be necessary for advertising transactions when there is a large change in publication frequency or circulation.

3.5.1.3 Sample Unit Identification and Frame and Sampling Issues

Newspaper Publishers

Newspaper publishers take several different forms. These establishments may be small local newspapers, regional newspapers or national newspapers. In general, the headquarters of the newspaper is where the records are available.

Periodical Publishers

The sample unit for periodical publishers is an individual periodical title, and not the entirety of activities of the publisher.

This sample was selected through a two-stage sampling process. In the first stage, publishing companies were selected from the QCEW. Wages were used as the size measure in this first stage. Each unit was assigned a number of magazine titles to be subsampled. The largest units were assigned multiple titles, but the majority of companies were assigned a single title only. These titles are the sample units and were selected from a secondary frame source, Mediafinder.

We chose to sample by title because it would be very difficult to accurately represent all of the activities of an entire publishing company in one sample unit with a reasonable number of items. The two-stage process of selecting titles was chosen because the alternative frame proved to be unreliable in providing consistent, comparable circulation figures across companies.

3.5.2 Software Publishing

3.5.2.1 Output Measurement

Output definition

The primary output of this industry is the provision of computer software and related services to ensure the successful use of the software.

Software publishers sell software licenses which grant customers the right to use programs designed and developed by the software publisher. These programs are standardized software solutions; each customer purchasing the software receives a program providing the same features and functionality. This is in contrast to custom software in which unique programs are developed and designed to meet the individual needs of each client. Along with software licenses, software publishers also provide related services for their software products such as technical support, product updates, software maintenance programs, consulting, software implementation services, and training services.

Software may be designed for use on personal computers (PCs), servers, cell phones, personal digital assistants (PDAs), game consoles, and a variety of other computing devices.

Software falls into two main categories based on how it is transacted. Mass produced software marketed to the general public is referred to in this study as “packaged software”. Software that is designed for business and institutional clients is typically server based, and is referred to in this study as “enterprise software”.

A software model gaining more attention in recent years is open source. Unlike traditional software licenses, open source software source code can be copied, altered, and redistributed free of charge. Open source software vendors typically distribute free software programs to their customers and earn revenues by providing support services, such as implementation or consulting, for their software.

Software applications accessed over the Internet from servers not located at the clients’ site as well as those pre-installed on a hardware device are not primary to this industry.

Pricing methodologies

The method of collecting prices depends on whether the software is considered enterprise software or packaged software.

Enterprise software

Enterprise software licenses are typically sold to businesses, institutions, or value-added resellers and are not mass marketed to the general public. The enterprise software category also includes flat fee site licensing agreements. The preferred price is an average price calculated by dividing the total revenues earned from the sale of a particular software product sold to a particular client type (end user, retailer, wholesaler/distributor, or OEM) by the total number of these licenses sold to these clients within a specified period.

Each month or quarter, many enterprise software publishers calculate an average percentage by which their final selling prices fall short of the list prices for each of their products. This calculation is known as the average discount off the list price. For enterprise software transactions, the average price will be calculated by applying this average discount to the list price of a selected transaction.

The average discount should be calculated based on all transactions of the selected software product which occurred during a specified time period. However, if a firm cannot provide this, it is acceptable to collect an average discount that is based on all transactions for the type of software that matches the one that has been selected. For example, if a transaction of Database software product A is selected, an average discount based on all Database software product A transactions should be applied to the list price. However, if the respondent only maintains average discount data for all of their database product transactions together (and not one for product A transactions only) it is acceptable to apply this average discount to the list price of the selected transaction as well.

Virtually all enterprise software transactions require the purchase of first year maintenance with the purchase of the software license. As a result, the collected transaction should consist of both the license prices (including all client and server licenses sold as part of the transaction) and the price of first year maintenance, even if the purchase of first year maintenance is optional. This is because virtually all enterprise software licenses are offered in conjunction with first year maintenance for one single negotiated fee.

If an average price cannot be collected, it is acceptable to collect an estimated transaction price for enterprise software transactions. A typical, recent enterprise software transaction will be chosen, and each month during repricing the respondent will estimate the selling price for that particular transaction to a similar client. The collected transaction should consist of all client and server license prices and the price of first year maintenance.

Packaged software

Packaged software licenses consist of mass produced software marketed to the general public. Packaged software can be purchased at retail locations or through the Internet via online stores. Buyers of packaged software include households, computer hardware manufacturers (OEMs), retailers, and distributors or wholesalers. Packaged software transactions may involve the purchase of one license by a household buyer or may involve the purchase of hundreds of individually priced licenses by a retailer or distributor.

The preferred price is an average price calculated by dividing the total revenues earned from the sale of a particular software product sold to a particular client type (end user, retailer, wholesaler/distributor, or OEM) by the total number of these licenses sold to these clients within a specified period.

If an average price cannot be collected for packaged software, it is acceptable to collect an actual transaction price for the sale of an individual license to a particular client type as long as the software publisher does not negotiate separate prices for separate clients of the same type (i.e. all retailers are offered the same per unit price). If the software publisher offers volume discounting in which the price per license decreases as the quantity of licenses increases, the price reported each month should be the per license price for a specified quantity of licenses sold. If software publishers negotiate separate prices with different clients of the same type, an estimated transaction price should be collected. A recent transaction which is representative of

the establishment's business should be chosen. Each month during repricing, the respondent will estimate the per license price for the chosen transaction if a similar client were to purchase the same number of licenses.

Renewed software maintenance prices

Since the price of first year maintenance will always be collected with the price of enterprise license agreements, renewed maintenance agreements will be allowed a separate chance of selection. These transactions will be collected with an estimated transaction price.

Maintenance is charged as a fixed percentage of the initial license price. The price of renewed maintenance will always be tied to the price of the license at the time it was initially transacted. Over time, the price of renewed maintenance transactions should move in the same direction as the price of the firm's license sales for any given software product. This will be lagged, however, with the prices of recent renewed maintenance transactions based on the license prices for the products in the preceding years.

For these transactions, a typical, recently renewed maintenance transaction should be selected. The product configuration (i.e. number of client and server licenses) and the number of years since the initial license sale will be noted. During repricing, the respondent will estimate the price of renewed maintenance in the current month for the specified licensing configuration purchased a specified number of years ago. For example, if the selected transaction is for a renewed maintenance agreement for a license purchased 2 years ago, in July 2005 the respondent will estimate the price of renewed maintenance based on the license sale prices in July 2003. In August 2005, the respondent will estimate the price based on license sale prices in August 2003.

Prices for other services related to software

Other software related services, such as technical support, consulting, and training, will be collected with the price of the entire engagement, or the entire term of service for any given project. The price will typically be expressed as the sum of the dollar values for each billed hour of time that a software publisher's employees worked on the project. In future months, the respondent will provide an *estimated transaction price* of what would be charged if they were to offer the same type of service to a similar client. If the responding firm has specific service offerings that they provide repeatedly, such as regular training classes or standard technical support offerings for packaged software, then the respondent may provide an *actual transaction price* based on the most recent sale of the service offering.

3.5.2.2 Service/Pricing Characteristics

System software

The Census Bureau classifies the following types of software as system software: operating systems software, network software, database management software, and development tools and programming languages software.

Operating systems software handles the interface to peripheral hardware, schedules tasks, allocates storage, and presents a default interface to the user when no application program is running. Network software controls, monitors, manages and communicates with operating systems, networks, network services, databases, storage and networked applications in an

integrated and cooperative fashion across a network from a central location. Database management software enables the storage, modification, and extraction of information from a database. Development tools and programming languages software assists in the development and/or authoring of computer programs and supports the professional developer in the design, development, and implementation of a variety of software systems and solutions.

Desktop and portable device application software

Desktop and portable device application software includes software that is often used for home or personal use and usually consists of a single license for use on a single computer, such as a PC, laptop, PDA, or other device. Examples of desktop and portable device application software include word processing software, spreadsheet software, personal finance software, and tax accounting software. This type of software may be purchased by both businesses and households.

Other application software publishing, including utilities software and cross-industry and vertical market enterprise applications

Utilities software runs tasks to maintain and monitor the computer system and its data files. Examples of utility software include virus checkers and screen savers. Cross-industry enterprise application software performs or manages a specific business function or process that is not unique to a particular industry. Examples include general administrative software such as HR software and accounting software. Vertical market enterprise application software performs a wide range of business functions for a specific industry group such as manufacturing, retail, healthcare, or engineering. Both of these latter types of enterprise software are typically server based.

Game Software

Game software is usually purchased by households. It includes software which runs on PCs as well as video game console platforms. Game software includes only the game cartridges or discs. The consoles or devices used to run the cartridges or discs are not classified in this industry.

Technical support, training, and other services related to software publishing

Software publishers provide other primary services to aid in the successful use of their software. These services include technical support, consulting, implementation, and training services. These services are considered primary to the industry only when software publishers offer these services for their own published software.

Software publishers also offer software product updates and maintenance agreements.

Constant quality measurement issues

Software publishers are constantly enhancing their software products with new features and functionality. We currently substitute by direct comparison when the differences between the current and new products are minimal. When there are large changes in functionality, such as the release of a new version, we attempt to approximate the value of the quality change by asking respondents to estimate the development costs associated with the enhancements made to the new version as well as the total number of licenses sold of the previous version. This

gives us a per-unit estimate of the production costs associated with the quality change in the software which we can use to make a price adjustment.

With the rapid technological change in this industry, it is necessary to periodically augment the sample in order to capture revolutionary products. This procedure allows for pricing a better overall mix of current software products, licensing models, and related services offered in the market place.

3.5.2.3 Sample Unit Identification and Frame and Sampling Issues

For virtually all sample units, however, the sample unit will refer to the operations of the entire firm. However, in some cases, the sample unit may be the software publishing division of a larger firm that operates across multiple industries, such as computer systems design, and computer hardware manufacturing.

3.5.3 Television Broadcasting

3.5.3.1 Output Measurement

Output definition

The primary output of this industry is the provision of broadcast television signals to an audience, which can be measured through the sale of advertising time during which specified levels of audience are available. Secondary to the provision of broadcast television signals, most television stations, networks, and barter syndicators provide additional levels of support, whether it is production of the advertisement or verification services. These services may include verification that the advertising took place and what audience was delivered during the running of the advertisement.

Pricing methodologies

Television Stations

The preferred price for television advertising sales is an average spot rate for a selected daypart. For example, if the daypart selected is prime time, then the average spot rate received by the local TV station for performing advertising services should be collected. This average should be calculated by dividing total revenue for selected daypart by total number of spots (local spots for local advertising and national spots for national advertising) sold for that daypart. This typically will be referred to as the station's base rate. This average can be calculated for any time period for which the respondent has data (day, week, month, etc.). An alternative method for determining the average rate uses the average cost per point or cost per thousand figures with the corresponding audience data. For example, if the average prime time CPP is \$300 and the station averages an 8 rating for prime time, then the average spot rate is \$2,400 ($\$300 * 8$).

For advertising, a fallback price is the *spot rate*, which is the actual rate received by the station for selling advertising services. In standard PPI pricing terms, this is an actual transaction rate. List prices are appropriate from stations that sell advertising services directly from a list, or rate sheet. These prices are also appropriate when average and actual prices cannot be obtained.

For network television affiliate services, the price is the annual contract amount, or “network compensation,” that local stations receive from networks for carrying the network’s programming.

Networks and Syndicators

The methodology for pricing network advertising is the same as described for local stations.

For programming contracts, syndication companies receive an annual fee. A specific contract is selected initially and the fees are updated when the contract is renewed.

3.5.3.2 Service/Pricing Characteristics

Television Stations

Television station advertising sales include the sale of advertising time to both local and national advertisers. Included in the time devoted for various types of programming that is broadcast by the local television stations is commercial advertising time. Local stations can sell this time in increments, known as spots, to both local and national advertisers. Local advertisers are establishments located within, or close to, the broadcast coverage area of the local station. An example of a local advertiser is an automobile dealership located in the same city as the station. National advertisers are establishments that in addition to conducting business within the coverage area of the station, have operations in other parts of the country as well. For example, automobile manufacturers such as Ford, General Motors, or Honda, are national advertisers.

In addition to revenue received from the sale of advertising time, local stations affiliated with a broadcast network agree to broadcast the network’s programming and commercials in their respective markets. In return for doing so, networks provide compensation and advertising time during its programming to the local stations. In addition, local stations are able to provide programming content to its viewers typically at a lower cost than by acquiring it on its own.

Networks and Syndicators

Like local television stations, networks and national barter syndication companies sell advertising time during their programming to national advertisers. This differs from local TV station advertising because of the mass audience capabilities. Network programming and nationally syndicated programs are capable of reaching the entire television household universe. It is very important for national barter syndicators to clear their programming in as many markets as possible in order to be capable of reaching the largest possible audience. Clearing their programming refers to getting agreements from local TV stations to air the syndicated programming in their market.

Constant quality measurement issues

A primary concern for television advertising is the inconsistency in the viewing audience over time. Seasonal changes in viewing habits and special programming tend to influence the amount of audience available to advertisers. By pricing average advertising rates, constant quality is maintained and no further adjustments are necessary.

3.5.3.3 Sample Unit Identification and Frame and Sampling Issues

The sample unit is an individual local station, network, or syndication company.

The frame used for this industry was the Cable and Television Factbook. This source provided a comprehensive list of local television stations with average weekly circulation as a size measure. Networks and syndicators were not available in this frame. Therefore, a frame was developed using Internet listings. The two frames were treated as separate strata.

3.5.4 Cellular and Other Wireless Telecommunications

3.5.4.1 Output Measurement

Output definition

The primary output of wireless telecommunication is that of placing parties in communication with each other by a radio tower network, which is networked by a wireline telephone network which is transparent to the end-user. The wireless telecommunication interface is characterized by relatively low-power omni-directional transmission between portable transmission devices and transmission towers. Cellular telephone services including traditional cellular service, Personal Communications Service (PCS), and Enhanced Specialized Mobile Radio (ESMR), are defined for this index as being “voice-grade” while speeds greater than 64kbps (kilobytes per second) are considered data. Some in the industry reserve the term “broadband,” which is also considered output of this industry, for speeds greater than 200kbps.

Pricing methodologies

The preferred price to collect for wireless telecommunications is fixed-weight average revenue for providing service to a specific market. Carriers are asked to provide average base period (billed) units of consumption, which will remain fixed during repricing, and average revenue per unit of consumption. The average revenue would be updated monthly, but would be calculated from current period units and revenues.

The price is obtained by computing the average price for each type of charge, multiplying the averages by their respective weights, and then summing the resultant revenues. This is *not* average revenue per line, which is revenue divided by the number of lines. This is revenue per average line, which is average prices multiplied by weighted (averaged) consumption. Also, note that revenue for some plan features, included in the final price, may be an average per line.

The following types of charges are included in the average revenue:

- *Access charge.* The basic charge is the *line charge* (the charge for a number) for cellular and other wireless customers. This is considered a monthly recurring charge.
- *Usage charges based on time.* Cellular usage, both inward (calls received) and outward (calls made), is metered and billed. Billing can be uniform (the first and last minute billed alike) or the initial period can be of a different duration or a different rate or both. At least one carrier charges for an initial period of one minute while additional periods are in increments of one second in duration. At least one carrier does not charge for the first incoming minute. Most carriers offer billing plans that contain an allowance, or “free”

minutes of airtime. There is usually an opposite but indirect relationship between the amount of free airtime and the recurring monthly charge. A high monthly charge guarantees a cash flow to the provider regardless of the vagaries of usage.

In addition to the standard usage charges, other charges, such as roaming minute charges, can be billed. These are charges for calls outside the providers' service area. They are much more expensive per minute, but otherwise they are treated the same as standard usage.

- *Usage charges other than timed.* Some charges are based on factors other than time. The most common are charges computed on a per-call basis. These charges are usually in addition to timed usage charges. Some roaming charges are rated on a per call basis and companies charge a fixed fee per day that roaming charges are incurred. For example, if your base area is Washington, D.C. and you place calls from Florida on one day, one would pay: 1) the day fee, 2) the roaming charge, and 3) the long distance telephone toll charges. A per-call charge might not be charged or could be charged in lieu of the roaming minute charge, or in addition to the roaming minute charge. Fee schedules are not uniform in structure or amounts.
- *Individual features and feature packages.* Cellular customers are much like wireline telephone customers in that new features, or options, are constantly being offered. Most features are offered on a per line basis although some could be billed on a per-account basis. These features include caller-ID, call waiting, and voice-mail. All these features are alike in the sense that they utilize the computerized switching equipment that provides the basic ability to control the network in the first place.
- *Non-recurring charges.* These are one-time charges like activation fees, cancellation fees, etc. Activation fees are routinely waived in promotion programs. The two major causes of plan cancellations are 1) switching from one plan to another within the same company (in which case fees are routinely waived) and 2) bankruptcy (in which case the fee is uncollectible). Basically, non-recurring fees are waived so often that they have no noticeable effect on total revenue.

Note that revenue for some plan features, included in the final price, may be an average per line.

If a company is unable to provide the average revenue, it is acceptable to price a bill for a standard service package.

3.5.4.2 Service/Pricing Characteristics

The types of wireless services included in this industry are defined as follows:

Cellular and other (Voice Grade) wireless services

These services allow customers to converse or send data just like a wireline service. The distinction between the three types of voice-grade wireless services (cellular, PCS, and ESMR), is primarily broadcasting frequency and how they are licensed. To the buyer, the technical differences between the three are essentially transparent.

Multiple purchasing plans exist for each of these services, but these are billing arrangements not different services. Computer systems allow many options but the service is still “talking”.

Broadband

This service allows data and graphics to be sent interactively over a network. This is essentially wireless internet and functions at the 200+kbps range.

Data (Instant Messaging)

This service allows data and graphics to be sent interactively over a network. This is most efficiently done in the 65-200 kbps range to take full advantage of the digital network and protocols of the broadband wireless network.

Constant quality measurement issues

There is a strong concern about new item bias in this industry. New services in this industry are expected to be introduced frequently and to become popular quickly. When completely new services are introduced there is concern about when to include them and how to adjust for their weight. The introduction of new products or service features after the index reference date is problematic for a Laspeyres index. However, if the index is not augmented to show these new services, new item bias will result. New service features are generally included as “other revenue” in the average price calculation and they are not discernible from the existing features.

3.5.4.3 Sample Unit Identification and Frame and Sampling Issues

The frame source is the Cellular Telecommunications Industry Association (CTIA) research department. This frame was segmented into three explicit strata that correspond to the FCC licensing classifications. The frame represents those establishments that have their own facilities and therefore provide an exhaustive list. Resellers are out of scope. “Plane phones” and “train phones” were truncated. Cellular and other wireless services are treated as separate establishments from other lines of business even when owned by the same company and located at the same address.

The traditional cellular strata consist of those MSA and RSA licenses awarded in the 1980’s auctions for cellular service. There are two bands for each license area. One band was awarded to long distance carriers and the second to other carriers generally but not exclusively to local phone companies. The PCS includes the winners of the 1990’s PCS license auctions. The basis for a PCS license is a much larger geographic area than for the first cellular licenses and there are six licenses instead of two for each area. In some cases, traditional and PCS license areas are subdivided with separate carriers in each subdivision. The ESMR strata consists of those companies originally providing “push-to-talk” service, but upgraded to a cellular-like service.

Within each stratum, the first step of disaggregation was geographic area. The sample was designed in this manner to minimize multiple selections in the same geographic areas while still sampling proportionate to size. In addition, items can be followed if the sampled license area is sold to another company.

These sampled license areas were then grouped according to the company that holds the license to form one sample unit. The number of quotes requested from each company corresponds to the number of geographic areas hit.

Government Regulations

Licenses to provide cellular services were auctioned by the FCC during the 1980's and correspond to either a Metropolitan Statistical Area (MSA) or a Rural Statistical Area (RSA). Having public records of these licenses allowed the PPI to develop a sample frame that was exhaustive of all wireless companies operating in the US as well as to sample by geography.

3.5.5 ISPs and Web Search Portals

3.5.5.1 Output Measurement

Output definition

The primary output of Internet service providers (ISP) is the provision of Internet access to a group of subscribers. These subscribers may be residential households, business or institutional facilities, or other Internet access providers. The unit of measure for this industry is an individual connection to the Internet.

The primary output of web search portals is the provision of a tool that allows an Internet user to locate particular sites that are of interest. This can be measured through the sale of listings and advertisements to companies who are interested in making an impression on the audience of Web searchers who visit the site.

It is difficult to ascertain whether certain product bundles reflect services that should be considered as primary to this industry. Some firms may offer services that bundle access services with other non-primary services, such as Web hosting.

Pricing methodologies

For Internet access services, the preferred price is an *average* price. This is the average of all rates that are charged to customers on a specific billing cycle for a specific form of access within a specific period of time. The average for each mode of access, such as dial-up, DSL, and leased line, will be collected as an average per line (the term "connection" may be used for dial-up and DSL). For leased line service, this average charge will be the average rate per line.

An individual *actual transaction price* was collected if average price data were not available. If this type of price is used, an individual transaction is selected for collection. However, for residential dial-up and DSL service, this will typically be the list price. This list price is acceptable for dial-up and DSL service only if the provider does not offer a significant amount of discounts.

For web search portals, the preferred price is an average of all rates that are charged to all customers for a specific form of advertising or listing service. These averages may be collected using click, impression, or paid inclusion as the unit of measure. Advertising formats include banners, classifieds, and pop-ups. Listings formats include directory, index, affiliate, and sponsored search.

An *estimated transaction price* was collected for web portal advertising and listings services if average price data were not available. This price should represent an estimate of what the seller would receive for a specific type of advertisement or listing if it were to be sold each month.

An individual actual transaction price was to be collected for distribution partner licensing services.

3.5.5.2 Service/Pricing Characteristics

Internet service providers

Dial-up and DSL Internet access is the provision of Internet access along the shared telephone network. With dial-up access, a modem at the end user's site converts an analog signal into a digital format that can be displayed on a computer screen. DSL technology provides a completely digital connection between the ISP and the user that allows Internet access to remain active at all times. ISDN lines also provide a digital connection, but are still considered a dial-up service because the connection does not remain active at all times.

Leased line Internet access is the provision of Internet access along a private telephone line reserved wholly or primarily for the use of an individual client. This service is provided to business and institutional users who require a large amount of Internet bandwidth capacity for their data processes. Examples of telecommunications lines that may be leased for Internet access include T-1, T-3, OC-3, and OC-12 lines.

Other Internet access and related services includes the provision of Internet access using any technologies other than dial-up, DSL, and leased lines. This includes wireless access, cable access, dark fiber Ethernet access, and satellite access. Also included in this group is advertising services offered by ISPs.

For Internet access, the most important price determining characteristics are the speed of the Internet connection and whether the access remains "always on". With dial-up access, a user must wait for a dial-up connection each time the Internet is being accessed. With DSL and leased line access, the connection remains "always on" and available at all times. The speed of the connection, measured in data transfer capacity or bandwidth, determines how much data, in the form of Web pages, Web applications, and data files, can be carried along the Internet to and from the end user's computer in a specific amount of time. Additional price determining characteristics for access services include the presence of bundled non-primary services such as Web hosting, e-mail, and instant messaging.

Web search portals

Web search portal listings services refer to the sale of inclusions in the results of keyword generated searches on Web sites. The most common types of listings are sponsored search, directory, and index. These listings may be sold on a "price per click" or flat rate (inclusion) basis. A click is an instance in which an Internet user clicks upon a listing in order to proceed to the listed company's Web site. An inclusion is an individual Web page listing in a search result.

The most important price determining characteristics include the position of the purchased listing within the search results, and whether it includes a short written description of the listed

site. Another potentially important factor in the price of a listing is the amount of times that an Internet user clicks on it. Sometimes a buyer has to pay a set amount for each time their listing is clicked upon.

Web search portal advertising services include the sale of advertising on the portions of a Web search portal site not dedicated to listings results. The most frequent forms of advertisements include banner advertisements, pop-up advertisements, and classified advertisements. These advertisements may be sold on a “price per impression”, “price per click”, or flat rate basis. An impression is an instance in which an advertisement appears on the computer screen of an Internet user. A click is an instance in which an Internet user clicks upon an advertisement in order to proceed to the advertising company’s Web site.

The prices of advertising services are also sometimes determined by the number of times that they are clicked upon. The frequency of an advertisement’s appearance on a user’s computer screen can also be used to set the price. Generally, the size of the advertisement and its position on the computer screen will be key in determining its value and price. Also important are the size of the audience that visits the Web page on which the advertisement will run and the demographic makeup of that audience.

Other Web search portal services include Web search portal distribution partner licensing services. This refers to the sales of listings by a Web search portal to any other site for a cash fee. Frequently the other site will be another Web search portal. Any type of listings service can be sold in a distribution partner licensing contract.

Constant quality measurement issues

In recent years, broadband Internet connections have grown in popularity as customers move away from the slower dial-up access to high speed connections like ADSL. This shift has become potential a source of new item bias. Directed substitution procedures will be implemented to determine if item substitution is necessary.

3.5.5.3 Sample Unit Identification and Frame and Sampling Issues

Many sample units are part of larger companies that are classified in other industries such as wired telecommunications or cable television. For these sample units, especially the backbone service providers, it was necessary to isolate the appropriate profit maximizing center (PMC) for the Internet access services and collect data provided by that PMC only. These larger companies did not appear in the frame since they were classified in other industries and had to be added.

Due to the high number of births and deaths in these industries, it was necessary to oversample these industries.

3.6 Professional Services

3.6.1 Output Measurement

Output definition

The primary output of this subsector is the provision of services by professionals with specialized knowledge and the experience necessary to apply this knowledge. These professionals include lawyers, accountants, engineers, and architects.

Pricing methodologies

Prices for professional services are model prices. Most of the services provided in these industries are based on unique, non-recurring transactions. Such industries require a specific contract to be collected and set as a baseline transaction. Inputs are fixed according to this baseline transaction. Although the sample unit may never encounter the exact transaction again, respondents report the amount of revenue they would hypothetically receive if the same contract were negotiated using the same inputs. The following example illustrates the use of this modified model methodology:

In the initial period, an accounting firm provides the following service description representing an actual service contract.

Type of service: Auditing. Time required for service completion: 290 hours. Client information: Repeat customer; commercial business. Length of billing period: Single bill for entire service. Services included in engagement:

<i>Service rendered</i>	<i>Rate</i>	<i>Hours</i>	<i>Total fee</i>
Partner	\$375	10	\$ 3,750
Manager	\$300	40	\$12,000
Senior accountant	\$220	60	\$13,200
Associates	\$125	180	\$22,500

Total for services rendered: \$51,450

During the next repricing period, the respondent is asked to price the exact same service as initially described.

There are several pricing alternatives across these industries. The most common methods include:

- *Contingency pricing* - A contingency fee is a payment that is made only if a specified outcome is achieved. For example, a contract in legal services may include a contingency clause that payment will be made for a favorable settlement in a personal injury case. These settlements are typically one-time occurrences that vary greatly in the amounts that they pay out and have no correlation to inputs such as number of hours worked.

- *Flat fees* – Professional may charge a single fee for service or project completion. Companies are asked estimate what the fee would be if the exact project were to be performed again.
- *Percentage of construction costs* - This pricing method applies to architectural services. Companies are asked to estimate what the construction costs and percentage fee for the selected project would be if the service were to be performed again.
- *Percentage of first-year compensation* – Executive search companies receive a percentage of the first-year salary for the position for which the executive is chosen. Companies are asked to estimate the salary and percentage fee for the selected position.

3.6.2 Service/Pricing Characteristics

The output priced in the professional services is a transaction representing a bundle of services. The transaction price is obtained by selecting a contract or billing invoice. PPI collects detailed information about the contract (or invoice). These details may include labor descriptions, labor costs, labor hours, expenses, reimbursables, construction costs, multipliers, or other negotiated mechanisms for setting the price.

Constant quality measurement issues

Using model pricing for these industries allows the service delivery process, type of buyer, and contract terms to be held constant in most cases. Exceptions will occur when a service is no longer offered; a service is fundamentally altered due to government regulation; a service delivery process is modified; a service client change (loss of government contracts) or a service contract term(s) change.

When a service is discontinued, an attempt will be made to substitute a similar service and directly compare prices (i.e., one with similar primary inputs and input quantities). If a service is fundamentally altered or the service delivery process is modified, a direct comparison may not be possible. Therefore, the best option is to identify the changes in primary inputs (i.e., type of labor input, rates, and quantities) for the purpose of assessing whether the new input requirements and their costs enable an explicit quality adjustment.

However, certain technological improvements to inputs may enable the same exact service priced in a prior period to be produced more quickly (requires less labor-hours) in the current period thereby reducing costs that may lead to lower fees. In this case, input requirements have changed but the service provided has not, therefore the price reduction is valid and an explicit quality adjustment is unnecessary.

The outputs of the professional services industries may evolve due to introduction of new technologies or new types of services leading to potential new item bias. To address this bias, the researcher periodically contacts each reporter to review their sampled services and determine whether new types of services have been introduced. If new services are identified, probability techniques are employed to give these new services a chance of selection.

3.6.3 Sample Unit Identification and Frame and Sampling Issues

The QCEW was used as the sample frame for the professional services. Depending on the industry, the sample unit is either the headquarters or an individual establishment.

3.7 Administrative Services

3.7.1 Temporary Help Services

3.7.1.1 Output Measurement

Output definition

A temporary help service is primarily engaged in supplying temporary help (employees) or continuing help to other businesses on a contract or fee basis. The help supplied is on the payroll of the supplying establishment but is under the direct or general supervision of the business to which the help is furnished. Many temporary help services offer their workers the same benefits that regular employees enjoy, such as dental and health insurance, 401(k) plans, paid holidays, and vacation pay. The average length of stay for a temporary worker is about 6 months, with very few staying for more than 2 years.

Pricing methodologies

The preferred price for temporary help services is the billing rate. This billing rate is the total amount the client company pays the temporary help service for the placement of temporary employees. This rate should not be confused with the pay rate – which is the rate a temporary help service pays the temporary employees. Collection of the billing rate is very convenient for reporters and helps ensure reporter compliance.

3.7.1.2 Service/Pricing Characteristics

The service that is priced is a specific job.

Prices for temporary help are billed on a per hour basis, and range depending on the skill of the employee, their assigned employment sector and client characteristics. Different employment sectors command different pay scales. If a temporary help agency has many locations, location would be a price determining characteristic. For example, a secretary in Los Angeles would command a very different wage than a secretary in rural Alabama.

Constant quality measurement issues

To maintain constant quality, the index disaggregates to a specific job instead of a specific contract, insuring that substitutes can be fairly easily acquired. When acquiring a substitute item, the price determining characteristics must be the same. For example, a substitute employee must have the same skills and work in the same assigned employment sector for a company with similar client characteristics.

Specifically, the job characteristics of each position that we hold constant include length of assignment, work shift, client characteristics, level of position, years of experience, and requirements such as education level, licensing and typing/computer skills. To insure that we

are also capturing discounts, a substitute employee should also come from a contract consisting of a similar number of employees and have the same risk evaluation.

There is no explicit quality adjustment when a matching substitute is found. Thus, any change in the billing rate for the new employee is reflected as a price change.

3.7.1.3 Sample Unit Identification and Frame and Sampling Issues

The sample unit is the headquarters of the temporary help company. To be correctly classified in this industry, employees that are placed must be considered the employees of the sample unit. Otherwise, the company would be an employment placement agency.

The QCEW was used as the sample frame for this industry.

3.7.2 Employments Agencies

3.7.2.1 Output Measurement

Output definition

Employment agencies are essentially engaged in the business of connecting employers and potential employees in the labor market. Their business is the business of solving the economic problem of imperfect information. If employers had perfect knowledge about all individuals in the labor market and all prospective employees had perfect information about what jobs were currently being offered in the market, then there would be no establishments in this industry. Thus, establishments in this industry operate as “matchmakers,” agents that make connections between those offering employment and those seeking employment.

Contrasted with temporary help services, employees are compensated by the firm with which they are placed.

Pricing methodologies

The preferred price for employment agencies is the actual commission received for a single employee placement. This commission is a percentage of the expected first year earnings of the employee placed.

An estimated price is used if no transaction was completed in a particular month. There are no “list” prices in this industry, due to commission-based pricing.

3.7.2.2 Service/Pricing Characteristics

There are two major factors that determine price in this industry: commission percentage, and the first-year compensation package of the position.

The commission rate is generally market-determined, and tends to prevail industry-wide.

The first-year compensation package is set by the client company, often with the agreement of the employment agency. Factors in determining the total compensation package generally relate to either describing the type of position being filled, or the type of employee being hired.

Some examples of these qualities include position title and seniority on the job end, and employee education, experience, and qualification on the employee end.

Constant quality measurement issues

A good rule for determining whether a substituted service should be quality adjusted is to consider whether or not the new service represents a new form of business of the agency. For example, a retained search firm hiring a CEO of General Motors versus finding a new CEO for Lucent, is providing two very different services in one sense, but is really engaging in the same form of business. Thus, the disparate price changes would not be quality adjusted, as this is a price change that is really being felt by the company.

Explicit quality adjustment may be feasible in certain circumstances. For example, if a firm has to provide a training course for a certain candidate to fill a position, the cost of the training course could be quality-adjusted out.

On the other hand, a contingency payment recruiting firm that changes from filling mostly Operations, Administration, and Human Resources jobs to filling mostly Office and Clerical jobs, is changing their method of business. Therefore the subsequent price changes would be considered a “service substitution” and would be quality adjusted by a “link to show no change.” The above quality adjustment measures also apply to the e-commerce firms in this industry.

3.7.2.3 Sample Unit Identification and Frame and Sampling Issues

The sample unit is the headquarters of the placement agency.

The main frame source is Kennedy Info Inc.’s “Search Select” Electronic Database of their 1999 *Directory of Executive Recruiters*. Despite the title, the directory includes all employment agencies that receive commission payments.

The source of the e-commerce strata is a *Media Metrix* ranking of the Top 15 Electronic Recruiters by market share, two of which were excluded as being out-of-scope.

3.7.3 Janitorial Services

3.7.3.1 Output Measurement

Output definition

The primary output is to furnish cleaning and maintenance services for buildings. Such cleaning services include janitorial services, maid/housekeeping, window cleaning, and chimney cleaning.

Pricing methodologies

The industry is dominated by contract pricing, although within each contract there is frequently some variation in the type of price. Establishments that provide janitorial/custodial services on a contract basis may charge a flat fee for their services. This flat fee is generally charged on a monthly basis and is sometimes billed on a per square foot basis. In addition, janitorial/custodial contractors may bill their clients on a cost plus markup basis. Establishments that bill in this type of manner compute all of their fixed and variable costs and then add a

percentage of sales/costs or a flat fee onto their total costs. The markup percentage may depend on the type of service performed, as there is no industry standard.

3.7.3.2 Service/Pricing Characteristics

The primary services for this industry can be classified into a few major categories; descriptions of these primary services are outlined below:

Janitorial/Custodial Services – Includes daily cleaning services such as floor cleaning, vacuuming, floor stripping/scrubbing/buffing, venetian blind cleaning, bathroom cleaning, wastebasket/ash tray emptying, and dusting. Janitors and custodians work primarily in commercial or public buildings. Also included in this segment of the industry are institutional maid/housekeepers who provide many of the cleaning services that janitors and custodians provide in office buildings; however, these industry members generally work at hospitals, nursing homes, and hotels/motels where additional linen services are performed.

Maid/Housekeeping Services - Performed in a private home or other residential setting and may include other cleaning services such as stove cleaning, refrigerator cleaning, and other tasks that are considered time consuming and undesirable.

Window Cleaning Services – Includes window washing and cleaning services. There is some specialization of service within this component of the industry, since many janitorial companies also perform window cleaning services as ancillary services. This service line encompasses all window cleaning services, including commercial and residential building window cleaning as well as high-rise and single-story buildings. Window cleaning establishments may also perform awning cleaning or metal maintenance cleaning services, which are both considered part of this industry.

Chimney Cleaning Services - Includes services associated with cleaning chimneys. This service appears to be distinctive and unique in that only establishments specializing in chimney cleaning and repairs offer it. Providers of general maintenance and housekeeping services often do not include chimney sweeping among their services. Many chimney sweepers also provide chimney and flashing repair, chimney relining services, as well as masonry repair services, which are services classified in Masonry, Stone Setting, and Other Stone Work. In many situations, the chimney sweep may derive a plurality of revenues from the non-chimney sweep services and may be misclassified. The revenues from these non-primary services should be collected as an other receipt.

Other Primary Services - Includes telephone booth cleaning and service station cleaning and degreasing.

Constant quality measurement issues

The characteristics of the service performed are held fixed allowing constant quality to be maintained over time.

3.7.3.3 Sample Unit Identification and Frame and Sampling Issues

The sample unit is the headquarters location of companies providing janitorial services.

The QCEW was used as the sample frame for this industry.

3.8 Transportation Services

3.8.1 Passenger Air Transportation

3.8.1.1 Output Measurement

Output definition

The primary output provided by establishments in this industry is the transportation of passengers over regular routes and on regular schedules.

Pricing methodologies

The type of price for the majority of this industry is average revenue per passenger. When calculating this average, a number of different time periods (e.g. day, week, month) can be considered. It would be optimal to use an entire month of data. By using data for travel that occurs throughout the month, any and all travel events would be included. However, this presents a problem in that respondents would need a number of days after the end of the month to calculate the average and this would introduce a one-month lag to the index. Thus, using a 21-day time period for the current month was selected as an alternative. This allows ample time (on average 7 business days) for a participating airline to retrieve the data and submit it to be included for the current month's index. Using a 21-day period also serves to produce a lower volatility index (versus a day or week) that more accurately measures industry price trends.

Using this method allows the PPI to capture price trends from all levels of pricing (published and unpublished) and all distribution channels. Price changes due to a shift in the mix of distribution channels, web based fares or deep discount fares, infrequent fare sales, the substitution of fare codes over time, and zero fares (frequent flier mile tickets) can also be reflected in the index.

For those establishments unable to provide the average revenue per passenger data, a fallback pricing methodology of pricing fare codes can be used. If this methodology has to be used, disaggregation to an individual fare code is necessary. Suggested breakouts to get to an individual fare code are restricted versus unrestricted, round trip versus one-way, or nonstop travel versus direct or connecting travel. These are only suggestions, as the airline may have others.

3.8.1.2 Service/Pricing Characteristics

The primary service characteristics include:

- Region (domestic or international)
- Market (origin and destination)
- Cabin (first/business or coach)

The average revenue per passenger will be collected for a given O&D and will be for either coach or first class (including business) passengers. Each market will either be classified as domestic or international, depending on the O&D. So the region, market, and cabin class will be held constant. Controlling for these variables should ensure comparability of the data through time.

Constant quality measurement issues

The development of the current pricing methodology grew out of increasing concerns that the PPI for airlines was exhibiting an upward bias. Some of the potential sources for this bias included the change in the mix of distribution channels, the transition to web based fares and/or deep discount fares, the substitution of fare codes over time, and the exclusion of zero fares (frequent flier mile tickets). By pricing individual fare codes, the PPI index had failed to capture these over time.

Over the last few years the airlines' mix of distribution channels has shifted and the Internet has become increasingly more prevalent, whether through an airline's direct Internet website or through one of the many web based distributors. Looking at Internet fares, it was found that these fares can disappear as quickly as they appear, making any kind of comparison using the current methodology almost impossible. In some cases these fares never reappeared. In addition, since data is collected directly from participating airlines using unique fare codes, it is believed that pricing via other traditional distribution channels (e.g. call centers, consolidators, brick and mortar travel agencies) where the fare codes and pricing may be different has never been captured correctly. Different fare codes are offered through different distribution channels. For example, in any given month a consumer may find the cheapest fare on an airline's website, on a third party internet website, or through a travel agent. Pricing individual fare codes not allow for an accurate comparison of this.

Another issue is the substitution of fare codes over time. In general, the PPI had gradually moved to what is referred to as "core" fare codes. Even though many of our current fare codes may indeed be considered "discount" fare codes they do not reflect fare sales or deep discounts. These "core" fares tend to be offered all the time and may or may not be actually purchased in a given month. Although these fares do represent part of an airline's pricing, they do not represent a very big portion of it. What the PPI ends up with is a group of fare codes that tend to move up in a slow and steady manner. The conclusion drawn from this is that pricing one fare code per O&D is not very reflective of the true price trends over time. The fact that a given airline may fly hundreds of routes and price discriminates in many ways on each of those routes is evidence that pricing one fare code per O&D does not accurately measure overall industry price trends.

3.8.1.3 Sample Unit Identification and Frame and Sampling Issues

The frame used for sampling this industry was the UI file from 4th quarter 2004, augmented by using the BTS Air Carrier Financial Reports (Form 41 Financial Data). These were treated as two separate frames.

4 Where Does the PPI Go from Here?

4.1 What Aggregation Strategies Should Be Considered to Include Services?

4.1.1 PPI Aggregation Background

Prior to 1978, the All Commodities index was the primary release vehicle for the PPI. This aggregate index is a weighted average of all the PPI commodity data, which includes mining, manufacturing and agriculture. This All Commodities index was criticized for multiple counting

of price change, which could lead to exaggerated measures of inflation. Multiple counting occurs when price changes of for less processed commodities within an aggregate index are passed forward to more processed goods. Multiple counting can be reduced by including additional intermediate stages of processing. In response to these criticisms, the PPI began emphasizing the Stage of Processing (SOP) System as its main release vehicle. The SOP system attempts overcome the problem of multiple counting by separating commodities into three distinct stages of process: crude, intermediate, and finished goods. While the SOP system improves multiple counting problems, the intermediate goods index is still subject to some multiple counting. PPI has been researching the various types of SOP indices that could include services and several models are being developed and tested.

With the PPI currently producing numerous individual detailed service indices and its coverage of over 76% of in-scope output of this sector, a natural question arises as to what kinds of economically meaningful aggregations of service based indices can be produced? While the focus of this section is on the research that is needed to develop a consensus on the publication of broad aggregates, such as a price index for the entire service sector, BLS is pleased to announce that planning is currently underway to begin calculation of additional aggregate indices for service subsectors and selected cross-sector aggregations. A paper describing these plans was been prepared for the June 9 FESAC meeting. The goal of adding selected aggregation detail to service industry PPIs is partly the result of the feedback received from the December 2005 FESAC meeting. For additional information, please see the paper, "Plans for New PPI Service Sector Aggregation Indexes" by Maureen Doherty and Roslyn Swick (Addendum E).

4.1.2 Industry and Commodity Indices

PPI produces indexes for both specific industries and commodities. These industry or commodity based indexes are the building blocks of aggregate PPIs. PPI must determine the advantages and disadvantages of developing aggregate indices, which incorporate services prices, from commodity versus industry data.

An industry index would net out the flow of services between the various services industries in the aggregation. Two of the most important advantages of an industry based aggregate index is that this index can be calculated net of internal flows, thus alleviating multiple counting problems, and that the index coding structure is based on NAICS, allowing for compatibility with other NAICS based data. Commodity aggregations would have significant multiple counting.

Currently, there are very few commodity service indices in the PPI. The only current service commodity indices are for commodities such as newspaper publishing which were previously classified as manufacturing but changed to services when the classification system changed from SIC to NAICS. Based on the International Monetary Fund manual on Producer Price Indices and the OECD Services Producer Price Index manual, commodity indices for services are recommended. In addition to industry net output indices, it is important for the PPI to develop a complete commodity structure for services just as exist for the manufacturing sector. This services commodity structure would have to be developed before aggregation of service commodities could be attempted.

Commodity aggregations may be used for specific groups of services. A commodity index that aggregates the various financial commodity indices could be produced. For example, there are currently two different PPI banking industries, both of which provide loans and deposit services. These two industries are Commercial Banks and Savings and Loans Institutions. From data in

these two industries and any future financial industries that provide loans and/or deposit services, an index for all loans, all home loans, all auto loans, etc. may be developed that aggregates the various loan services together to produce a comprehensive set of commodity indices on loans. The same type of commodity aggregation could be done for deposit services.

Another commodity aggregation index could be developed for health services based on Major Diagnostic Categories (MDC) that would provide measurement of various treatments based on the MDCs. For example, indices from the hospitals, physicians, and pharmaceutical industries could be used to produce a commodity index that measure the price of the various treatments based on MDCs. These series of indices are frequently requested and would be greatly utilized by both the medical community and the research community.

A variety of different commodity and industry net output indices could be produced by aggregating data that includes the various sectors of the economy.

Weights for all these industries could be derived or obtained from the Economic Census data or Bureau of Economic Analysis data either in the form of Made-In-Industry weights, Wherever-Made weights or Input-Output data.

4.1.3 Stage of Processing (Transaction Flow) Indices

A variety of aggregations could be produced using data from all sectors of the economy that are priced in the PPI program. Aggregations which provide a view of the transaction flow of goods and services through the economy could be produced. These types of aggregations are generally referred to as stage of processing (SOP) indices. Commodity-based SOP price indices regroup commodities according to the class of buyer and the amount of physical processing or assembling the products have undergone. PPI uses BEA flow data to allocate commodity weight to the appropriate stage of processing. An important function of the PPI is its use in forecasting consumer inflation. The current PPI SOP indices give data users the opportunity to see the flow of transactions through the economy. The addition of services price indices to an overall system of SOP indices that include services in all stages of production will provide a more complete view of the economy's transaction flow and hopefully, also improve the PPI's ability to forecast consumer inflation.

A series of commodity and industry SOP indices which include service industries could be produced that are based on the gross fixed investment or the personal consumption expenditures data found in the BEA national accounts input output tables. These indices would be very similar to the current PPI SOP indices for Finished Goods and Capital Expenditures but would also include services information. Another SOP commodity or industry index could also be developed that measures business services. Most international definitions of business services include service sector industry output that is used for intermediate demand. Service and transportation indices are generally used for producing these indices.

4.1.3 Future Developments

If any of these aggregate indices were to be developed at the current time, they would have to be constructed from the lowest level industry indices, since current PPI systems allow an item to be used in only one lowest level index. However, over the next two years, the PPI program will have new computer and estimation system capabilities, which will allow items to be used in multiple lowest level indices thus permitting greater flexibility in the index construction techniques that can be employed. In addition, the PPI program has embarked on a research

project to evaluate the viability of potential aggregation structures. Research areas may include determining the economic interpretation of the index, examining the index's relative volatility, and analyzing the usefulness of the index to data users. Once the research is completed and the new computer system is available, the PPI will be able to begin calculating new indexes based on our research results.

Another advantage to the new computer systems being developed is that these systems will allow additional research on current pricing methodology and alternative price methodologies. This research could be done using one set of items and their data to produce a variety of indices using different weights, structures, and/or pricing formulas. This type of research could greatly enhance the quality of the current indices being produced by the PPI program.

4.2 What are the Gaps?

Although the focus of this paper has been on the expansion of the PPI Program's coverage of the service-providing sector, recently there also has been significant expansion of its coverage of non-residential construction. Indexes for four new building types are in various stages of planning, initial data collection, calculation and publication. New Warehousing and New Office Construction are in publication, New School Construction is being published in July 2006, and New Industrial and Manufacturing Buildings are being added in 2007. PPI is also planning on publishing, in 2008, indexes for four specialty building contractor trades to reflect work on new structures and maintenance of existing structures.

Despite these advances in coverage, significant gaps in the coverage of the overall U.S. economy remain. The PPI program is beginning a comprehensive review of its coverage gaps and is attempting to identify and prioritize the order of adding new industries into the family of indexes it produces. This section lists the gaps that exist and the next section provides a set of possible criteria for identifying this priority list.

A complete listing of the indices that the PPI calculates and does not calculate is provided in Appendix C. This Appendix provides a listing of all six-digit industries in the 2002 NAICS classification system, using the implied ordering from the NAICS system. Each industry is placed into one of 6 groupings as described by the text table given below.

Classification of NAICS industries by publication status in the Producer Price Index Program	
Code	Publication Status
1.0	Currently published, 6 digit NAICS
2.0	Currently published, higher level aggregate, 5 digits or higher
3.0	In calculation but not published due to low and declining establishment counts
4.0	Not published, 6-digit NAICS split off from SIC, not yet sampled
5.0	Not published, 6-digit NAICS covered by higher level NAICS aggregate that is published
6.0	All other eligible 6-digit NAICS not published
7.0	Not eligible for publication, no defined output

Beginning with the last of these categories, the list shown in Table 1 provides the NAICS industries that are currently defined as out of scope for the PPI program. These industries do not have measurable marketed output and therefore, not eligible for inclusion in the PPI.

Table 1. Industries that are not eligible for publication in the PPI program owing to a lack of defined output.

NAICS code	Industry Title	NAICS code	Industry Title
336414	Guided Missile and Space Vehicle Manufacturing	813212	Voluntary Health Organizations
336415	Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing	813219	Other Grantmaking and Giving Services
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing	813311	Human Rights Organizations
336992	Military Armored Vehicle, Tank, and Tank Component Manufacturing	813312	Environment, Conservation and Wildlife Organizations
488111	Air Traffic Control	813319	Other Social Advocacy Organizations
519120	Libraries and Archives	813410	Civic and Social Organizations
519190	All Other Information Services	813910	Business Associations
521110	Monetary Authorities - Central Bank	813920	Professional Organizations
525110	Pension Funds	813930	Labor Unions and Similar Labor Organizations
525120	Health and Welfare Funds	813940	Political Organizations
525190	Other Insurance Funds	813990	Other Similar Organizations (except Business, Professional, Labor, and Political Organizations)
525910	Open-End Investment Funds	814110	Private Households
525920	Trusts, Estates, and Agency Accounts	921110	Executive Offices
525930	Real Estate Investment Trusts	921120	Legislative Bodies
525990	Other Financial Vehicles	921130	Public Finance Activities
541710	Research and Development in the Physical, Engineering, and Life Sciences	921140	Executive and Legislative Offices, Combined
541720	Research and Development in the Social Sciences and Humanities	921150	American Indian and Alaska Native Tribal Governments
551111	Offices of Bank Holding Companies	921190	Other General Government Support
551112	Offices of Other Holding Companies	922110	Courts
551114	Corporate, Subsidiary, and Regional Managing Offices	922120	Police Protection
561591	Convention and Visitors Bureaus	922130	Legal Counsel and Prosecution
611110	Elementary and Secondary Schools	922140	Correctional Institutions
611513	Apprenticeship Training	922150	Parole Offices and Probation Offices
624110	Child and Youth Services	922160	Fire Protection
624120	Services for the Elderly and Persons with Disabilities	922190	Other Justice, Public Order, and Safety Activities
624190	Other Individual and Family Services	923110	Administration of Education Programs
624210	Community Food Services	923120	Administration of Public Health Programs
624221	Temporary Shelters	923130	Administration of Human Resource Programs (except Education, Public Health, and Veterans' Affairs Programs)
624229	Other Community Housing Services	923140	Administration of Veterans' Affairs
624230	Emergency and Other Relief Services	924110	Administration of Air and Water Resource and Solid Waste Management Programs
624310	Vocational Rehabilitation Services	924120	Administration of Conservation Programs
813110	Religious Organizations	925110	Administration of Housing Programs
813211	Grantmaking Foundations	925120	Administration of Urban Planning and Community and Rural Development

Table 1. Industries that are not eligible for publication in the PPI program owing to a lack of defined output. cont.

NAICS code	Industry Title	NAICS code	Industry Title
926110	Administration of General Economic Programs	926150	Regulation, Licensing, and Inspection of Miscellaneous Commercial Sectors
926120	Regulation and Administration of Transportation Programs	927110	Space Research and Technology
926130	Regulation and Administration of Communications, Electric, Gas, and Other Utilities	928110	National Security
926140	Regulation of Agricultural Marketing and Commodities	928120	International Affairs

Tables 2 to 5 provide listings of 6-digit NAICS industries that are eligible for publication in the PPI program but are not currently published. Table 2 lists industries are not published owing to a low and declining count of establishments associated with a declining domestic market for production.

Table 2. In calculation but not published due to low and declining establishment counts

NAICS code	Industry Title
212231	Lead ore and zinc ore mining
325221	Cellulosic organic fiber manufacturing
331311	Alumina Refining
337129	Wood Television, Radio, and Sewing Machine Cabinet Manufacturing

Table 3 lists industries that are 6-digit NAICS industries that resulted from the conversion from the 1987 Standard Industrial Classification System (SIC) to the NAICS which created some new industries that were formerly subsumed under higher level industry aggregations under SIC. These new NAICS industries have not yet been sampled by the PPI program.

Table 3. Not published, 6-digit NAICS split off from SIC, not sampled under NAICS

NAICS Code	Industry Title	NAICS Code	Industry Title
111191	Oilseed and Grain Combination Farming	524291	Claims Adjusting
111336	Fruit and Tree Nut Combination Farming	524292	Third Party Administration of Insurance and Pension Funds
111998	All Other Miscellaneous Crop Farming	524298	All Other Insurance Related Services
112111	Beef Cattle Ranching and Farming	531390	Other Activities Related to Real Estate
444210	Outdoor Power Equipment Stores	532411	Commercial air, rail, and water transportation equipment rental and leasing
445120	Convenience Stores	541214	Payroll Services
446120	Cosmetics, Beauty Supplies, and Perfume Stores	621112	Offices of Physicians, Mental Health Specialists
453910	Pet and Pet Supplies Stores	621491	HMO Medical Centers
453920	Art Dealers	621493	Freestanding Ambulatory Surgical and Emergency Centers
522190	Other Depository Intermediation	621910	Ambulance Services
522210	Credit Card Issuing		

Table 4 lists the six-digit NAICS industries that are not currently published, but where there is industry coverage as part of a higher level aggregate that is published. There are nine such higher-level aggregates, however, the two largest categories by far are Merchant Wholesalers, Durable Goods (NAICS 423000) and Merchant Wholesalers, Non Durable Goods (NAICS 424000).

Table 4. Industries that are not currently published, but where the 6-digit NAICS covered by higher level NAICS aggregate that is published			
NAICS code	Industry Title	NAICS code	Industry Title
221110	Electric power generation	423460	Ophthalmic Goods Merchant Wholesalers
221111	Hydroelectric Power Generation	423490	Other Professional Equipment and Supplies Merchant Wholesalers
221112	Fossil Fuel Electric Power Generation	423510	Metal Service Centers and Other Metal Merchant Wholesalers
221113	Nuclear Electric Power Generation	423520	Coal and Other Mineral and Ore Merchant Wholesalers
221119	Other Electric Power Generation	423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
336110	Automobile and Light Duty Motor Vehicle Manufacturing	423620	Electrical and Electronic Appliance, Television, and Radio Set Merchant Wholesalers
336111	Automobile mfg	423720	Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers
336112	Light truck & utility vehicle mfg	423730	Warm Air Heating and Air-Conditioning Equipment and Supplies Merchant Wholesalers
423000	Merchant Wholesalers, Durable Goods	423740	Refrigeration Equipment and Supplies Merchant Wholesalers
423110	Automobile and Other Motor Vehicle Merchant Wholesalers	423810	Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers	423820	Farm and Garden Machinery and Equipment Merchant Wholesalers
423130	Tire and Tube Merchant Wholesalers	423830	Industrial Machinery and Equipment Merchant Wholesalers
423140	Motor Vehicle Parts (Used) Merchant Wholesalers	423840	Industrial Supplies Merchant Wholesalers
423210	Furniture Merchant Wholesalers	423850	Service Establishment Equipment and Supplies Merchant Wholesalers
423220	Home Furnishing Merchant Wholesalers	423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers	423910	Sporting and Recreational Goods and Supplies Merchant Wholesalers
423320	Brick, Stone, and Related Construction Material Merchant Wholesalers	423920	Toy and Hobby Goods and Supplies Merchant Wholesalers
423330	Roofing, Siding, and Insulation Material Merchant Wholesalers	423930	Recyclable Material Merchant Wholesalers
423390	Other Construction Material Merchant Wholesalers	423940	Jewelry, Watch, Precious Stone, and Precious Metal Merchant Wholesalers
423410	Photographic Equipment and Supplies Merchant Wholesalers	423990	Other Miscellaneous Durable Goods Merchant Wholesalers
423420	Office Equipment Merchant Wholesalers	424000	Merchant Wholesalers, Non-durable Goods
423430	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	424110	Printing and Writing Paper Merchant Wholesalers
423440	Other Commercial Equipment Merchant Wholesalers	424120	Stationery and Office Supplies Merchant Wholesalers
423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers		

Table 4. Industries that are not currently published, but where the 6-digit NAICS covered by higher level NAICS aggregate that is published

NAICS code	Industry Title	NAICS code	Industry Title
424130	Industrial and Personal Service Paper Merchant Wholesalers	424940	Tobacco and Tobacco Product Merchant Wholesalers
424210	Drugs and Druggists' Sundries Merchant Wholesalers	424950	Paint, Varnish, and Supplies Merchant Wholesalers
424310	Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers	424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers
424320	Men's and Boys' Clothing and Furnishings Merchant Wholesalers	445200	Specialty Food Stores
424330	Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers	445210	Meat Markets
424340	Footwear Merchant Wholesalers	445220	Fish and Seafood Markets
424410	General Line Grocery Merchant Wholesalers	445230	Fruit and Vegetable Markets
424420	Packaged Frozen Food Merchant Wholesalers	445291	Baked Goods Stores
424430	Dairy Product (except Dried or Canned) Merchant Wholesalers	445292	Confectionery and Nut Stores
424440	Poultry and Poultry Product Merchant Wholesalers	445299	All Other Specialty Food Stores
424450	Confectionery Merchant Wholesalers	452900	Other General Merchandise Stores
424460	Fish and Seafood Merchant Wholesalers	452910	Warehouse Clubs and Supercenters
424470	Meat and Meat Product Merchant Wholesalers	452990	All Other General Merchandise Stores
424480	Fresh Fruit and Vegetable Merchant Wholesalers	454310	Fuel Dealers
424490	Other Grocery and Related Products Merchant Wholesalers	454311	Heating Oil Dealers
424510	Grain and Field Bean Merchant Wholesalers	454312	Liquefied Petroleum Gas (Bottled Gas) Dealers
424520	Livestock Merchant Wholesalers	454319	Other Fuel Dealers
424590	Other Farm Product Raw Material Merchant Wholesalers	481210	Nonscheduled Air Transportation
424610	Plastics Materials and Basic Forms and Shapes Merchant Wholesalers	481211	Nonscheduled Chartered Passenger Air Transportation
424690	Other Chemical and Allied Products Merchant Wholesalers	481212	Nonscheduled Chartered Freight Air Transportation
424710	Petroleum Bulk Stations and Terminals	481219	Other Nonscheduled Air Transportation
424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)	541610	Management Consulting Services
424810	Beer and Ale Merchant Wholesalers	541611	Administrative Management and General Management Consulting Services
424820	Wine and Distilled Alcoholic Beverage Merchant Wholesalers	541612	Human Resources and Executive Search Consulting Services
424910	Farm Supplies Merchant Wholesalers	541613	Marketing Consulting Services
424920	Book, Periodical, and Newspaper Merchant Wholesalers	541614	Process, Physical Distribution, and Logistics Consulting Services
424930	Flower, Nursery Stock, and Florists' Supplies Merchant Wholesalers	541618	Other Management Consulting Services

The final list, found in Table 5, provides all other industries that are in scope in the PPI and where the PPI program currently does not have coverage.

NAICS code	Industry Title	NAICS code	Industry Title
111411	Mushroom Production	237120	Oil and Gas Pipeline and Related Structures Construction
111419	Other Food Crops Grown Under Cover	237130	Power and Communication Line and Related Structures Construction
111421	Nursery and Tree Production	237210	Land subdivision
111422	Floriculture Production	237310	Highway, Street, and Bridge Construction
111910	Tobacco Farming	237990	Other Heavy and Civil Engineering Construction
111930	Sugarcane Farming	238110	Poured Concrete Foundation and Structure Contractors
111991	Sugar Beet Farming	238121	Residential structural steel contractors
112340	Poultry Hatcheries	238122	Nonresidential structural steel contractors
112420	Goat Farming	238131	Residential framing contractors
112511	Finfish Farming and Fish Hatcheries	238132	Nonresidential framing contractors
112512	Shellfish Farming	238141	Residential masonry contractors
112519	Other Animal Aquaculture	238142	Nonresidential masonry contractors
112910	Apiculture	238151	Residential glass and glazing contractors
112920	Horses and Other Equine Production	238152	Nonresidential glass and glazing contractors
112930	Fur-Bearing Animal and Rabbit Production	238161	Residential roofing contractors
112990	All Other Animal Production	238162	Non residential roofing contractor
113110	Timber Tract Operations	238171	Residential siding contractors
113210	Forest Nurseries and Gathering of Forest Products	238172	Nonresidential siding contractors
114119	Other Marine Fishing	238191	Other residential exterior contractors
114210	Hunting and Trapping	238192	Other nonresidential exterior contractors
115111	Cotton Ginning	238211	Residential electrical contractors
115112	Soil Preparation, Planting, and Cultivating	238212	Non residential electrical contractor
115113	Crop Harvesting, Primarily by Machine	238221	Residential plumbing and HVAC contractors
115114	Postharvest Crop Activities (except Cotton Ginning)	238222	Non residential plumbing and HVAC contractors
115115	Farm Labor Contractors and Crew Leaders	238291	Other residential equipment contractors
115116	Farm Management Services	238292	Other nonresidential equipment contractors
115210	Support Activities for Animal Production	238311	Residential drywall contractors
115310	Support Activities for Forestry	238312	Nonresidential drywall contractors
221310	Water Supply and Irrigation Systems	238321	Residential painting contractors
221320	Sewage Treatment Facilities	238322	Nonresidential painting contractors
221330	Steam and Air-Conditioning Supply	238331	Residential flooring contractors
236115	New Single-Family Housing Construction (except Operative Builders)	238332	Nonresidential flooring contractors
236116	New Multifamily Housing Construction (except Operative Builders)	238341	Residential tile and terrazzo contractors
236117	New Housing Operative Builders	238342	Nonresidential tile and terrazzo contractors
236118	Residential Remodelers	238351	Residential finish carpentry contractors
236210	Industrial Building Construction	238352	Nonresidential finish carpentry contractors
236220	Commercial and Institutional Building Construction	238391	Other residential finishing contractors
237110	Water and Sewer Line and Related Structures Construction	238392	Other nonresidential finishing contractors

Table 5. All other eligible 6-digit NAICS industries not currently published *continued*

NAICS code	Industry Title	NAICS code	Industry Title
238911	Residential site preparation contractors	441229	All Other Motor Vehicle Dealers
238912	Nonresidential site preparation contractors	442291	Window Treatment Stores
238991	All other residential trade contractors	442299	All Other Home Furnishings Stores
238992	All other nonresidential trade contractors	446199	All Other Health and Personal Care Stores
326212	Tire Retreading	448130	Children's and Infants' Clothing Stores
334611	Software Reproducing	448150	Clothing Accessories Stores
339116	Dental Laboratories	448190	Other Clothing Stores
425110	Business to Business Electronic Markets	451140	Musical Instrument and Supplies Stores
441120	Used Car Dealers	451212	News Dealers and Newsstands
441221	Motorcycle Dealers	453310	Used Merchandise Stores

4.3 What Principles Should Be Used to Determine where PPI Should Be Expanded?

Decisions are continually being made in the PPI program as to where resources are best placed in the program. As described above, critical resources are being used to develop the much needed new computer system for producing the PPI. In the future, it is hoped that existing or possibly additional resources can be used to provide additional detailed indices in the existing PPI industry and commodity indices and/or to expand into areas where there currently are no PPI industry or commodity indices.

By researching where the PPI should expand or add index coverage, the PPI program is hoping to develop a systematic methodology for analyzing where the additional data should be added. The following is a list of possible criteria that could be used to determine where the additional resources should be utilized.

1. Should the value of shipments or turnover for an industry or a product area be the primary basis for deciding the importance of producing indices for a particular industry or for providing more detailed indices for a particular industry?

If value of shipments data based on 2002 Economic Census would be used to select the industries for PPI to expand, the following 25 non-covered industries have the highest values:

2002 NAICS Code	Industry Title	2002 VOS (\$000)
722110	Full-Service Restaurants	144,649,964
236220	Commercial building construction	139,929,312
236117	New housing operative builders	139,021,424
238221	Residential plumbing and HVAC contractors	117,785,785
722211	Limited-Service Restaurants	116,516,316
522220	Sales Financing	115,236,407
522294	Secondary Market Financing	102,426,532
238211	Residential electrical contractors	82,141,261
237310	Highway, street, and bridge construction	81,660,219
541512	Computer Systems Design Services	78,335,457
522292	Real Estate Credit	75,479,073

2002 NAICS Code	Industry Title	2002 VOS (\$000)
621210	Offices of Dentists	71,102,922
236115	New single-family general contractors	61,781,469
541511	Custom Computer Programming Services	60,125,952
531110	Lessors of Residential Buildings and Dwellings	55,295,976
512110	Motion Picture and Video Production	46,761,808
236118	Residential remodelers	45,034,336
238912	Nonresidential site preparation contractors	37,442,354
238911	Residential site preparation contractors	37,442,354
522130	Credit Unions	37,050,065
522210	Credit Card Issuing	35,855,753
561730	Landscaping Services	35,171,624
522298	All Other Nondepository Credit Intermediation	34,918,178
237130	Power and communication system construction	34,810,458
524130	Reinsurance Carriers	34,182,779

2. Is the completion of a subsector a basis for determining if an industry index should be produced? Many times industries in the same subsector have similar products or services, so an already developed and vetted pricing methodology may already exist and can be used to produce indices for these industries. In addition, there may be substantial overlap between existing industries and new industries. By completing the subsector, better or more comprehensive commodity indices may be able to be developed. Some subsectors have PPI industry indices but these indices do not have sufficient weight so the PPI program cannot publish an aggregate index for these subsectors. For example, there may be industries A and B for which PPI has industry indices but no indices for industries C, D, and E. These three industries with no indices may make up 50% of the subsector with industry C accounting for 30% of the total weight. If an index is produced for industry C, then the subsector would have 80% coverage and an aggregate could then be produced for this subsector with no additional resources required. Would this be a sufficient reason to attempt to price industry C? An alternative strategy may be to develop PPI industry indices for subsectors where there is little or no coverage of the subsector. The advantage to producing industry indices in a subsector with little or no price indices would be two-fold. There would be additional information for any subsector that previously had no indices since there would now be indices. In addition, if the PPI program was producing aggregate indices for the entire US marketed economy or intermediate demand indices or any other stage of processing type indices, there would data to estimate other industry or commodity indices for the missing industries in that sector.

For example, there are three industries that were moved from services and retail trade to manufacturing in the NAICS. These industries would complete the in-scope manufacturing sector. These industries are:

2002 NAICS Code	Industry Title
339116	Dental Laboratories
334611	Software Reproducing
326212	Tire retreading

As another example, consider NAICS subsector 523, Securities, commodity contracts, and other financial investments and related activities. Currently, four industries, which represent 88% of the subsector, have price indices in the PPI. In order to complete the coverage of this subsector, the following industries would be added to those four industries:

2002 NAICS Code	Industry Title
523130	Commodity Contracts Dealing
523140	Commodity Contracts Brokerage
523210	Securities and Commodity Exchanges
523910	Miscellaneous Intermediation
523991	Trust, Fiduciary, and Custody Activities
523999	Miscellaneous Financial Investment Activities

There are also several subsectors in the PPI that have no coverage. For example, Subsectors 711, Performing arts, spectator sports, and related industries and 712, Museums, historical sites and similar institutions, are two these subsectors with no current price indices. If these subsectors were to be priced in the PPI, the following industries would be added:

2002 NAICS Code	Industry Title
711110	Theater Companies and Dinner Theaters
711120	Dance Companies
711130	Musical Groups and Artists
711190	Other Performing Arts Companies
711211	Sports Teams and Clubs
711212	Racetracks
711219	Other Spectator Sports
711310	Promoters of Performing Arts, Sports, and Similar Events with Facilities
711320	Promoters of Performing Arts, Sports, and Similar Events without Facilities
711410	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures
711510	Independent Artists, Writers, and Performers
712110	Museums
712120	Historical Sites
712130	Zoos and Botanical Gardens
712190	Nature Parks and Other Similar Institutions

Table 6, given next, provides for each 3-digit NAICS sector the number of eligible 6-digit NAICS industries that are published and the number that, if published, would complete the subsector.

Table 6. List of eligible 6-digit NAICS industries by PPI publication status and by 3-digit NAICS sector

3-digit NAICS code and title	Number of eligible 6-digit NAICS industries		
	Currently published	Not currently published	Total
111-Crop Production	20	10	30
112-Animal Production	8	10	18
113-Forestry and Logging	1	2	3
114-Fishing, Hunting and Trapping	2	2	4
115-Support Activities for Agriculture and Forestry	0	8	8
211-Oil and Gas Extraction	2	0	2
212-Mining (except Oil and Gas)	21	1	22
213-Support Activities for Mining	5	0	5
221-Utilities	4	7	11
236-Construction of Buildings	0	6	6
237-Heavy and Civil Engineering Construction	0	6	6
238-Specialty Trade Contractors	0	37	37
311-Food Manufacturing	47	0	47
312-Beverage and Tobacco Product Manufacturing	9	0	9
313-Textile Mills	12	0	12
314-Textile Product Mills	8	0	8
315-Apparel Manufacturing	24	0	24
316-Leather and Allied Product Manufacturing	10	0	10
321-Wood Product Manufacturing	14	0	14
322-Paper Manufacturing	20	0	20
323-Printing and Related Support Activities	12	0	12
324-Petroleum and Coal Products Manufacturing	5	0	5
325-Chemical Manufacturing	33	1	34
326-Plastics and Rubber Products Manufacturing	16	1	17
327-Nonmetallic Mineral Product Manufacturing	24	0	24
331-Primary Metal Manufacturing	25	1	26
332-Fabricated Metal Product Manufacturing	43	0	43
333-Machinery Manufacturing	49	0	49
334-Computer and Electronic Product Manufacturing	29	1	30
335-Electrical Equipment, Appliance, and Component Manufacturing	22	0	22
339-Miscellaneous Manufacturing	23	1	24
423-Merchant Wholesalers, Durable Goods	1	37	38
424-Merchant Wholesalers, Nondurable Goods	1	32	33
425-Wholesale Electronic Markets and Agents and Brokers	1	1	2
441-Motor Vehicle and Parts Dealers	5	3	8
442-Furniture and Home Furnishings Stores	2	2	4
443-Electronics and Appliance Stores	4	0	4
444-Building Material and Garden Equipment and Supplies Dealers	5	1	6
445-Food and Beverage Stores	3	7	10
446-Health and Personal Care Stores	3	2	5
447-Gasoline Stations	2	0	2
448-Clothing and Clothing Accessories Stores	6	3	9

Table 6. List of eligible 6-digit NAICS industries by PPI publication status and by 3-digit NAICS sector

3-digit NAICS code and title	Number of eligible 6-digit NAICS industries		
	Currently published	Not currently published	Total
451-Sporting Goods, Hobby, Book, and Music Stores	5	2	7
452-General Merchandise Stores	3	2	5
453-Miscellaneous Store Retailers	4	5	9
454-Nonstore Retailers	5	4	9
481-Air Transportation	3	3	6
482-Rail Transportation	1	1	2
483-Water Transportation	3	3	6
484-Truck Transportation	6	0	6
485-Transit and Ground Passenger Transportation	0	11	11
486-Pipeline Transportation	2	2	4
487-Scenic and Sightseeing Transportation	0	3	3
488-Support Activities for Transportation	6	6	12
491-Postal Service	1	0	1
492-Couriers and Messengers	2	0	2
493-Warehousing and Storage	3	1	4
511-Publishing Industries (except Internet)	7	0	7
512-Motion Picture and Sound Recording Industries	0	11	11
515-Broadcasting (except Internet)	4	0	4
516-Internet Publishing and Broadcasting	0	1	1
517-Telecommunications	4	3	7
518-Internet Service Providers, Web Search Portals, and Data Processing Services	3	0	3
519-Other Information Services	0	1	1
521-Monetary Authorities - Central Bank	0	0	0
522-Credit Intermediation and Related Activities	2	12	14
523-Securities, Commodity Contracts, and Other Financial Investments and Related Activities	4	6	10
524-Insurance Carriers and Related Activities	4	6	10
525-Funds, Trusts, and Other Financial Vehicles	0	0	0
531-Real Estate	6	3	9
532-Rental and Leasing Services	3	11	14
533-Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	1	1
541-Professional, Scientific, and Technical Services	7	38	45
551-Management of Companies and Enterprises	0	0	0
561-Administrative and Support Services	6	25	31
562-Waste Management and Remediation Services	1	10	11
611-Educational Services	1	14	15
621-Ambulatory Health Care Services	5	16	21
622-Hospitals	3	0	3
623-Nursing and Residential Care Facilities	2	4	6
624-Social Assistance	0	1	1
711-Performing Arts, Spectator Sports, and Related Industries	0	11	11
713-Amusement, Gambling, and Recreation Industries	3	7	10
721-Accommodation	2	5	7
722-Food Services and Drinking Places	0	8	8
811-Repair and Maintenance	1	18	19

3-digit NAICS code and title	Number of eligible 6-digit NAICS industries		
	Currently published	Not currently published	Total
812-Personal and Laundry Services	0	16	16
813-Religious, Grantmaking, Civic, Professional, and Similar Organizations	0	0	0
814-Private Households	0	0	0
921-Executive, Legislative, and Other General Government Support	0	0	0
922-Justice, Public Order, and Safety Activities	0	0	0
923-Administration of Human Resource Programs	0	0	0
924-Administration of Environmental Quality Programs	0	0	0
925-Administration of Housing Programs, Urban Planning, and Community Development	0	0	0
926-Administration of Economic Programs	0	0	0
927-Space Research and Technology	0	0	0
928-National Security and International Affairs	0	0	0

- Should user demand for specific industries or specific detailed indices be a determining factor when deciding where to expand the PPI? For example, at a recent meeting of the FESAC, the view was expressed that the PPI Program should expand its coverage of education and health, owing to their anticipated importance to public policy debates over the next 20 years. Should the PPI program be surveying trade associations and other data users to determine areas where more indices are required? If so, what data users should be surveyed? What do other Federal agencies such as BEA, Census and the Federal Reserve Board think are the most significant gaps to be filled in the future and in what priority?

The PPI has begun an initial dialog with its counterparts in the BEA Current Industry Analysis Division. Based on this dialog, additional PPI data would be needed in the following industries:

BEA Current Industry Analysis Division (CIAD) Priorities for BLS PPIs

June 12, 2006

CIAD maintains and develops BEA's Annual Industry Accounts (AIAs), which consist of the annual time series of input-output (IO) and GDP-by-industry tables. The commodity composition of each industry's domestically-produced output and its inputs (including imported inputs) are derived at roughly the 6-digit NAICS level-of-detail within a balanced IO framework. Next, each industry's contribution to real GDP growth is derived by deflating its outputs and inputs, primarily with BLS producer and international price indexes. BEA publishes quantity and price measures of industry output, input, and value added at roughly the 3-digit NAICS level-of-detail for all private industries and government.

CIAD uses approximately 1,900 PPI's and 270 IPI's to deflate industries outputs and inputs, nonetheless, several gaps in PPI coverage exist which, if addressed, would significantly improve the accuracy of BEA's quantity and price measures in several important industries. The PPI's that CIAD needs to fill these gaps are listed below in priority order.

1. Detailed wholesale trade PPI's, as listed below in priority order. CIAD will be evaluating the recently-introduced wholesale trade PPI's for the December 2007 update of the AIAs -- NAICS 423 (durables); 424 (nondurables); 425120 (agents and brokers) -- but more detailed deflation would significantly improve the quantity and price indexes for wholesale trade.

NAICS (WHOLESALE)DESCRIPTION

4247	Petroleum and Petroleum Products Merchant Wholesalers
42343	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers
4244	Grocery and Related Product Wholesalers
4238	Machinery
4231	Motor Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers
4236	Electrical and Electronic Goods Merchant Wholesalers
42344	Other Commercial Equipment Merchant Wholesalers
4239	Miscellaneous Durable Goods Merchant Wholesalers
4243	Apparel, Piece Goods, and Notions Merchant Wholesalers
4249	Miscellaneous Nondurable Goods Merchant Wholesalers
4242	Drugs and Druggists' Sundries Merchant Wholesalers

2. Detailed retail trade PPI's, as listed below in priority order. CIAD will incorporate BLS's recently-introduced summary retail trade PPI's in its 2006 annual update of the AIAs, but detailed deflation would also significantly improve the quantity and price indexes for retail trade.

NAICS (RETAIL)	DESCRIPTION
45291	Warehouse Clubs and Supercenters
45411	Electronic Shopping and Mail-Order Houses
45300	Miscellaneous Store Retailers
45299	All other general merchandise stores

3. Additional PPI's for professional and business services industries (NAICS54-56), particularly for NAICS 55.

551112	Offices of Other Holding Companies
551111	Offices of Bank Holding Companies
551114	Corporate, Subsidiary, and Regional Managing Offices

4. PPI's for detailed lines of property and casualty insurance services. Currently BLS publishes 8 distinct PPIs here, but we'd like an expansion of detail following the lines of insurance shown in Best Aggregates and Averages. These lines do not have specific NAICS codes, but are covered under 524126 Direct Property and Casualty Insurance Carriers. For NAICS codes that are shown, we would like PPIs for 524127 Direct Title Insurance Carriers, 524128 Other Direct Insurance (except Life, Health, and Medical Carriers) with some product breakout, and 524130 Reinsurance Carriers.

5. PPI detail for commercial banks' depositor services (e.g., ATM transaction fees and service charges on deposit accounts). PPI detail for banks' loan services is excellent.

6. Detailed PPI's for securities brokerage services. We understand the present coverage as being commissions on trades for clients. We request 2 additional PPI's: for commission charges and for other brokerage services.

7. PPIs for Health care and social assistance (NAICS 62) at the 6-digit NAICS level of detail.

8. PPIs for Educational services (NAICS 61) at the 5- or 6-digit NAICS level of detail.

4. Should the particular characteristics of the industry be a determining factor in deciding where the expansion efforts should be employed? If a particular set of industries are conceptually easier to price in the PPI should they be given higher priority in determining which industries to survey? Or if some industries are conceptually more difficult to price, should they be given a higher or lower priority in determining what to price? Or if an industry would use a pricing methodology that has already been developed and tested for another industry index, should industry indices be developed for the new industry since little additional research is required? Should consideration be given to whether or not a quality adjustment strategy is available for an industry index? For example, PPI produced health services indices for many years even though only limited quality adjustment could be applied until recently. However, the PPI program has never produced a custom software index because there is no accepted quality adjustment strategy available. Would a custom software index be meaningful and useful if there was no quality adjustment methodology for the industry?

Additional indices could easily be developed for subsector 524 using the current insurance methodology. These indices would be for the following industries:

2002 NAICS Code	Industry Title
524127	Direct Title Insurance Carriers
524128	Other Direct Insurance (except Life, Health, and Medical) Carriers
524130	Reinsurance Carriers
524291	Claims Adjusting
524292	Third Party Administration of Insurance and Pension Funds
524298	All Other Insurance Related Activities

However, no current methodology is known to price industries such as Colleges and Universities (part of NAICS 611, Educational services). So possible difficult industries to price would be:

2002 NAICS Code	Industry Title
611210	Junior Colleges
611310	Colleges, Universities, and Professional Schools

- Should the US PPI program be reviewing PPI data from other countries to determine where critical gaps exist in the US industry indices? Since Canada and Mexico share the same classification system, should the US PPI be producing indices for the same industries or have the same detailed industry indices as these other countries? Should the same comparison occur with OECD or Eurostat countries? Would similar industries with similar structures facilitate international comparisons?

Currently, Statistic Canada produces six services industry group indices. Five of the six service industry groups are also priced in the US. The sixth industry group that is not currently priced in the US would require pricing the following industries:

2002 NAICS Code	Industry Title
541511	Custom Computer Programming Services
541512	Computer Systems Design Services
541513	Computer Facilities Management Services
541519	Other Computer Related Services

- Should additional quantitative data be used to determine which mix of additional industries or additional detail for existing industries should be pursued? Possible measures to use would be the growth rate of industries. If industries where the PPI current produces indices are growing at a more rapid rate than industries which haven't been surveyed by the PPI, would it be better to add additional indices to those growing industries? Another possible measure to use would be the change in the number of employees in an industry. If the number of employees in an industry is shrinking, does that indicate that the industry has less importance or would need fewer detailed industry indices? Conversely, if the number of employees are growing in an industry does that signify an increase in importance for an industry and therefore, additional indices are necessary to accurately represent that industry.

The following chart shows the industries with future employment and salary growth. Four of these industries are currently priced in the PPI.

In PPI	NAICS	Industry	Employment (in thousands)		Change	
			2004	2014	Number	Percent
	61171	Educational support services, private	67.0	120.0	53.0	79.1
X	62161	Home health care services	773.2	1,310.3	537.1	69.5
X	51121	Software publishers	238.7	400.0	161.3	67.6
X	54161	Management, scientific, and technical consulting services	779.0	1,250.2	471.2	60.5
	62331	Community care facilities for the elderly	582.6	902.1	319.5	54.8
	62149	Outpatient care centers, except mental health and substance abuse	298.4	447.4	149.0	49.9
	62142	Residential mental health and substance abuse facilities	154.0	230.8	76.8	49.9
	62139	Offices of all other health practitioners	71.7	107.0	35.3	49.3
X	62321	Residential mental retardation facilities	337.1	496.7	159.6	47.3
	56121	Facilities support services	115.6	170.0	54.4	47.1

Source: BLS National Employment Matrix

4.4 Concluding Remarks

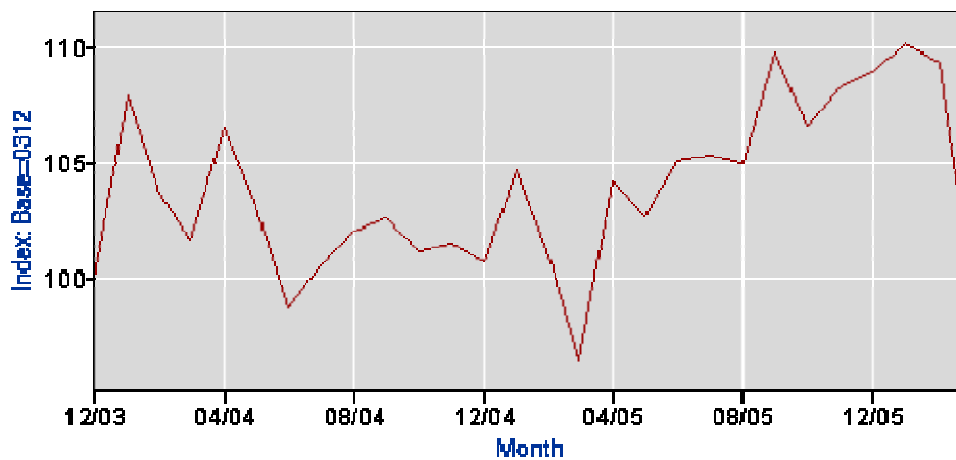
The expansion of the PPI coverage of the service-providing sector has been a significant and remarkable achievement. As it looks to the future, the PPI program plans to undertake an expansive review of the gaps that remain in its coverage of the U.S. economy, both in service-providing and goods-producing sectors. This paper has attempted to lay out the history of the PPI service sector expansion and some approaches that can be taken to address closing coverage gaps in the future. As this chapter has indicated, there are some clear alternative methods that can be used to develop data driven guidance in determining the priorities for future index development. However, the ultimate judgment and course that is taken will require substantial dialog with our statistical partners, the academic community, business, and policy users of our data.

Addendum A - Data Analysis

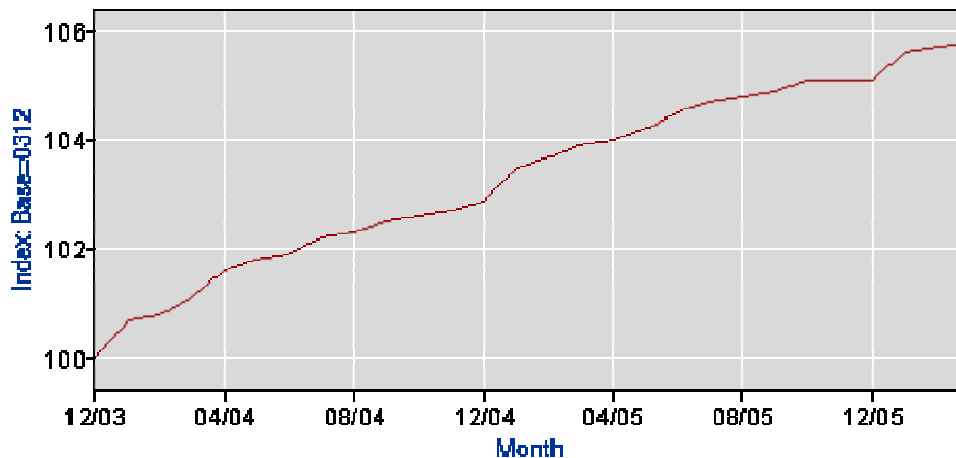
Industry Index Data

The following are a series of charts depicting the time series data for selected industries in the service sector. All data displayed are publicly available and published. For all these charts, the scale on the chart was the scale selected by the program. In some industries, the charts make the price movement appear very drastic but in reality, it is the relative sizes of the scale in those charts that make the indices appear volatile.

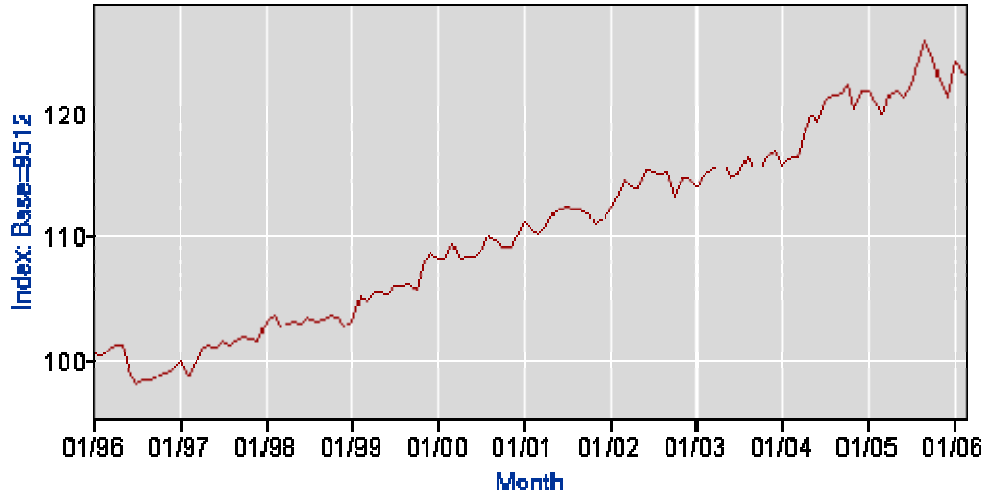
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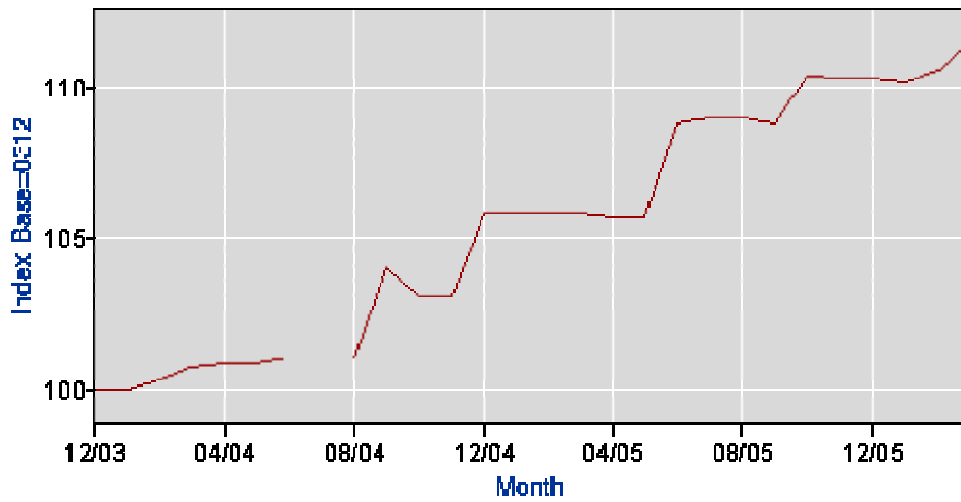
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Base Date: 0312



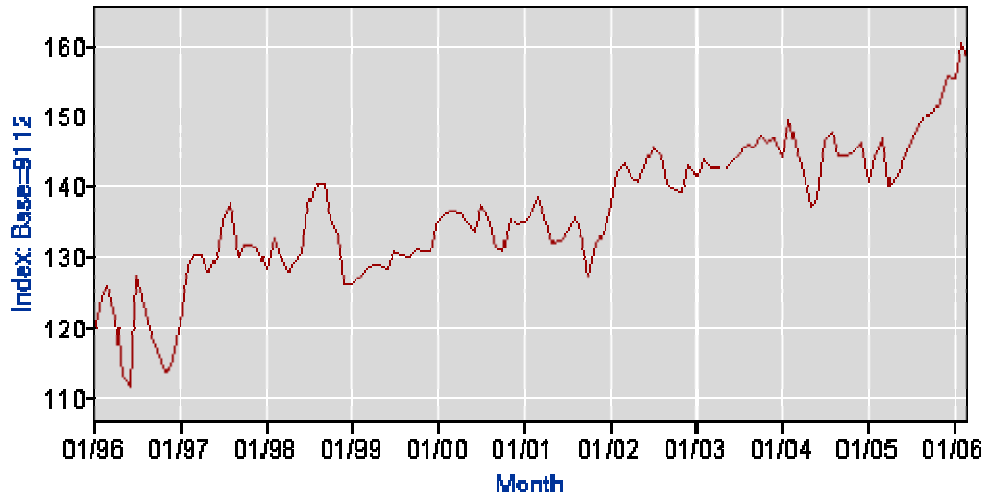
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Industry: Lessors of nonresidential bldg (excluding miniwarehouses)
Base Date: 9512



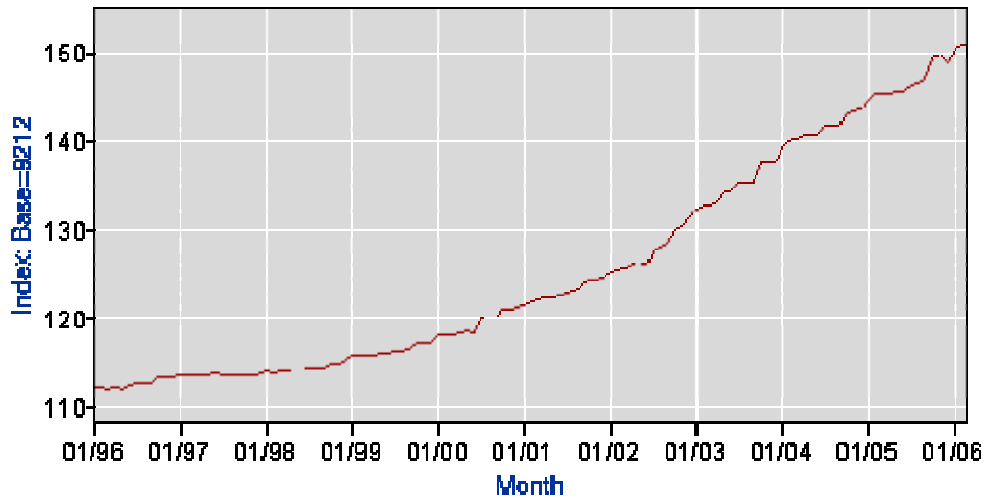
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Industry: Offices of real estate agents and brokers
Base Date: 0312



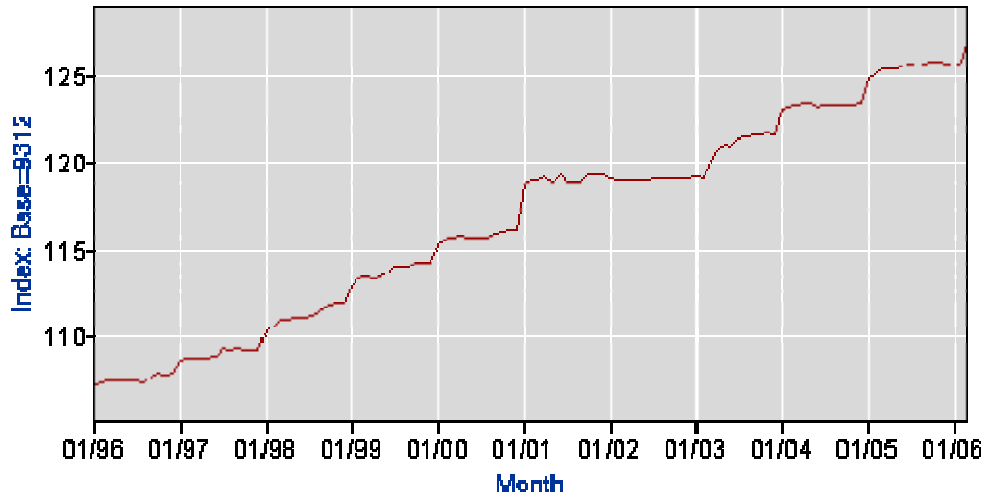
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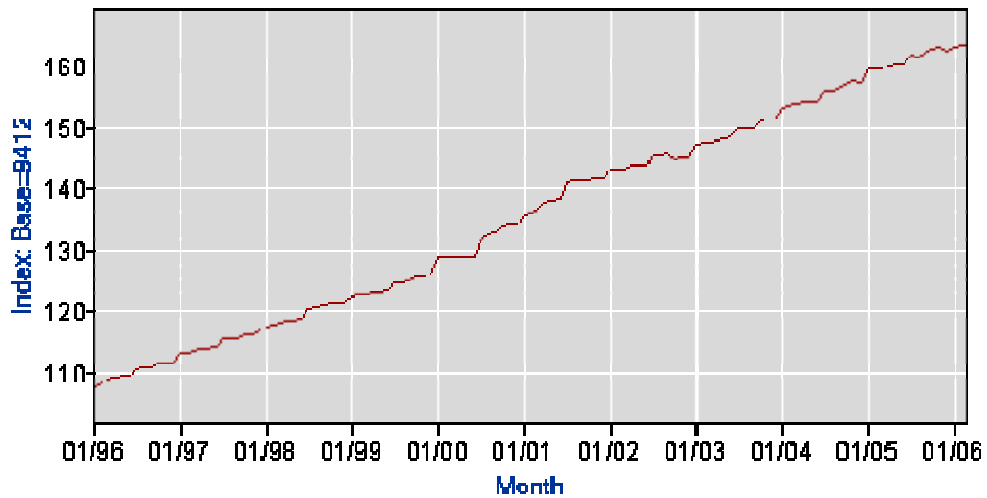
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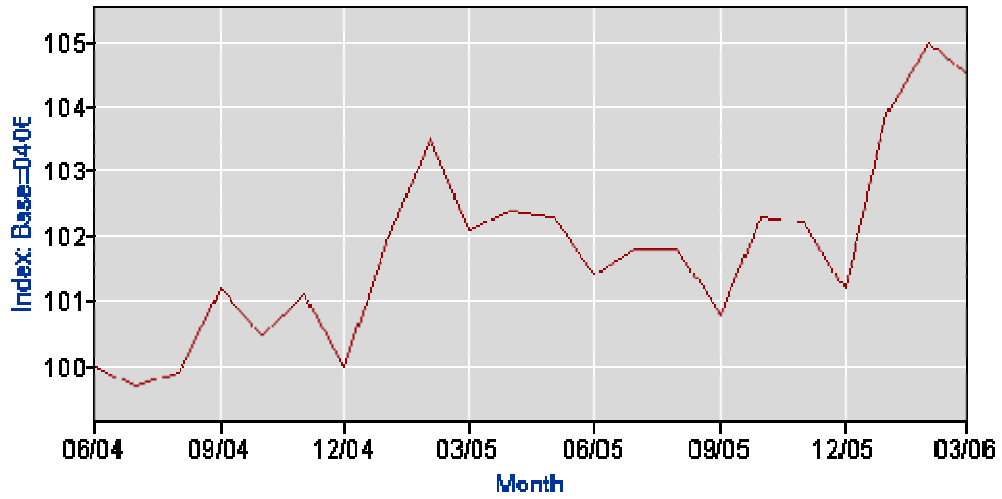
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Base Date: 9312



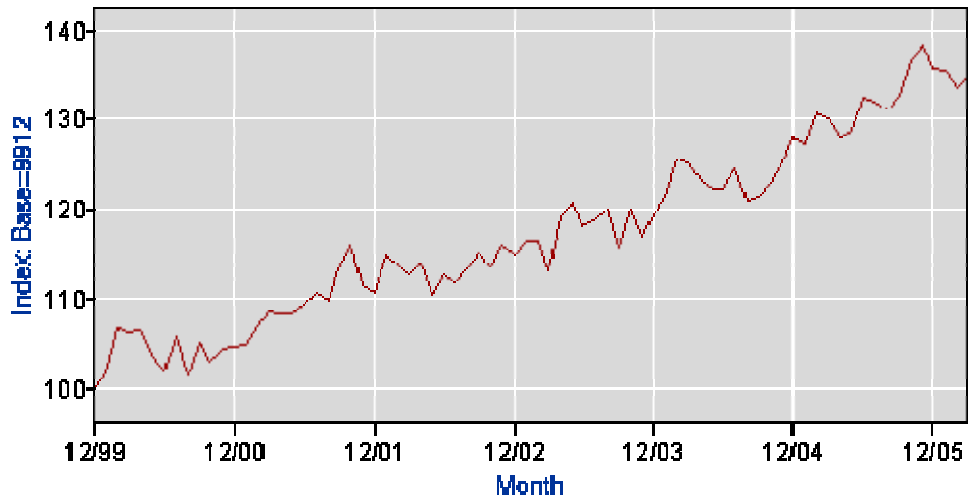
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Base Date: 9412



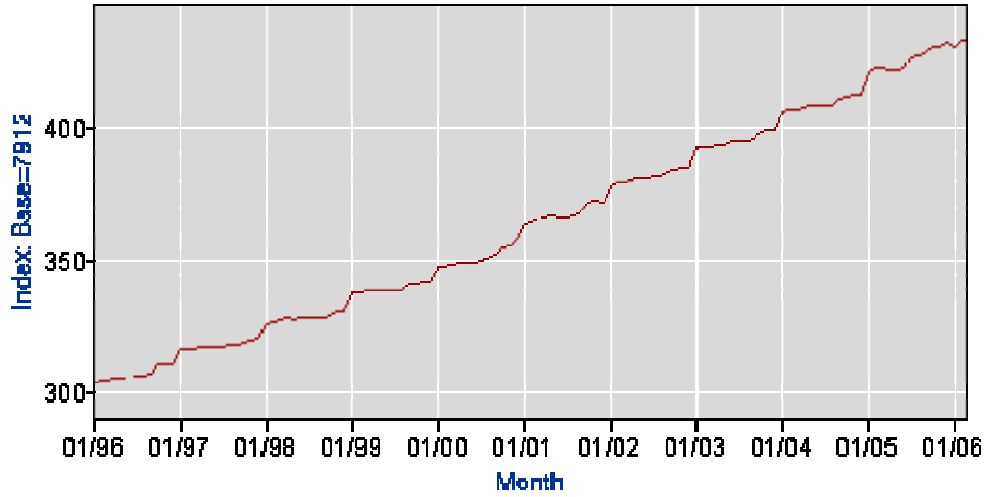
Series Id: PCU423---423---
Industry: Merchant wholesalers, durable goods
Base Date: 0406



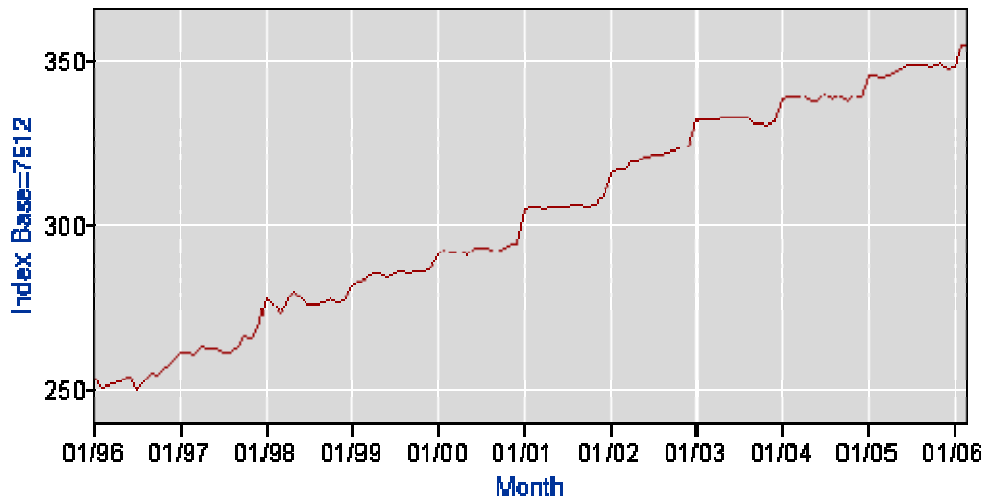
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Industry: Grocery (except convenience) stores
Base Date: 9912



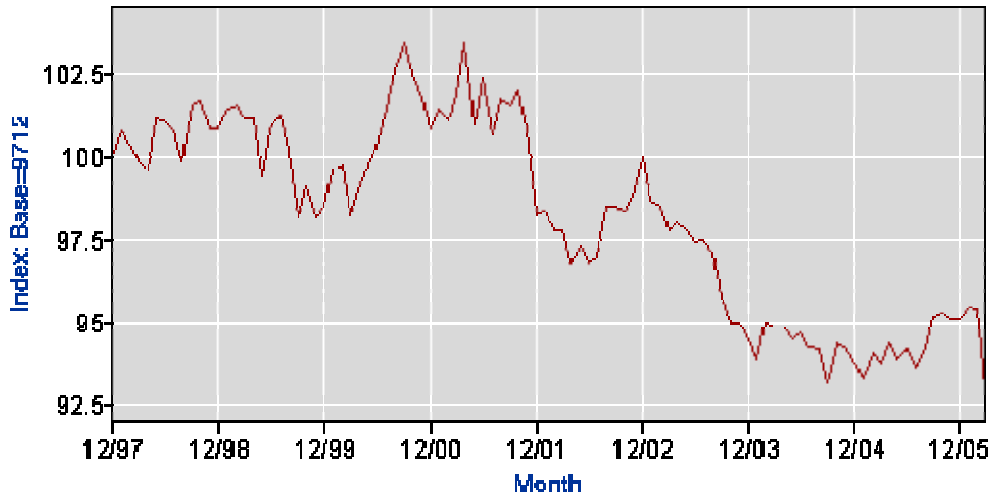
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Base Date: 7912



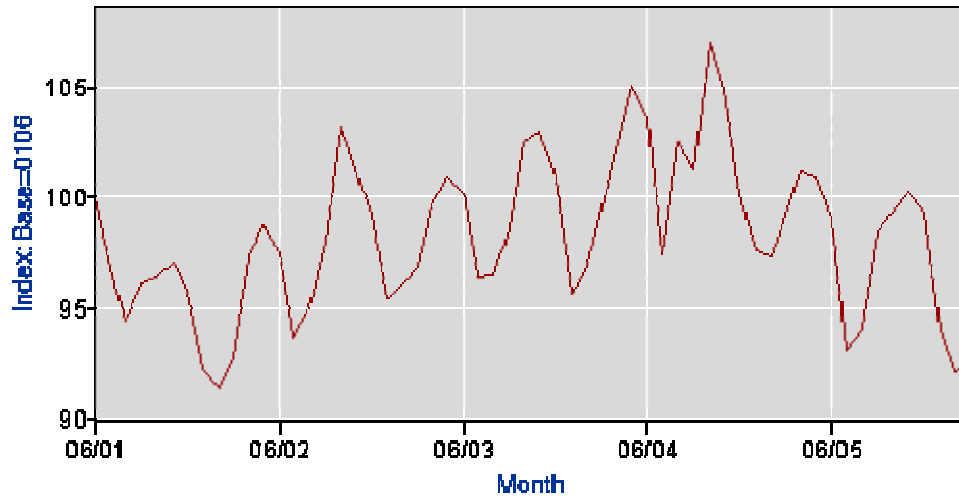
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Industry: Periodical publishers
Base Date: 7912



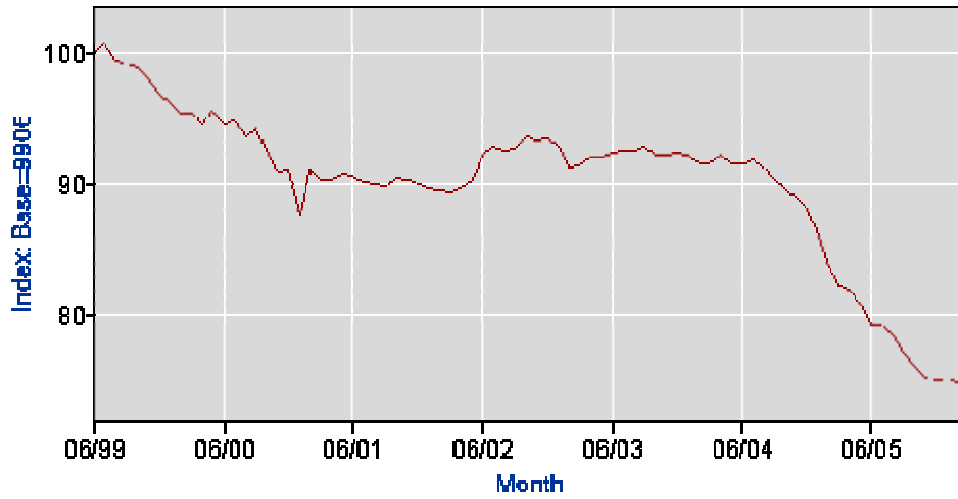
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Base Date: 9712



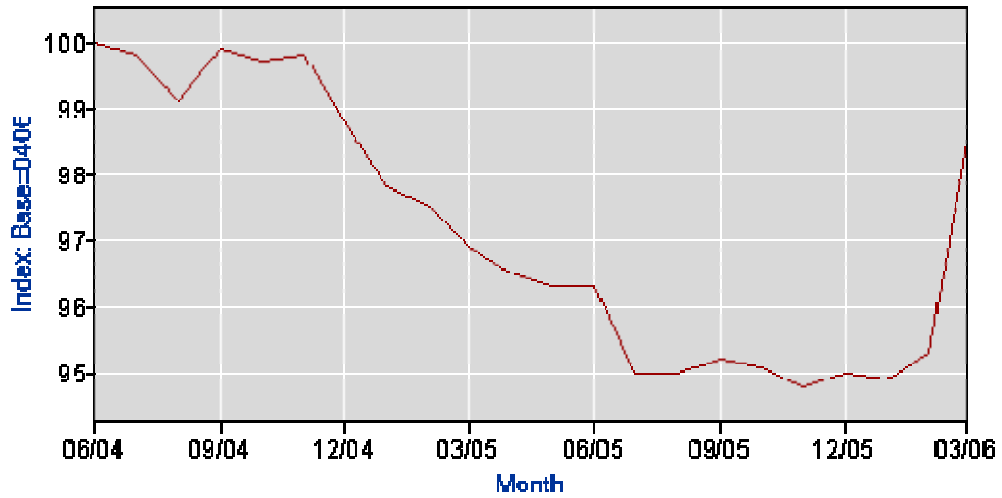
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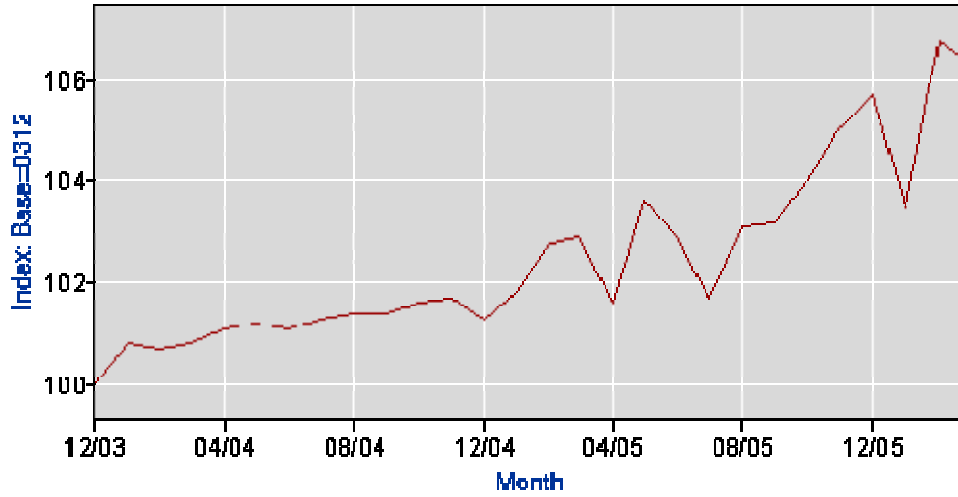
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Industry: Cellular and other wireless carriers
Base Date: 9906



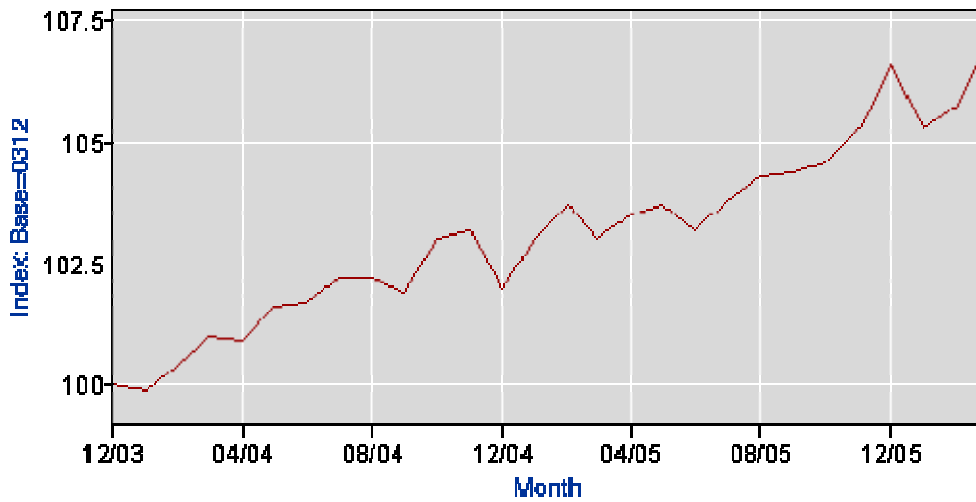
Series Id: PCU51811-51811-
Industry: ISPs and Web search portals
Base Date: 0406



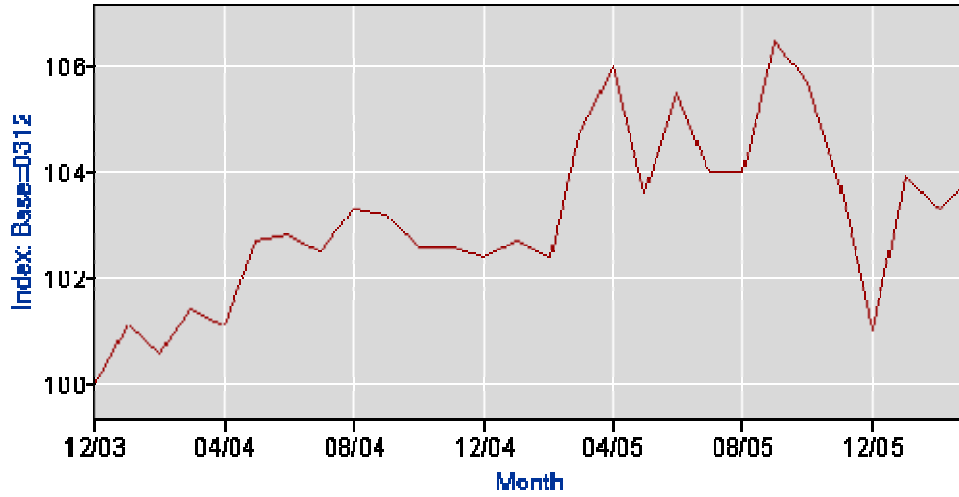
Series Id: PCU541211541211
Industry: Offices of certified public accountants
Base Date: 0312



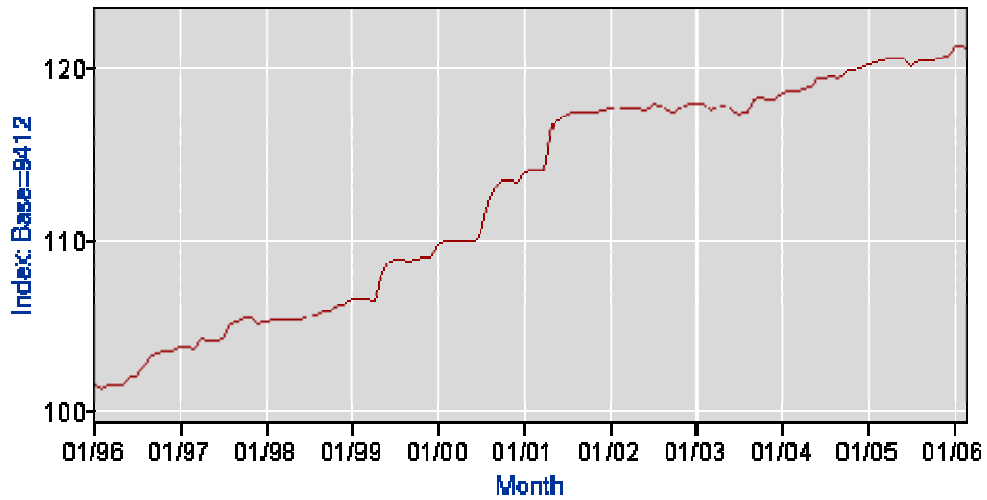
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Industry: Temporary help services
Base Date: 0312



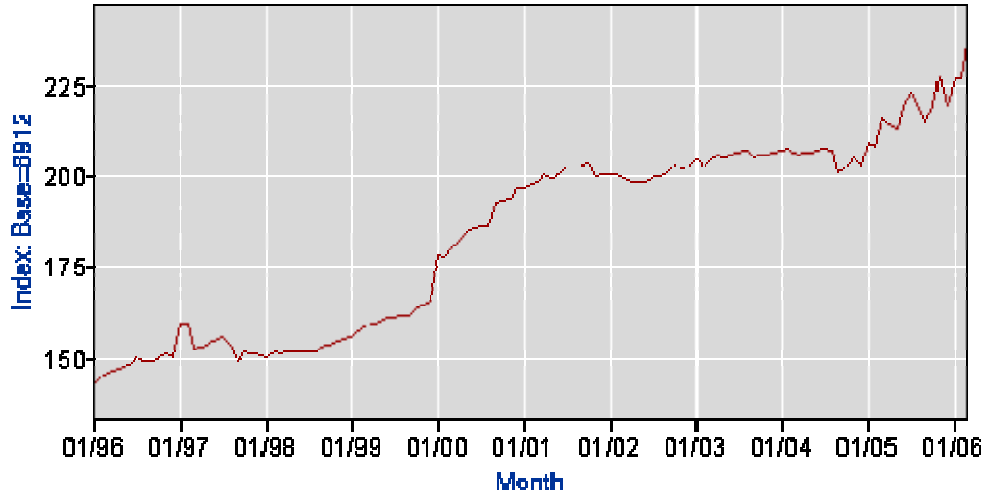
Series Id: PCU561310561310
Industry: Employment placement agencies
Base Date: 0312



Series Id: PCU561720561720
Industry: Janitorial services
Base Date: 9412



Series Id: PCU481111481111
Industry: Scheduled passenger air transportation
Base Date: 8912



Bureau of Economic Analysis Use of PPI Data Chart

This chart is from the November 2004 Survey of Current Business and shows the data used by BEA for deflation of the national accounts. Any changes since that time have been incorporated into the chart. This chart demonstrates the importance of the PPI program to the deflation of the national accounts.

Source Data and Methods for Current-Dollar GDP and Current-Dollar GDI

Component	Deflation, using price based on	Using quantity for extrapolation or direct valuation
Personal consumption expenditures		
Durable and nondurable goods	PPI, for military clothing	
Services Motor vehicle repair, rental, and other services; other repair services; other purchased intercity transportation; legal and funeral services; barbershops, beauty parlors, and health clubs; nursing homes; laundries; employment agency fees; accounting and tax return preparation services; recreation (except cable TV, parimutuel net receipts, lotteries and computer online services); hotels and motels; commercial business, trade, and correspondence schools; educational services not elsewhere classified; research organizations and foundations	PPI, for proprietary and government nursing homes and employment agency fees	
Physicians, dentists, and other professional medical services	PPI, for physicians, home health care, and medical laboratories	
Financial services furnished without payment by banks, other depository institutions, and investment companies	PPI, for investment companies' securities commissions	
Brokerage charges and investment counseling, bank service charges, intercity transportation except "other," and private higher education	PPI, for securities commissions	

Source Data and Methods for Current-Dollar GDP and Current-Dollar GDI

Component	Deflation, using price based on	Using quantity for extrapolation or direct valuation
<p>Services <i>continued</i> Public education and hospitals, water and other sanitary services, and lotteries</p> <p>Insurance, private hospitals, religious activities, cable TV, electricity, natural gas, telephone, and local transport</p>	<p>PPI, for public hospitals</p> <p>PPI, for private for-profit hospitals</p>	<p>Quantity extrapolation. For medical care and hospitalization insurance, benefits deflated by PPI; for workers compensation, premiums deflated by PPI</p>
<p>Fixed investment</p>		
<p>Nonresidential structures</p>		
<p>Power and communications</p> <p>Mining exploration, shafts, and wells</p>	<p>PPI, for power excluding electric</p> <p>PPI, for casing, oil and gas well drilling, and oil and gas field services</p>	
<p>Other structures</p>	<p>PPI, for brokers' commissions</p>	
<p>Nonresidential equipment and software</p>		
<p>Equipment except those listed below</p> <p>New autos, new light trucks, and net purchases of used autos and used light trucks</p>	<p>PPI, for most domestic components and for imported transportation equipment</p> <p>PPI, for new light trucks</p>	
<p>Software</p>	<p>PPI, for prepackaged software; for own account and custom software</p>	
<p>Residential investment</p>		
<p>Manufactured homes</p> <p>Brokers' commissions</p>	<p>PPI</p> <p>PPI</p>	

Source Data and Methods for Current-Dollar GDP and Current-Dollar GDI

Component	Deflation, using price based on	Using quantity for extrapolation or direct valuation
Change in private inventories		
Non-farm		
Purchased goods of all industries	PPI	
Work-in-process and finished goods, manufacturing	PPI	
Net exports of goods and services		
Exports and imports of goods	PPI, for gold; semiconductor exports, selected transportation equipment; selected agricultural foods, feeds, and beverages; and selected imports of refined petroleum	
Exports and imports of services	PPI, for selected other transportation BEA price indexes, CPI, PPI and implicit price deflator of final sales to domestic purchases	
Government consumption expenditures and gross investment		
Federal government		
National defense except consumption of general government fixed capital	PPI, for selected goods and services CPI and PPI, for utilities and communications	
Nondefense except consumption of general government fixed capital	PPI, for most goods and selected services For custom software, BEA index derived from nondefense compensation price index and PPI	
State and local government		
Consumption expenditures and gross investment except those listed below	PPI, for electricity, hospitals, most professional services, and goods	

Pricing Methods Chart

This chart lists the seven internationally accepted pricing methods and indicates which methods are used by the US PPI program for the various industry indices listed. If there are substantial numbers of the different methods for an industry, all those methods are checked for that industry. These seven methods were developed by a special OECD/Eurostat task force. This task force developed the Service Producer Price Index manual. A thesaurus for these pricing methods is being developed for use at the Voorburg Group meeting, a UN city group on services statistics. A draft version (Version 4) of this thesaurus is included as an addendum to this paper.

NAICS	Industry Title	Direct use	Unit value	Component pricing	Percentage fee	Model	Time-based	Contract
423000	Merchant Wholesalers, Durable Goods	X	X					
424000	Merchant Wholesalers, Non-durable Goods	X	X					
425120	Wholesale Trade Agents and Brokers				X			
441110	New Car Dealers	X	X					
441210	Recreational Vehicle Dealers	X	X					
441222	Boat Dealers	X	X					
441310	Automotive Parts and Accessories Stores	X						
441320	Tire Dealers	X						
442110	Furniture Stores	X						
442210	Floor Covering Stores	X						
443111	Household Appliance Stores	X						
443112	Radio, Television, and Other Electronics Stores	X						
443120	Computer and Software Stores	X						
443130	Camera and Photographic Supplies Stores	X						
444110	Home Centers	X						
444120	Paint and Wallpaper Stores	X						
444130	Hardware Stores	X						
444190	Other Building Material Dealers	X						
444220	Nursery, Garden Center, and Farm Supply Stores	X						
445110	Supermarkets and Other Grocery (except Convenience) Stores	X						
445200	Specialty Food Stores	X						
445310	Beer, Wine, and Liquor Stores	X						
446110	Pharmacies and Drug Stores	X						
446130	Optical Goods Stores	X						
446191	Food (Health) Supplement Stores	X						
447110	Gasoline Stations with Convenience Stores	X						
447190	Other Gasoline Stations	X						
448110	Men's Clothing Stores	X						
448120	Women's Clothing Stores	X						
448140	Family Clothing Stores	X						
NAICS	Industry Title	Direct use	Unit value	Component pricing	Percentage fee	Model	Time-based	Contract
448210	Shoe Stores	X						
448310	Jewelry Stores	X						

448320	Luggage and Leather Goods Stores	X						
451110	Sporting Goods Stores	X						
451120	Hobby, Toy, and Game Stores	X						
451130	Sewing, Needlework, and Piece Goods Stores	X						
451211	Book Stores	X						
451220	Prerecorded Tape, Compact Disc, and Record Stores	X						
452111	Department Stores (except Discount Department Stores)	X						
452112	Discount Department Stores	X						
452900	All Other General Merchandise Stores	X						
453110	Florists	X						
453210	Office Supplies and Stationery Stores	X						
453220	Gift, Novelty, and Souvenir Stores	X						
453930	Manufactured (Mobile) Home Dealers	X	X					
454111	Electronic Shopping	X						
454112	Electronic Auctions	X						
454113	Mail-Order Houses	X						
454210	Vending Machine Operators	X						
454310	Fuel Dealers	X						
481111	Scheduled Passenger Air Transportation		X					
481112	Scheduled Freight Air Transportation	X						
481210	Nonscheduled Air Transportation	X						
482111	Line-Haul Railroads							X
483111	Deep Sea Freight Transportation	X						
483113	Coastal and Great Lakes Freight Transportation	X						
483211	Inland Water Freight Transportation	X						
484110	General Freight Trucking, Local	X						
484121	General Freight Trucking, Long-Distance, Truckload	X						
484122	General Freight Trucking, Long-Distance, Less Than Truckload	X						
484210	Used Household and Office Goods Moving	X						
484220	Specialized Freight (except Used Goods) Trucking, Local	X						
484230	Specialized Freight (except Used Goods) Trucking, Long-Distance	X						
486110	Pipeline Transportation of Crude Oil	X						
486910	Pipeline Transportation of Refined Petroleum Products	X						
488119	Other Airport Operations	X						
488190	Other Support Activities for Air Transportation	X						
NAICS	Industry Title	Direct use	Unit value	Component pricing	Percentage fee	Model	Time-based	Contract
488310	Port and Harbor Operations	X						
488320	Marine Cargo Handling	X						
488330	Navigational Services to Shipping	X						
488510	Freight Transportation Arrangement	X						
491110	Postal Service	X						

492110	Couriers	X						
492210	Local Messengers and Local Delivery	X						
493110	General Warehousing and Storage					X		
493120	Refrigerated Warehousing and Storage					X		
493130	Farm Product Warehousing and Storage					X		
511110	Newspaper Publishers	X	X					
511120	Periodical Publishers	X	X					
511130	Book Publishers	X	X					
511140	Directory and Mailing List Publishers	X	X					
511191	Greeting Card Publishers	X						
511199	All Other Publishers	X						
511210	Software Publishers	X	X					
515111	Radio Networks		X					
515112	Radio Stations		X					
515120	Television Broadcasting		X					
515210	Cable and Other Subscription Programming	X						
517110	Wired Telecommunications Carriers		X					
517211	Paging		X					
517212	Cellular and Other Wireless Telecommunications					X		
517510	Cable and Other Program Distribution	X						
518111	Internet Service Providers	X	X					
518112	Web Search Portals	X	X					
518210	Data Processing, Hosting, and Related Services	X						
522110	Commercial Banking		X					
522120	Savings Institutions		X					
523110	Investment Banking and Securities Dealing	X	X		X	X		
523120	Securities Brokerage				X			
523920	Portfolio Management				X			
523930	Investment Advice	X				X		
524113	Direct Life Insurance Carriers					X		
524114	Direct Health and Medical Insurance Carriers					X		
524126	Direct Property and Casualty Insurance Carriers					X		
		Direct use	Unit value	Component pricing	Percentage fee	Model	Time-based	Contract
524210	Insurance Agencies and Brokerages				X			
531120	Lessors of Nonresidential Buildings (except Miniwarehouses)		X					
531130	Lessors of Miniwarehouses and Self-Storage Units	X						
531210	Offices of Real Estate Agents and Brokers				X			
531311	Residential Property Managers				X			
531312	Nonresidential Property Managers				X			
531320	Offices of Real Estate Appraisers	X						

532111	Passenger Car Rental	X						
532120	Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing	X						
532412	Construction, Mining, and Forestry Machinery and Equipment Rental and Leasing	X						
541110	Offices of Lawyers			X		X		
541211	Offices of Certified Public Accountants			X		X		
541219	Other Accounting Services			X		X		
541310	Architectural Services			X		X		
541330	Engineering Services			X		X		
541610	Management Consulting Services			X		X		
541810	Advertising Agencies				X	X		
561310	Employment Placement Agencies	X						
561320	Temporary Help Services	X						
561330	Professional Employer Organizations	X						
561510	Travel Agencies	X			X			
561612	Security Guards and Patrol Services	X						
561720	Janitorial Services							X
562111	Solid Waste Collection	X						
611420	Computer Training	X	X					
621111	Offices of Physicians (except Mental Health Specialists)					X		
621511	Medical Laboratories	X						
621512	Diagnostic Imaging Centers	X						
621610	Home Health Care Services	X						
621991	Blood and Organ Banks	X						
622110	General Medical and Surgical Hospitals					X		
622210	Psychiatric and Substance Abuse Hospitals					X		
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals					X		
623110	Nursing Care Facilities	X						
623210	Residential Mental Retardation Facilities	X						
NAICS	Industry Title	Direct use	Unit value	Component pricing	Percentage fee	Model	Time-based	Contract
713110	Amusement and Theme Parks	X						
713910	Golf Courses and Country Clubs	X						
713940	Fitness and Recreational Sports Centers	X						
721110	Hotels (except Casino Hotels) and Motels	X	X					
721120	Casino Hotels	X	X					
811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance					X		

Analysis of Index Quality Chart

This chart looks the various characteristics of a producer price index and rates these characteristics according to the particular data that is used in producing that index. The goal of the rating system is to provide a metric that can be used rate indices for a particular country and also to provide international comparisons between the different indices. This metric was developed for possible use at future Voorburg Group meetings. The metric and instructions for using the metric are included as an addendum to this paper. A subset of PPI services indices are displayed in this chart with their ratings.

Producer Price Index Quality Assessment Framework

Points	Assessment Category	NAICS 524	NAICS 5221	NAICS 517212	NAICS 515120
	Shipment price (weight =0.1) <i>Select A or B</i>	100	100	100	100
0	A. Order pricing (actual shipment may be different)				
100	B. Completion of service or proxy	x	x	x	x
	Current period production (weight = 0.10) <i>Select A or B</i>	100	100	100	100
50	A. No new products since reference period	x	x	x	x
0	B. Critical new products since reference period <i>Select C or D</i>				
50	C. Substitution/models updated regularly	x	x	x	x
0	D. No substitution/models not updated				
	Transaction price (weight = 0.25) <i>Select most prevalent in industry</i>	75	100	75	100
100	A. Real transaction price				
50	B. List price				
100	C. Unit value for homogenous group		x		x
50	D. Unit value for non-homogenous group				
75	E. Model price	x		x	
50	F. Input costs plus profit and overhead				

	Output price (weight = 0.25) <i>Select most prevalent in industry</i>	75	100	75	100
100	A. Actual transaction (or average)		x		x
75	B. Model transaction with all features	x		x	
50	C. Model with some features				
50	D. Price reflects some components				
50	E. Input costs with all features				
25	F. Input costs with some features				
0	G. Charge out rates				
	Monthly measure (weight = 0.10) <i>Select A or B</i>	75	50	50	50
50	A. Current month, not lagged	x		x	
0	B. Lagged		x		x
	<i>Select C, D, or E</i>				
50	C. Average over entire month		x	x	x
40	D. Average of multiple measurements over portions of month				
25	E. Single point in time	x			
	Constant quality (weight = 0.20) <i>Select A or B</i>	100	100	100	100
100	A. Rapid changes not expected/explicitly adjust	x	x	x	x
0	B. Rapid changes expected/no explicit adjustment				
	TOTAL SCORE	85	95	82.5	95

Type A point range = over 90

Type B point range = 70 to 90

Type C point range = less than 70

Addendum B – SPPI Thesaurus

... you cannot use language to get in between language and reality. If you describe reality, you always uses words; so when you compare a concept with reality, you in fact compare only a concept with another concept.
 – Roger Scruton (after Wittgenstein)

1. Introduction

2. Guidance for terminology on SPPI’s in Voorburg Group documents

The Eurostat/OECD SPPI Guide provides extensive discussions on seven main pricing methods that are widely recognized. These seven pricing methods form the basis for descriptions of the pricing methods of individual SPPI’s in mini-papers and sector-papers. However, to describe an SPPI well and unambiguously, it has to be described with additional terms. Two main criteria are of importance to specify pricing methods: the *target of measurement* and the *data type in the survey*. Consequently, the best way to describe the pricing method of a particular SPPI is to determine and describe:

- which of the seven **Pricing methods** in the Eurostat/OECD SPPI Guide it is,
- what the **data type in the survey** is, and
- what the **target of measurement** is.

For instance, after describing an SPPI as using model pricing, it still has to be clarified what form of model transaction is used as target of measurement (fictitious or not, same or different for every respondent) and what the data type in the survey is. Likewise, for a unit value method, it has to be clarified whether the target of measurement is a regularly occurring transaction or only some output components, and more information about the data type in the survey.

The list of preferred terms consists of the terms in table 1: seven pricing methods, six types of data type in the survey, and four types of target of measurement.

Table 1. Preferred terms for SPPI’s (described further in section 3).

Data type in the survey	Pricing methods	Target of measurement
Percentages fees and related value	Direct use of prices of repeated services	Real transaction
List prices	Contract pricing	Model transaction
Input prices	Model pricing	Output components
Real transaction prices	Unit values	Hourly charge-out rates
Income and amount sold	Component pricing	
Expert estimate	Percentage fees	
	Pricing based on working time	

Additionally, it is of much interest to describe the pricing method of an SPPI in terms of three more aspects. This is especially interesting for international comparisons and discussion on the merits and quality of different options. This is the topic of section 4.

- 1) Length of delivery and length of the survey period
- 2) Relation between the moment of delivery and price recording in the index
- 3) Number of real transactions covered in one piece of price information

3. Preferred terms in describing pricing methods

3.1 The seven pricing methods from the SPPI Guide

Component pricing: a pricing method that divides the service into a number of key output components of which one or more are then priced separately as target of measurement. The data type in the survey for this pricing method concerns existing company data (real transaction prices, income and amount sold, list prices, input costs, etc.). The statistician enters all the prices on a worksheet or bill, resulting in an aggregate price. But this price is not (necessarily) an estimation of a transaction price. Component pricing thereby differs from model pricing, as in the latter a single price for an entire transaction is surveyed.

This method's best-known use is in telephony PPI's, where it is sometimes known by a synonym (the bill method), a term which should not to be used to avoid confusion.

Contract pricing: a pricing method which uses real transaction prices of a special kind as the data type in the survey. They are special because the prices are charged for a same (or very similar) service that is repeated each survey period by the same producer for the same client. The word 'contract' in the name refers to the long-term and/or framework contracts that are established between client and producer. This pricing method may work if the pricing mechanism entails these contracts, for instance in cleaning, security services and freight transport. This pricing method can be regarded as a special case of the direct use of prices of repeated services.

Direct use of prices of repeated services: a straightforward pricing method which surveys a real transaction price or a list price, thereby acquiring directly the price of a service that occurs every survey period (a real transaction). This coincides with the PPI Manual's transaction pricing and is standard PPI and CPI practice. It is the preferred and easiest method because there is no difference between the surveyed prices and the target of measurement, no assumptions or calculations are necessary.

Model pricing: a pricing method in which a price is estimated for a standardised product, a model transaction, which is not transacted in the comparison period. A single fictitious service can be set as the re-pricable product for a group of respondents. Alternatively, the specifications of the standardised product can be based on an actual contract or bill in the past. Synonyms for this second type observed in the literature which should not to be used to avoid confusion are: estimated net transaction price or billed method.

In another form of model pricing an expert of the respondent enterprise estimates a realistic transaction price. The expert can use real transaction prices, income and amount sold, list prices, input prices as data type in the survey for calculating this price, (each of which may reflect prices for time worked). The resulting total price for the standardised product is always fully fictitious. Alternatively, the expert can use his subjective judgement based on the overall market situation, for instance by keeping recent bids in mind, resulting in a pure expert estimate.

The model pricing method is used for unique services, notably the professional business services for which hourly charge-out rates are also used often. It is often a challenge to make an adequate quality adjustment when the standardised product becomes outdated and is replaced by a new standardised product.

Model pricing differs from component pricing in that only the price for a model transaction is the target of measurement. Component pricing uses multiple prices which together do not necessarily reflect the price of a model transaction.

Percentage fees: a pricing method that estimates a price by multiplying a percentage and the value of the asset that the service and the percentage fee are tied to. This is only possible if the pricing mechanism uses these figures, for instance, the price for a service related to a specific piece of real estate uses the price of this real estate and a percentage fee. Other examples include placing advertisements and rental.

The target of measurement is usually a model transaction, sometimes an output component. For operational or practical reasons separate measurement of the change of the percentage fees and the asset prices can be preferred over e.g. model pricing.

Each data type in the survey (the percentage and the asset price) can be surveyed from a different source. Strictly speaking, the percentage can be taken from a list or be estimated by an expert or calculated as an average. Often, the price (index) of the asset is already available within the statistical institute, like the price index for a good rented.

A synonym, not to be used to avoid confusion is ad valorem price.

Pricing based on working time: a pricing method which surveys the money amount charged to a buyer of a service, for a standard amount (e.g. one hour) of work by an employee of the producer, contributing to the production (provision) of that service. It is only used in the professional business services where the pricing mechanism is such that the price of a service is largely based on the number and charge-out rate of the hours needed to produce the service (not to be mistaken for the employee's wage). The data type in the survey can differ highly:

1. unit values type information of turnover or income divided by number of hours worked (also known as realised hourly rates in the Netherlands and fee income per grade of worker in the UK),
2. list prices (also known as standard hourly rates),
3. input prices in the form of wages multiplied by or summed with a markup, or
4. expert estimate.

Pricing based on working time has usually as a target of measurement the hourly charge-out rate, but prices for working time can also be entered into a model transaction. If the price of a model transaction is highly determined by hourly rates, the OECD/Eurostat SPPI Guide recommends that the pricing method is classified as pricing based on working time, to make clear to users that the resulting SPPI has potentially a 'productivity bias', i.e. no correction for changing productivity or efficiency during the working time.

Unit values: a pricing method that uses income and amount sold as data type in the survey. The quotient of these two results in an average price over a large number of transactions, which may be regarded as a model transaction or an output component but it is usually an average price over a whole group of transactions, for instance, in telephony, the 'local calling price' is the total revenue from local phone calls divided by the total number of local phone calls. If heterogeneous products are added up, a bias can occur.

Besides as a pricing method, the term 'unit value' is often used for the data type in the survey, (for which we propose income and amount sold) and for the target of measurement. The term is often used for an 'average price' over multiple transactions and/or a survey period, being preferred over the alternative, a single price observation. In this sense, model transactions, lists of output components or hourly charge-out rates can use unit value type information. Note that other literature like the PPI Manual uses the term slightly differently, although not in contradictory ways.

3.2 Data types in surveys

Expert estimate: a data type in the survey which bases a price on the potentially subjective judgement of the expert in the responding company who fills in the survey form. The estimate can reflect different types of units, for instance only components of an entire service or prices per working time and per product. If an SPPI uses expert estimates, it effectively transfers the responsibility and burden of pricing to the expert. The price paid is less control over how the price that enters SPPI calculation is established.

Input prices: a data type in the survey which corresponds to the prices of all (or a number of) input components needed to make a set amount of output. The profit margin is always to be included as an important input component. If not included, input and output prices become unacceptably linked. The pricing mechanism is sometimes such that an enterprise applies a markup factor to calculate an output price from an input price. Markup is best known from its use in the pricing method pricing based on working time which multiplies the markup factor with an hourly wage to arrive at an hourly charge-out rate. The other pricing method using this data type in the survey is model pricing. Strictly speaking, the input prices can be taken from a list or be estimated by an expert or calculated as an average from real transactions, but an input price is set apart as it is not an output price, unlike every standard data type in the survey.

Income and amount sold: a data type in the survey in which the quotient of the two variables (income and amount sold) results in a price, which can be used in almost any pricing method. In calculating this price, the equation $Value (v) = Price(p) * Quantity(q)$ is re-written at the micro level into $p=v/q$.

List price: a data type in the survey in which the price of a product is quoted from the producer's price list, catalogue, Internet site, and the like. It is generally the gross price exclusive of all discounts, surcharges, rebates, and the like that apply to an actual transaction. A list price is therefore inferior to a real transaction price or shipment price for PPI compilation, although from case to case the assumption of correspondence with a real transaction price can differ significantly (i.e. from being a reasonable to a poor assumption). List prices for fixed mounts of working time are known as standard hourly rates. Another synonym which should not be used to avoid confusion is book price.

Percentage fees and related value: a data type in the survey, only to be used in the pricing method percentage fees. Strictly speaking, the percentage can be taken from a list or be estimated by an expert or calculated as an average from real transactions, but a percentage is set apart as it is not a price, unlike every other data type in the survey. The 'related value' (see the pricing method percentage fees) is an unusual data type as well.

Real transaction price: a data type in the survey in which the price was truly paid in the market, taken from a receipt, bank statement or electronic database with transactions.

3.3 Targets of measurement

Hourly charge-out rates: a target of measurement of the pricing method pricing based on working time, which accepts as the unit for periodic pricing one hour's work by an employee of the producer which contributes to the production (provision) of a service.

Model transaction: a target of measurement in which a standardised service is frozen to allow meaningful price comparisons over time. A single fictional service can be set as the re-pricable item for a group of respondents. Alternatively, the specifications of the standardised service can be based on

an actual contract or bill in the past (e.g. the base period). In this case, each respondent has better insight in the product.

Output components: a target of measurement which constitutes of a number of (typically not all) components of a service, mostly used in component pricing. Either the prices of all components are added up and compared with the sum in each comparison period, or the price of each output component is compared separately with prices in comparison periods.

Real transaction: a target of measurement which occurs in the ideal situation. Every comparison period the same service is really provided and for this service a price is available. The main pricing method is direct use of prices of repeated services, including contract pricing, although perfect unit values could estimate a real transaction.

4. Three more aspects for describing a pricing method well

1) Length of delivery and length of the survey period

A discriminating aspect between pricing methods is the comparison of the lengths of service delivery and the survey period. Three situations can be imagined:

- start and finish of delivery within one survey period,
- delivery that lasts longer than one survey period because one contract (transaction) covers a repeated service (e.g. *daily cleaning*); each period the same or similar services are delivered.
- delivery that lasts longer than one survey period due to the nature of the service (e.g. *construction project*).

2) Relation between the moment of delivery and price recording in the index

A discriminating aspect between pricing methods is the comparison of the moment of delivery of the service and the moment that the price related to this service is recorded in the SPPI. A number of situations can be imagined:

- a. During delivery
 - i. As delivery progresses
 - ii. At the start
 - iii. At the end (e.g. shipment prices)
- b. Before delivery starts; when contract is signed (e.g. order prices)
- c. After delivery is finished (e.g. in *construction*)
- d. Depending on the moment of payment, which differs per transaction.

3) Number of real transactions covered in one piece of price information

For clarity's sake, it is useful to specify the number of transactions that are covered in one piece of price information as received from the respondent (One (e.g. contract pricing), More than one (e.g. unit value), None (e.g. model pricing), Unclear (e.g. indicator of general average price change, standard hourly rates))

5. Related terms

Amount: see income and amount sold. The quantity of (a component of a) service which is homogenous enough to be useful in calculations. E.g. the quantity of calling minutes is useful, the quantity of projects of an engineering firm is not useful.

Ad valorem price: see percentage fee and percentage fees and related value.

Average invoiced hourly rate: Swedish term. See pricing based on working time.

Average price per qualification: French term. See pricing based on working time.

Bill(ing) method: see component pricing

Billed method: see model pricing

Book price: see list price.

Data type in the survey: a description of the raw data surveyed by a statistician from a respondent. The pricing method transforms these data into a prices for the target of measurement.

Estimated net transaction price: see model pricing

Fee income per grade of worker: see pricing based on working time.

Fictitious service: a service that is devised for a price survey only, used in model pricing.

Function point: a unit in a system to quantify software used by the ABS.

Income: money paid to a producer, see income and amount sold. The same is sometimes meant by revenue and turnover.

Input components: a target of measurement which is based on the assumption that a selection of input prices can be an acceptable estimate of output prices. Although “input components” would amount to a preferred term (there is no better term), it is a highly *unpreferred* target of measurement and is therefore not listed with the preferred terms. Note that input prices can be used in a number of pricing methods which all lead to a better target of measurement.

In the EU, National accounts are prohibited to deflate input and output with such similar (mutually dependent) figures.

An example is the use of truck write-off, driver’s wage and fuel costs to estimate an output price for road haulage.

Market price: see real transaction price.

Mark-up: see input prices.

Offered price: see tender(ed) price.

Order price: the price quoted at the time the order is placed by the purchaser. (From PPI manual). See also shipment price.

Pricing method: two descriptions are offered for this term:

A) the assumptions, modelling and calculations made to transform data of a certain data type in the survey into prices (for a certain type of target of measurement) that can be used further in regular calculation of price relatives and subsequent aggregation in SPPI compilation.

B) the use of a specific type of information on prices to represent the evolution of price in price index compilation. It is a procedure put in place by statisticians to make price data eligible to be entered in an

index. The pricing method is largely determined by the characteristics of the data. (from *SPPI Guide*, OECD et al. 2005)

Pricing mechanism: the way prices come about in the market between producer and client. Note: it differs largely from a pricing method.

Rate method: the price of a unit of which typically large numbers are bought. Mostly used for telephony, where a rate is e.g. a price per minute calling.

Realised hourly rates: see pricing based on working time.

Revenue: see income.

Service: a product which is not a good or commodity. See also service transaction.

Service transaction: any transaction which is not merely the change of ownership of a good or commodity.

Shipment price: the price at the time the order is delivered to the purchaser. (From PPI manual). See also order price.

Specification pricing: a term to be avoided, used in different and irreconcilable ways. The word 'specification' reflects that for good PPI compilation each product sampled has to be specified and its quality held constant.

Standard hourly rates: see pricing based on working time.

Target of measurement: the unit of which the price is estimated by a pricing method.

Tender(ed) price: a price that is offered and which may differ from the transaction price arrived at. List prices and model pricing may involve tendered prices.

Transaction: The buying and selling of a product on terms mutually agreed by the buyer and seller. (From PPI manual).

Transaction pricing: ideal pricing method which uses actually paid prices of individual transactions that are repeated in every survey period. (From PPI Manual). See direct use of prices of repeated services.

Turnover: see income.

Unique service: a type of service such that any two actually provided services of the type differ too much to allow meaningful comparison of their prices for acquiring a price relative. (Operational definition for services statisticians)

Addendum C - PPI Quality Assessment Procedures

Background

The quality assessment system allows the scoring of each NAICS or ISIC industry currently in publication by the national statistical office against a standardized framework. The assessment framework identifies six major concepts of fundamental importance to output price measurement.

1. Output price – This includes correct identification of the unique output generating activities of the industry and formulating an operational methodology that allows the pricing of the unique outputs.
2. Transaction price – This addresses how well the reported price reflects actual market transaction pricing.
3. Shipment price – This addresses whether the price reflects the completion and provision of the product to the customer.
4. Representative of current period production – This is an assessment of how closely the current item sample comes to reflecting current period production in the industry.
5. Constant quality – This is an assessment of how well the index movement reflects pure price change unaffected by product changes or terms of transaction changes.
6. Timely price measure – This includes an assessment of how well the reported price represents the entire reference period and how well the reported price adheres to the current period concept and avoids phenomena such as lags.

This assessment framework isolates each of the six concepts and allows the assignment of a quality score relevant to that specific concept. The advantage of this approach is that the specific limitation in the operational approach followed by the national statistical office is immediately evident from perusing the assessment form. Additionally, summing the individual scores permits a fairly objective assessment of the overall quality of the published data. The scoring ranges listed below define whether a given industry index is assessed as a Type A, B, or C deflator. Data users can then know the overall quality of the index and areas of deficiency.

Finally, this approach allows the identification of the specific strengths and weaknesses in a given pricing method. Let us assume that the pricing method for a wired telecommunications services index is a unit value price reflecting all transactions for a homogeneous product line such as residential long-distance telephony. Let us also assume that the reporters provide data for an entire period of such calls for all residential customers, but with a one-period lag. We can assess this pricing method against all six concepts. Since the data are lagged one period, the scoring will reflect that limitation. Rather than listing every possible combination of pricing methods and speaking more broadly of quality, this approach readily identifies both the strengths and weaknesses of the pricing method captured in the survey statistic.

Procedures

1. The form should be filled out for a single ISIC or NAICS industry by a PPI practitioner familiar with the methodologies and collection results for the industry being assessed.

2. The scoring should strictly follow the assigned points for each item. For example, 3.b. *The price is a list price not equal to the transaction price* scores 50 points. The person completing the framework would not judgmentally adjust the score because they felt that the price was close to the transaction price and deserved better than a 50.

3. The scoring should reflect the plurality pricing methodology used in the industry. It is understood that several different types of pricing methods may be encountered in a single industry.

4. Shipment price – The appropriate price for the PPI should be the price at the time there is a change in ownership from the producer to the buyer. The price at the time of shipment or provision of the service is, operationally, the closest one could come to this. Order prices are quoted at the time the customer places the order and while often the same as the shipment price, they may be different. This is especially true if a price escalator is used to adjust for cost increases over the life of the long-term contract. A price that serves as a proxy for the transaction price when the good is shipped, such as a model price, should be treated as a shipment price.

5. Representative of current period production – The sample of items actively being repriced in the current period should reflect current period production and not base period production. If new product lines have emerged in the industry after the index reference period, the item sample could no longer be viewed as representative. Additionally, new major product/service features may be important in the current period when they were not in the index reference period. Items a. and b. score this phenomenon. This contrasts with c. and d. because the real issue is sample representativeness being maintained over time. Item substitution, which generally occurs when a product is obsolete, is generally insufficient toward maintaining an up to date sample on a regular basis. Newer versions of a product with additional features generally enter the market place and co-exist with the earlier versions for quite some time before they fully replace the older version. This causes the item sample to be unrepresentative. Sample augmentation or resampling is the usual way of overcoming this problem. Items c. and d. deal more with products that have very minor or more evolutionary changes. Especially for model pricing, the specification should be periodically updated to reflect current practice.

6. Transaction price – In order for alternative a. Transaction price to be chosen, the good or service must be assumed to be transacted on a very regular basis. If the item is not transacted at least once every pricing period, then it is a model price. Alternative e. Model pricing refers to one of three pricing mechanisms:

a) A transaction price in some or many periods, but requires price estimation occasionally due to somewhat irregular shipments.

b) A transaction price was reported in the reference period, the item specification was frozen at that point, and price estimation occurs for all subsequent repricing.

c) A model transaction was constructed in the reference period by the national statistical office, and was priced from the inception by estimation.

If the so called price is actually a cost of an input or inputs, with no adjustment for profit and overhead, then it is not a price at all. Such a statistic has no place in a PPI. There is no scoring option for this as such a statistic is out of scope of the PPI and cannot be considered a PPI eligible for any meaningful quality assessment.

7. Output price – This primarily attempts to evaluate how close to an actual good or service the priced item comes. That is, does the priced item truly reflect an actual unique output of the industry. Alternatives a. through f. refer to an item where both the detailed specification of the unique good or service is clearly described in the repricing form and the price directly relates to the description of the

item. Alternative g. is the situation where the recorded price bears no relation to the item description. It refers to charges for unique services, such as the rate charged per hour for senior accountant services by an accounting firm, but does not directly relate to a given output. This does not allow for any productivity improvements affecting the price index.

8. Timely measure – Alternatives a. and b. refer to whether the price strictly relates to the current period or includes some portion of the previous period. It is especially difficult when pricing unit values to construct a pricing method that only encompasses transactions occurring in the current period. Reporters often compile average price information over a particular period and then require additional time to compile and report out the data. This prevents the price office from obtaining the data in time for the current period tabulation. Alternatives c, d, and e refer to the representativeness of the data – do they truly represent the entire time period. A price representing a single point in time may miss some very dynamic changes that could occur later in the period. This is often the case with pricing energy items.

9. Constant quality maintained – This refers to the ability of the price office to come up with a valuation of any quality change where such changes occur with some frequency. It does not reward the use of fallbacks such as overlap pricing. In an industry where change is encountered with some frequency, either a producer cost or hedonic method must be used to arrive at the value of the quality adjustment. There are industries where product change occurs at a very slow pace. This would also qualify as alternative a.

PPI Quality Assessment Framework

Points	Category and Questions	Score
	1. Shipment Price (Weight = .10)	
	<i>Select a. or b.</i>	
0	a. Price represents order pricing, actual price at shipment may well be different.	
100	b. Price represents the completion of service or a proxy measure for the completed transaction.	
	2. Representative of current period production (Weight = .10)	
	<i>Select a. or b.</i>	
50	a. Emergence of new product lines or critical new product features has not occurred since the index reference period or since sample augmentation last done.	
0	b. Emergence of new product lines or critical new product features has occurred since the index reference period or since sample augmentation last done.	
	<i>Select c. or d.</i>	
50	c. Product substitution usually occurs when an item becomes obsolete or, if model pricing applies, the models are regularly updated to reflect changes.	
0	d. Product substitution usually does not occur when an item becomes obsolete	

	or, if model pricing applies, the models are not regularly updated to reflect changes.	
	3. Transaction price (Weight = .25)	
	<i>Select the one most prevalent in the industry</i>	
100	a. The price is the real transaction price or a list price that can always be assumed to be equal to the transaction price.	
50	b. The price is a list price not equal to the transaction price.	
100	c. The price is a unit value for a homogeneous group of products.	
50	d. The price is a unit value for a non-homogeneous group of products.	
75	e. The price is a model price.	
50	f. The price is constructed from input cost plus profit and overhead mark-up.	
	4. Output price (Weight = .25)	
	<i>Select the one most prevalent in the industry</i>	
100	a. Recorded price reflects an actual transaction or average of actual transactions.	
75	b. Recorded price reflects a model transaction incorporating the pricing of all features found in an actual transaction.	
50	c. Recorded price reflects a model transaction incorporating the pricing of only some of the features found in an actual transaction.	
50	d. Recorded price reflects some components of a transaction.	
50	e. Recorded price reflects input costs plus overhead and profit margins incorporating the pricing of all features found in an actual transaction.	
25	f. Recorded price reflects input costs plus overhead and profit margins incorporating the pricing of some of the features found in an actual transaction.	
0	g. Recorded price reflects charge out rates for fixed labor inputs not directly tied to a specific quantity of output.	

	5. Timely measure (Weight = .10)	
	<i>Select a. or b.</i>	
50	a. Pricing data reflect the service provision in the current period and are not lagged.	
0	b. Pricing data are lagged.	
	<i>Select c., d., or e.</i>	
50	c. Pricing data reflect an average over the entire period.	
40	d. Pricing data reflect an average of multiple measurements over a portion of the period.	
25	e. Pricing data reflect a single point in time.	
	6. Constant quality maintained (Weight = .20)	
	<i>Select a. or b.</i>	
100	a. Rapid changes to product specification are not expected or, if they are, a good method to explicitly quality adjust is in use.	
0	b. Rapid changes to product specification are expected and no explicit quality adjustment method is in use.	
	Total =	
	Type A point range = over 90	
	Type B point range = 70 to 90	
	Type C point range = less than 70	

Addendum D - List of Six Digit NAICS Industries by PPI Index Publication Status

List of six-digit NAICS industries by PPI index publication status*		
Publication Status*	NAICS code	Industry Title
1	111110	Soybean Farming
1	111120	Oilseed (except Soybean) Farming
1	111130	Dry Pea and Bean Farming
1	111140	Wheat Farming
1	111150	Corn Farming
1	111160	Rice Farming
4	111191	Oilseed and Grain Combination Farming
1	111199	All Other Grain Farming
1	111211	Potato Farming
1	111219	Other Vegetable (except Potato) and Melon Farming
1	111310	Orange Groves
1	111320	Citrus (except Orange) Groves
1	111331	Apple Orchards
1	111332	Grape Vineyards
1	111333	Strawberry Farming
1	111334	Berry (except Strawberry) Farming
1	111335	Tree Nut Farming
4	111336	Fruit and Tree Nut Combination Farming
1	111339	Other Noncitrus Fruit Farming
6	111411	Mushroom Production
6	111419	Other Food Crops Grown Under Cover
6	111421	Nursery and Tree Production
6	111422	Floriculture Production
6	111910	Tobacco Farming
1	111920	Cotton Farming
6	111930	Sugarcane Farming
1	111940	Hay Farming
6	111991	Sugar Beet Farming
1	111992	Peanut Farming
4	111998	All Other Miscellaneous Crop Farming
4	112111	Beef Cattle Ranching and Farming
1	112112	Cattle Feedlots
1	112120	Dairy Cattle and Milk Production
1	112210	Hog and Pig Farming
1	112310	Chicken Egg Production
1	112320	Broilers and Other Meat Type Chicken Production
1	112330	Turkey Production
6	112340	Poultry Hatcheries
1	112390	Other Poultry Production
1	112410	Sheep Farming
6	112420	Goat Farming
6	112511	Finfish Farming and Fish Hatcheries
6	112512	Shellfish Farming
List of six-digit NAICS industries by PPI index publication status*		
Publication Status*	NAICS code	Industry Title
6	112519	Other Animal Aquaculture

6	112910	Apiculture
6	112920	Horses and Other Equine Production
6	112930	Fur-Bearing Animal and Rabbit Production
6	112990	All Other Animal Production
6	113110	Timber Tract Operations
6	113210	Forest Nurseries and Gathering of Forest Products
1	113310	Logging
1	114111	Finfish Fishing
1	114112	Shellfish Fishing
6	114119	Other Marine Fishing
6	114210	Hunting and Trapping
6	115111	Cotton Ginning
6	115112	Soil Preparation, Planting, and Cultivating
6	115113	Crop Harvesting, Primarily by Machine
6	115114	Postharvest Crop Activities (except Cotton Ginning)
6	115115	Farm Labor Contractors and Crew Leaders
6	115116	Farm Management Services
6	115210	Support Activities for Animal Production
6	115310	Support Activities for Forestry
1	211111	Crude petroleum and natural gas extraction
1	211112	Natural gas liquid extraction
1	212111	Bituminous coal and lignite surface mining
1	212112	Bituminous coal underground mining
1	212113	Anthracite mining
1	212210	Iron ore mining
1	212221	Gold ore mining
1	212222	Silver ore mining
3	212231	Lead ore and zinc ore mining
1	212234	Copper ore and nickel ore mining
1	212291	Uranium-radium-vanadium ore mining
1	212299	All other metal ore mining
1	212311	Dimension stone mining and quarrying
1	212312	Crushed and broken limestone mining
1	212313	Crushed and broken granite mining
1	212319	Other crushed and broken stone mining
1	212321	Construction sand and gravel mining
1	212322	Industrial sand mining
1	212324	Kaolin and ball clay mining
1	212325	Clay, ceramic, and refractory minerals mining
1	212391	Potash, soda, and borate mineral mining
1	212392	Phosphate rock mining
1	212393	Other chemical and fertilizer mineral mining
1	212399	All other nonmetallic mineral mining
1	213111	Drilling oil and gas wells
1	213112	Support activities for oil and gas operations
List of six-digit NAICS industries by PPI index publication status*		
Publication Status*	NAICS code	Industry Title
1	213113	Support activities for coal mining
1	213114	Support activities for metal mining
1	213115	Support activities for nonmetallic minerals
2	221110	Electric power generation
5	221111	Hydroelectric Power Generation

5	221112	Fossil Fuel Electric Power Generation
5	221113	Nuclear Electric Power Generation
5	221119	Other Electric Power Generation
1	221121	Electric bulk power transmission & control
1	221122	Electric power distribution
1	221210	Natural gas distribution
6	221310	Water Supply and Irrigation Systems
6	221320	Sewage Treatment Facilities
6	221330	Steam and Air-Conditioning Supply
6	236115	New Single-Family Housing Construction (except Operative Builders)
6	236116	New Multifamily Housing Construction (except Operative Builders)
6	236117	New Housing Operative Builders
6	236118	Residential Remodelers
6	236210	Industrial Building Construction
6	236220	Commercial and Institutional Building Construction
6	237110	Water and Sewer Line and Related Structures Construction
6	237120	Oil and Gas Pipeline and Related Structures Construction
6	237130	Power and Communication Line and Related Structures Construction
6	237210	Land Subdivision
6	237310	Highway, Street, and Bridge Construction
6	237990	Other Heavy and Civil Engineering Construction
6	238110	Poured Concrete Foundation and Structure Contractors
6	238121	Residential structural steel contractors
6	238122	Nonresidential structural steel contractors
6	238131	Residential framing contractors
6	238132	Nonresidential framing contractors
6	238141	Residential masonry contractors
6	238142	Nonresidential masonry contractors
6	238151	Residential glass and glazing contractors
6	238152	Nonresidential glass and glazing contractors
6	238161	Residential roofing contractors
6	238162	Non residential roofing contractor
6	238171	Residential siding contractors
6	238172	Nonresidential siding contractors
6	238191	Other residential exterior contractors
6	238192	Other nonresidential exterior contractors
6	238211	Residential electrical contractors
6	238212	Non residential electrical contractor
6	238221	Residential plumbing and HVAC contractors
6	238222	Non residential plumbing and HVAC contractors
6	238291	Other residential equipment contractors

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
6	238292	Other nonresidential equipment contractors
6	238311	Residential drywall contractors
6	238312	Nonresidential drywall contractors
6	238321	Residential painting contractors
6	238322	Nonresidential painting contractors
6	238331	Residential flooring contractors
6	238332	Nonresidential flooring contractors
6	238341	Residential tile and terrazzo contractors
6	238342	Nonresidential tile and terrazzo contractors

6	238351	Residential finish carpentry contractors
6	238352	Nonresidential finish carpentry contractors
6	238391	Other residential finishing contractors
6	238392	Other nonresidential finishing contractors
6	238911	Residential site preparation contractors
6	238912	Nonresidential site preparation contractors
6	238991	All other residential trade contractors
6	238992	All other nonresidential trade contractors
1	311111	Dog & cat food mfg
1	311119	Other animal food mfg
1	311211	Flour milling
1	311212	Rice milling
1	311213	Malt mfg
1	311221	Wet corn milling
1	311222	Soybean processing
1	311223	Other oilseed processing
1	311225	Fats & oils refining & blending
1	311230	Breakfast cereal mfg
1	311311	Sugarcane mills
1	311312	Cane sugar refining
1	311313	Beet sugar mfg
1	311320	Chocolate & confectionery mfg from cacao beans
1	311330	Confectionery mfg from purchased chocolate
1	311340	Nonchocolate confectionery mfg
1	311411	Frozen fruit, juice, & vegetable mfg
1	311412	Frozen specialty food mfg
1	311421	Fruit & vegetable canning
1	311422	Specialty canning
1	311423	Dried & dehydrated food mfg
1	311511	Fluid milk mfg
1	311512	Creamery butter mfg
1	311513	Cheese mfg
1	311514	Dry, condensed, & evaporated dairy product mfg
1	311520	Ice cream & frozen dessert mfg
1	311611	Animal (except poultry) slaughtering
1	311612	Meat processed from carcasses
1	311613	Rendering & meat byproduct processing

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	311615	Poultry processing
1	311711	Seafood canning
1	311712	Fresh & frozen seafood processing
1	311811	Retail bakeries
1	311812	Commercial bakeries
1	311813	Frozen cakes, pies, & other pastries mfg
1	311821	Cookie & cracker mfg
1	311822	Flour mixes & dough mfg from purchased flour
1	311823	Dry pasta mfg
1	311830	Tortilla mfg
1	311911	Roasted nuts & peanut butter mfg
1	311919	Other snack food mfg
1	311920	Coffee & tea mfg

1	311930	Flavoring syrup & concentrate mfg
1	311941	Mayonnaise, dressing, & other prepared sauce mfg
1	311942	Spice & extract mfg
1	311991	Perishable prepared food mfg
1	311999	All other miscellaneous food mfg
1	312111	Soft drink mfg
1	312112	Bottled water mfg
1	312113	Ice mfg
1	312120	Breweries
1	312130	Wineries
1	312140	Distilleries
1	312210	Tobacco stemming & redrying
1	312221	Cigarette mfg
1	312229	Other tobacco product mfg
1	313111	Yarn spinning mills
1	313112	Yarn texturizing, throwing, & twisting mills
1	313113	Thread mills
1	313210	Broadwoven fabric mills
1	313221	Narrow fabric mills
1	313222	Schiffli machine embroidery
1	313230	Nonwoven fabric mills
1	313241	Weft knit fabric mills
1	313249	Other knit fabric & lace mills
1	313311	Broadwoven fabric finishing mills
1	313312	Textile & fabric finishing (except broadwoven fabric) mills
1	313320	Fabric coating mills
1	314110	Carpet & rug mills
1	314121	Curtain & drapery mills
1	314129	Other household textile product mills
1	314911	Textile bag mills
1	314912	Canvas & related product mills
1	314991	Rope, cordage, & twine mills
1	314992	Tire cord & tire fabric mills

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	314999	All other miscellaneous textile product mills
1	315111	Sheer hosiery mills
1	315119	Other hosiery & sock mills
1	315191	Outerwear knitting mills
1	315192	Underwear & nightwear knitting mills
1	315211	Men's & boys' cut & sew apparel contractors
1	315212	Women's, girls', & infants' cut & sew apparel contractors
1	315221	Men's & boys' cut & sew underwear & nightwear mfg
1	315222	Men's & boys' cut & sew suit, coat, & overcoat mfg
1	315223	Men's & boys' cut & sew shirt (exc work shirt) mfg
1	315224	Men's & boys' cut & sew trouser, slack, & jean mfg
1	315225	Men's & boys' cut & sew work clothing mfg
1	315228	Men's & boys' cut & sew other outerwear mfg
1	315231	Women's & girls' cut/sew lingerie & nightwear mfg
1	315232	Women's & girls' cut & sew blouse & shirt mfg
1	315233	Women's & girls' cut & sew dress mfg
1	315234	Women's & girls' cut & sew suit, coat, skirt mfg

1	315239	Women's & girls' cut & sew other outerwear mfg
1	315291	Infants' cut & sew apparel mfg
1	315292	Fur & leather apparel mfg
1	315299	All other cut & sew apparel mfg
1	315991	Hat, cap, & millinery mfg
1	315992	Glove & mitten mfg
1	315993	Men's & boys' neckwear mfg
1	315999	Other apparel accessories & other apparel mfg
1	316110	Leather & hide tanning & finishing
1	316211	Rubber & plastics footwear mfg
1	316212	House slipper mfg
1	316213	Men's footwear (except athletic) mfg
1	316214	Women's footwear (except athletic) mfg
1	316219	Other footwear mfg
1	316991	Luggage mfg
1	316992	Women's handbag & purse mfg
1	316993	Personal leather good (except women's handbag & purse) mfg
1	316999	All other leather good mfg
1	321113	Sawmills
1	321114	Wood preservation
1	321211	Hardwood veneer & plywood mfg
1	321212	Softwood veneer & plywood mfg
1	321213	Engineered wood member (except truss) mfg
1	321214	Truss mfg
1	321219	Reconstituted wood product mfg
1	321911	Wood window & door mfg
1	321912	Cut stock, resawing lumber, & planing
1	321918	Other millwork (including flooring)
1	321920	Wood container & pallet mfg

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	321991	Manufactured home (mobile home) mfg
1	321992	Prefabricated wood building mfg
1	321999	All other miscellaneous wood product mfg
1	322110	Pulp mills
1	322121	Paper (except newsprint) mills
1	322122	Newsprint mills
1	322130	Paperboard mills
1	322211	Corrugated & solid fiber box mfg
1	322212	Folding paperboard box mfg
1	322213	Setup paperboard box mfg
1	322214	Fiber can, tube, drum, & similar products mfg
1	322215	Nonfolding sanitary food container mfg
1	322221	Coated & laminated packaging paper & plastics film mfg
1	322222	Coated & laminated paper mfg
1	322223	Plastics, foil, & coated paper bag mfg
1	322224	Uncoated paper & multiwall bag mfg
1	322225	Laminated aluminum foil mfg for flexible packaging uses
1	322226	Surface-coated paperboard mfg
1	322231	Die-cut paper & paperboard office supplies mfg
1	322232	Envelope mfg
1	322233	Stationery, tablet, & related product mfg

1	322291	Sanitary paper product mfg
1	322299	All other converted paper product mfg
1	323110	Commercial lithographic printing
1	323111	Commercial gravure printing
1	323112	Commercial flexographic printing
1	323113	Commercial screen printing
1	323114	Quick printing
1	323115	Digital printing
1	323116	Manifold business forms printing
1	323117	Books printing
1	323118	Blankbook, looseleaf binders, & devices mfg
1	323119	Other commercial printing
1	323121	Tradebinding & related work
1	323122	Prepress services
1	324110	Petroleum refineries
1	324121	Asphalt paving mixture & block mfg
1	324122	Asphalt shingle & coating materials mfg
1	324191	Petroleum lubricating oil & grease mfg
1	324199	All other petroleum & coal products mfg
1	325110	Petrochemical mfg
1	325120	Industrial gas mfg
1	325131	Inorganic dye & pigment mfg
1	325132	Synthetic organic dye & pigment mfg
1	325181	Alkalies & chlorine mfg
1	325182	Carbon black mfg

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	325188	All other basic inorganic chemical mfg
1	325191	Gum & wood chemical mfg
1	325192	Cyclic crude & intermediate mfg
1	325193	Ethyl alcohol mfg
1	325199	All other basic organic chemical mfg
1	325211	Plastics material & resin mfg
1	325212	Synthetic rubber mfg
3	325221	Cellulosic organic fiber manufacturing
1	325222	Noncellulosic organic fiber mfg
1	325311	Nitrogenous fertilizer mfg
1	325312	Phosphatic fertilizer mfg
1	325314	Fertilizer (mixing only) mfg
1	325320	Pesticide & other agricultural chemical mfg
1	325411	Medicinal & botanical mfg
1	325412	Pharmaceutical preparation mfg
1	325413	In-vitro diagnostic substance mfg
1	325414	Biological product (except diagnostic) mfg
1	325510	Paint & coating mfg
1	325520	Adhesive mfg
1	325611	Soap & other detergent mfg
1	325612	Polish & other sanitation good mfg
1	325613	Surface active agent mfg
1	325620	Toilet preparation mfg
1	325910	Printing ink mfg
1	325920	Explosives mfg

1	325991	Custom compounding of purchased resins
1	325992	Photographic film, paper, plate, & chemical mfg
1	325998	All other miscellaneous chemical product & preparation mfg
1	326111	Plastics bag mfg
1	326112	Plastics packaging film & sheet (including laminated) mfg
1	326113	Unlaminated plastics film & sheet (except packaging) mfg
1	326121	Unlaminated plastics profile shape mfg
1	326122	Plastics pipe & pipe fitting mfg
1	326130	Laminated plastics plate, sheet, (except packaging), & shape mfg
1	326140	Polystyrene foam product mfg
1	326150	Urethane & other foam product (except polystyrene) mfg
1	326160	Plastics bottle mfg
1	326191	Plastics plumbing fixture mfg
1	326192	Resilient floor covering mfg
1	326199	All other plastics product mfg
1	326211	Tire mfg (except retreading)
6	326212	Tire retreading
1	326220	Rubber & plastics hoses & belting mfg
1	326291	Rubber product mfg for mechanical use
1	326299	All other rubber product mfg
1	327111	Vitreous china plumbing fixture & bathroom accessories mfg

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	327112	Vitreous china, fine earthenware, & other pottery product mfg
1	327113	Porcelain electrical supply mfg
1	327121	Brick & structural clay tile mfg
1	327122	Ceramic wall & floor tile mfg
1	327123	Other structural clay product mfg
1	327124	Clay refractory mfg
1	327125	Nonclay refractory mfg
1	327211	Flat glass mfg
1	327212	Other pressed & blown glass & glassware mfg
1	327213	Glass container mfg
1	327215	Glass product mfg made of purchased glass
1	327310	Cement mfg
1	327320	Ready-mix concrete mfg
1	327331	Concrete block & brick mfg
1	327332	Concrete pipe mfg
1	327390	Other concrete product mfg
1	327410	Lime mfg
1	327420	Gypsum product mfg
1	327910	Abrasive product mfg
1	327991	Cut stone & stone product mfg
1	327992	Ground or treated mineral & earth mfg
1	327993	Mineral wool mfg
1	327999	All other miscellaneous nonmetallic mineral product mfg
1	331111	Iron & steel mills
1	331112	Electrometallurgical ferroalloy product mfg
1	331210	Iron & steel pipe & tube mfg from purchased steel
1	331221	Rolled steel shape mfg
1	331222	Steel wire drawing
3	331311	Alumina Refining

1	331312	Primary aluminum production
1	331314	Secondary smelting & alloying of aluminum
1	331315	Aluminum sheet, plate, & foil mfg
1	331316	Aluminum extruded product mfg
1	331319	Other aluminum rolling & drawing
1	331411	Primary smelting & refining of copper
1	331419	Other nonferrous metal primary smelting & refining
1	331421	Copper rolling, drawing, & extruding
1	331422	Copper wire (except mechanical) drawing
1	331423	Secondary smelting, refining, & alloying of copper
1	331491	Other nonferrous metal rolling, drawing, & extruding
1	331492	Other nonferrous metal secondary smelting, refining, & alloying
1	331511	Iron foundries
1	331512	Steel investment foundries
1	331513	Steel foundries (except investment)
1	331521	Aluminum die-casting foundries
1	331522	Nonferrous (except aluminum) die-casting foundries

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	331524	Aluminum foundries (except die-casting)
1	331525	Copper foundries (except die-casting)
1	331528	Other nonferrous foundries (except die-casting)
1	332111	Iron & steel forging
1	332112	Nonferrous forging
1	332114	Custom roll forming
1	332115	Crown & closure mfg
1	332116	Metal stamping
1	332117	Powder metallurgy part mfg
1	332211	Cutlery & flatware (except precious) mfg
1	332212	Hand & edge tool mfg
1	332213	Saw blade & handsaw mfg
1	332214	Kitchen utensil, pot, & pan mfg
1	332311	Prefabricated metal building & component mfg
1	332312	Fabricated structural metal mfg
1	332313	Plate work mfg
1	332321	Metal window & door mfg
1	332322	Sheet metal work mfg
1	332323	Ornamental & architectural metal work mfg
1	332410	Power boiler & heat exchanger mfg
1	332420	Metal tank (heavy gauge) mfg
1	332431	Metal can mfg
1	332439	Other metal container mfg
1	332510	Hardware mfg
1	332611	Spring (heavy gauge) mfg
1	332612	Spring (light gauge) mfg
1	332618	Other fabricated wire product mfg
1	332710	Machine shops
1	332721	Precision turned product mfg
1	332722	Bolt, nut, screw, rivet, & washer mfg
1	332811	Metal heat treating
1	332812	Metal coating/engraving (exc jewelry/silverware) & allied service
1	332813	Electroplating, plating, polishing, anodizing, & coloring

1	332911	Industrial valve mfg
1	332912	Fluid power valve & hose fitting mfg
1	332913	Plumbing fixture fitting & trim mfg
1	332919	Other metal valve & pipe fitting mfg
1	332991	Ball & roller bearing mfg
1	332992	Small arms ammunition mfg
1	332993	Ammunition (except small arms) mfg
1	332994	Small arms mfg
1	332995	Other ordnance & accessories mfg
1	332996	Fabricated pipe & pipe fitting mfg
1	332997	Industrial pattern mfg
1	332998	Enameled iron & metal sanitary ware mfg
1	332999	All other miscellaneous fabricated metal product mfg

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	333111	Farm machinery & equipment mfg
1	333112	Lawn & garden tractor & home lawn & garden equipment mfg
1	333120	Construction machinery mfg
1	333131	Mining machinery & equipment mfg
1	333132	Oil & gas field machinery & equipment mfg
1	333210	Sawmill & woodworking machinery mfg
1	333220	Plastics & rubber industry machinery mfg
1	333291	Paper industry machinery mfg
1	333292	Textile machinery mfg
1	333293	Printing machinery & equipment mfg
1	333294	Food product machinery mfg
1	333295	Semiconductor machinery mfg
1	333298	All other industrial machinery mfg
1	333311	Automatic vending machine mfg
1	333312	Commercial laundry, drycleaning, & pressing machine mfg
1	333313	Office machinery mfg
1	333314	Optical instrument & lens mfg
1	333315	Photographic & photocopying equipment mfg
1	333319	Other commercial & service industry machinery mfg
1	333411	Air purification equipment mfg
1	333412	Industrial & commercial fan & blower mfg
1	333414	Heating equipment (except warm air furnaces) mfg
1	333415	AC & warm air heating & commercial/industrial refrig equip mfg
1	333511	Industrial mold mfg
1	333512	Machine tool (metal cutting types) mfg
1	333513	Machine tool (metal forming types) mfg
1	333514	Special die & tool, die set, jig, & fixture mfg
1	333515	Cutting tool & machine tool accessory mfg
1	333516	Rolling mill machinery & equipment mfg
1	333518	Other metalworking machinery mfg
1	333611	Turbine & turbine generator set units mfg
1	333612	Speed changer, industrial high-speed drive, & gear mfg
1	333613	Mechanical power transmission equipment mfg
1	333618	Other engine equipment mfg
1	333911	Pump & pumping equipment mfg
1	333912	Air & gas compressor mfg
1	333913	Measuring & dispensing pump mfg

1	333921	Elevator & moving stairway mfg
1	333922	Conveyor & conveying equipment mfg
1	333923	Overhead traveling crane, hoist, & monorail system mfg
1	333924	Industrial truck, tractor, trailer, & stacker machinery mfg
1	333991	Power-driven handtool mfg
1	333992	Welding & soldering equipment mfg
1	333993	Packaging machinery mfg
1	333994	Industrial process furnace & oven mfg
1	333995	Fluid power cylinder & actuator mfg
List of six-digit NAICS industries by PPI index publication status*		
Publication Status*	NAICS code	Industry Title
1	333996	Fluid power pump & motor mfg
1	333997	Scale & balance (except laboratory) mfg
1	333999	All other miscellaneous general purpose machinery mfg
1	334111	Electronic computer mfg
1	334112	Computer storage device mfg
1	334113	Computer terminal mfg
1	334119	Other computer peripheral equipment mfg
1	334210	Telephone apparatus mfg
1	334220	Radio & TV broadcasting & wireless communications equipment mfg
1	334290	Other communications equipment mfg
1	334310	Audio & video equipment mfg
1	334411	Electron tube mfg
1	334412	Bare printed circuit board mfg
1	334413	Semiconductor & related device mfg
1	334414	Electronic capacitor mfg
1	334415	Electronic resistor mfg
1	334416	Electronic coil, transformer, & other inductor mfg
1	334417	Electronic connector mfg
1	334418	Printed circuit assembly (electronic assembly) mfg
1	334419	Other electronic component mfg
1	334510	Electromedical & electrotherapeutic apparatus mfg
1	334511	Search, detection, navigation, & guidance instrument mfg
1	334512	Automatic environmental control mfg
1	334513	Industrial process control instrument mfg
1	334514	Totalizing fluid meter & counting device mfg
1	334515	Electricity measuring & testing instrument mfg
1	334516	Analytical laboratory instrument mfg
1	334517	Irradiation apparatus mfg
1	334518	Watch, clock, & part mfg
1	334519	Other measuring & controlling device mfg
6	334611	Software Reproducing
1	334612	Prerecorded CD (except software), tape, & record reproducing
1	334613	Magnetic & optical recording media mfg
1	335110	Electric lamp bulb & part mfg
1	335121	Residential electric lighting fixture mfg
1	335122	Commercial/industrial/institutional electric lighting fixture mfg
1	335129	Other lighting equipment mfg
1	335211	Electric housewares & household fan mfg
1	335212	Household vacuum cleaner mfg
1	335221	Household cooking appliance mfg
1	335222	Household refrigerator & home freezer mfg

1	335224	Household laundry equipment mfg
1	335228	Other major household appliance mfg
1	335311	Power, distribution, & specialty transformer mfg
1	335312	Motor & generator mfg
1	335313	Switchgear & switchboard apparatus mfg

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	335314	Relay & industrial control mfg
1	335911	Storage battery mfg
1	335912	Primary battery mfg
1	335921	Fiber optic cable mfg
1	335929	Other communication & energy wire mfg
1	335931	Current-carrying wiring device mfg
1	335932	Noncurrent-carrying wiring device mfg
1	335991	Carbon & graphite product mfg
1	335999	All other miscellaneous electrical equipment & component mfg
2	336110	Automobile and Light Duty Motor Vehicle Manufacturing
5	336111	Automobile mfg
5	336112	Light truck & utility vehicle mfg
1	336120	Heavy duty truck mfg
1	336211	Motor vehicle body mfg
1	336212	Truck trailer mfg
1	336213	Motor home mfg
1	336214	Travel trailer & camper mfg
1	336311	Carburetor, piston, piston ring, & valve mfg
1	336312	Gasoline engine & engine parts mfg
1	336321	Vehicular lighting equipment mfg
1	336322	Other motor vehicle electrical & electronic equipment mfg
1	336330	Motor vehicle steering & suspension component (except spring) mfg
1	336340	Motor vehicle brake system mfg
1	336350	Motor vehicle transmission & power train parts mfg
1	336360	Motor vehicle seating & interior trim mfg
1	336370	Motor vehicle metal stamping
1	336391	Motor vehicle air-conditioning mfg
1	336399	All other motor vehicle parts mfg
1	336411	Aircraft mfg
1	336412	Aircraft engine & engine parts mfg
1	336413	Other aircraft part & auxiliary equipment mfg
7	336414	Guided Missile and Space Vehicle Manufacturing
7	336415	Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
7	336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing
1	336510	Railroad rolling stock mfg
1	336611	Ship building & repairing
1	336612	Boat building
1	336991	Motorcycle, bicycle, & parts mfg
7	336992	Military Armored Vehicle, Tank, and Tank Component Manufacturing
1	336999	All other transportation equipment mfg
1	337110	Wood kitchen cabinet & counter top mfg
1	337121	Upholstered household furniture mfg
1	337122	Nonupholstered wood household furniture mfg
1	337124	Metal household furniture mfg

1	337125	Household furniture (except wood & metal) mfg
List of six-digit NAICS industries by PPI index publication status*		
Publication Status*	NAICS code	Industry Title
1	337127	Institutional furniture mfg
3	337129	Wood Television, Radio, and Sewing Machine Cabinet Manufacturing
1	337211	Wood office furniture mfg
1	337212	Custom architectural woodwork & millwork mfg
1	337214	Office furniture (except wood) mfg
1	337215	Showcase, partition, shelving, & locker mfg
1	337910	Mattress mfg
1	337920	Blind & shade mfg
1	339111	Laboratory apparatus & furniture mfg
1	339112	Surgical & medical instrument mfg
1	339113	Surgical appliance & supplies mfg
1	339114	Dental equipment & supplies mfg
1	339115	Ophthalmic goods mfg
6	339116	Dental Laboratories
1	339911	Jewelry (except costume) mfg
1	339912	Silverware & hollowware mfg
1	339913	Jewelers' material & lapidary work mfg
1	339914	Costume jewelry & novelty mfg
1	339920	Sporting & athletic goods mfg
1	339931	Doll & stuffed toy mfg
1	339932	Game, toy, & children's vehicle mfg
1	339941	Pen & mechanical pencil mfg
1	339942	Lead pencil & art good mfg
1	339943	Marking device mfg
1	339944	Carbon paper & inked ribbon mfg
1	339950	Sign mfg
1	339991	Gasket, packing, & sealing device mfg
1	339992	Musical instrument mfg
1	339993	Fastener, button, needle, & pin mfg
1	339994	Broom, brush, & mop mfg
1	339995	Burial casket mfg
1	339999	All other miscellaneous mfg
1	423000	Merchant Wholesalers, Durable Goods
5	423110	Automobile and Other Motor Vehicle Merchant Wholesalers
5	423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers
5	423130	Tire and Tube Merchant Wholesalers
5	423140	Motor Vehicle Parts (Used) Merchant Wholesalers
5	423210	Furniture Merchant Wholesalers
5	423220	Home Furnishing Merchant Wholesalers
5	423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers
5	423320	Brick, Stone, and Related Construction Material Merchant Wholesalers
5	423330	Roofing, Siding, and Insulation Material Merchant Wholesalers
5	423390	Other Construction Material Merchant Wholesalers
5	423410	Photographic Equipment and Supplies Merchant Wholesalers
5	423420	Office Equipment Merchant Wholesalers
5	423430	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers
List of six-digit NAICS industries by PPI index publication status*		
Publication	NAICS code	Industry Title

Status*		
5	423440	Other Commercial Equipment Merchant Wholesalers
5	423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers
5	423460	Ophthalmic Goods Merchant Wholesalers
5	423490	Other Professional Equipment and Supplies Merchant Wholesalers
5	423510	Metal Service Centers and Other Metal Merchant Wholesalers
5	423520	Coal and Other Mineral and Ore Merchant Wholesalers
5	423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
5	423620	Electrical and Electronic Appliance, Television, and Radio Set Merchant Wholesalers
5	423690	Other Electronic Parts and Equipment Merchant Wholesalers
5	423710	Hardware Merchant Wholesalers
5	423720	Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers
5	423730	Warm Air Heating and Air-Conditioning Equipment and Supplies Merchant Wholesalers
5	423740	Refrigeration Equipment and Supplies Merchant Wholesalers
5	423810	Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers
5	423820	Farm and Garden Machinery and Equipment Merchant Wholesalers
5	423830	Industrial Machinery and Equipment Merchant Wholesalers
5	423840	Industrial Supplies Merchant Wholesalers
5	423850	Service Establishment Equipment and Supplies Merchant Wholesalers
5	423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers
5	423910	Sporting and Recreational Goods and Supplies Merchant Wholesalers
5	423920	Toy and Hobby Goods and Supplies Merchant Wholesalers
5	423930	Recyclable Material Merchant Wholesalers
5	423940	Jewelry, Watch, Precious Stone, and Precious Metal Merchant Wholesalers
5	423990	Other Miscellaneous Durable Goods Merchant Wholesalers
1	424000	Merchant Wholesalers, Non-durable Goods
5	424110	Printing and Writing Paper Merchant Wholesalers
5	424120	Stationery and Office Supplies Merchant Wholesalers
5	424130	Industrial and Personal Service Paper Merchant Wholesalers
5	424210	Drugs and Druggists' Sundries Merchant Wholesalers
5	424310	Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers
5	424320	Men's and Boys' Clothing and Furnishings Merchant Wholesalers
5	424330	Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers
5	424340	Footwear Merchant Wholesalers
5	424410	General Line Grocery Merchant Wholesalers
5	424420	Packaged Frozen Food Merchant Wholesalers
5	424430	Dairy Product (except Dried or Canned) Merchant Wholesalers
5	424440	Poultry and Poultry Product Merchant Wholesalers
5	424450	Confectionery Merchant Wholesalers
5	424460	Fish and Seafood Merchant Wholesalers
5	424470	Meat and Meat Product Merchant Wholesalers
5	424480	Fresh Fruit and Vegetable Merchant Wholesalers
List of six-digit NAICS industries by PPI index publication status*		
Publication Status*	NAICS code	Industry Title
5	424490	Other Grocery and Related Products Merchant Wholesalers
5	424510	Grain and Field Bean Merchant Wholesalers
5	424520	Livestock Merchant Wholesalers

5	424590	Other Farm Product Raw Material Merchant Wholesalers
5	424610	Plastics Materials and Basic Forms and Shapes Merchant Wholesalers
5	424690	Other Chemical and Allied Products Merchant Wholesalers
5	424710	Petroleum Bulk Stations and Terminals
5	424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)
5	424810	Beer and Ale Merchant Wholesalers
5	424820	Wine and Distilled Alcoholic Beverage Merchant Wholesalers
5	424910	Farm Supplies Merchant Wholesalers
5	424920	Book, Periodical, and Newspaper Merchant Wholesalers
5	424930	Flower, Nursery Stock, and Florists' Supplies Merchant Wholesalers
5	424940	Tobacco and Tobacco Product Merchant Wholesalers
5	424950	Paint, Varnish, and Supplies Merchant Wholesalers
5	424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers
6	425110	Business to Business Electronic Markets
1	425120	Wholesale Trade Agents and Brokers
1	441110	New Car Dealers
6	441120	Used Car Dealers
1	441210	Recreational Vehicle Dealers
6	441221	Motorcycle Dealers
1	441222	Boat Dealers
6	441229	All Other Motor Vehicle Dealers
1	441310	Automotive Parts and Accessories Stores
1	441320	Tire Dealers
1	442110	Furniture Stores
1	442210	Floor Covering Stores
6	442291	Window Treatment Stores
6	442299	All Other Home Furnishings Stores
1	443111	Household Appliance Stores
1	443112	Radio, Television, and Other Electronics Stores
1	443120	Computer and Software Stores
1	443130	Camera and Photographic Supplies Stores
1	444110	Home Centers
1	444120	Paint and Wallpaper Stores
1	444130	Hardware Stores
1	444190	Other Building Material Dealers
4	444210	Outdoor Power Equipment Stores
1	444220	Nursery, Garden Center, and Farm Supply Stores
1	445110	Supermarkets and Other Grocery (except Convenience) Stores
4	445120	Convenience Stores
2	445200	Specialty Food Stores
5	445210	Meat Markets
5	445220	Fish and Seafood Markets
5	445230	Fruit and Vegetable Markets

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
5	445291	Baked Goods Stores
5	445292	Confectionery and Nut Stores
5	445299	All Other Specialty Food Stores
1	445310	Beer, Wine, and Liquor Stores
1	446110	Pharmacies and Drug Stores
4	446120	Cosmetics, Beauty Supplies, and Perfume Stores

1	446130	Optical Goods Stores
1	446191	Food (Health) Supplement Stores
6	446199	All Other Health and Personal Care Stores
1	447110	Gasoline Stations with Convenience Stores
1	447190	Other Gasoline Stations
1	448110	Men's Clothing Stores
1	448120	Women's Clothing Stores
6	448130	Children's and Infants' Clothing Stores
1	448140	Family Clothing Stores
6	448150	Clothing Accessories Stores
6	448190	Other Clothing Stores
1	448210	Shoe Stores
1	448310	Jewelry Stores
1	448320	Luggage and Leather Goods Stores
1	451110	Sporting Goods Stores
1	451120	Hobby, Toy, and Game Stores
1	451130	Sewing, Needlework, and Piece Goods Stores
6	451140	Musical Instrument and Supplies Stores
1	451211	Book Stores
6	451212	News Dealers and Newsstands
1	451220	Prerecorded Tape, Compact Disc, and Record Stores
1	452111	Department Stores (except Discount Department Stores)
1	452112	Discount Department Stores
2	452900	Other General Merchandise Stores
5	452910	Warehouse Clubs and Supercenters
5	452990	All Other General Merchandise Stores
1	453110	Florists
1	453210	Office Supplies and Stationery Stores
1	453220	Gift, Novelty, and Souvenir Stores
6	453310	Used Merchandise Stores
4	453910	Pet and Pet Supplies Stores
4	453920	Art Dealers
1	453930	Manufactured (Mobile) Home Dealers
6	453991	Tobacco Stores
6	453998	All Other Miscellaneous Store Retailers (except Tobacco Stores)
1	454111	Electronic Shopping
1	454112	Electronic Auctions
1	454113	Mail-Order Houses
1	454210	Vending Machine Operators
2	454310	Fuel Dealers

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
5	454311	Heating Oil Dealers
5	454312	Liquefied Petroleum Gas (Bottled Gas) Dealers
5	454319	Other Fuel Dealers
6	454390	Other Direct Selling Establishments
1	481111	Scheduled Passenger Air Transportation
1	481112	Scheduled Freight Air Transportation
2	481210	Nonscheduled Air Transportation
5	481211	Nonscheduled Chartered Passenger Air Transportation
5	481212	Nonscheduled Chartered Freight Air Transportation
6	481219	Other Nonscheduled Air Transportation

1	482111	Line-Haul Railroads
6	482112	Short Line Railroads
1	483111	Deep Sea Freight Transportation
6	483112	Deep Sea Passenger Transportation
1	483113	Coastal and Great Lakes Freight Transportation
6	483114	Coastal and Great Lakes Passenger Transportation
1	483211	Inland Water Freight Transportation
6	483212	Inland Water Passenger Transportation
1	484110	General Freight Trucking, Local
1	484121	General Freight Trucking, Long-Distance, Truckload
1	484122	General Freight Trucking, Long-Distance, Less Than Truckload
1	484210	Used Household and Office Goods Moving
1	484220	Specialized Freight (except Used Goods) Trucking, Local
1	484230	Specialized Freight (except Used Goods) Trucking, Long-Distance
6	485111	Mixed Mode Transit Systems
6	485112	Commuter Rail Systems
6	485113	Bus and Other Motor Vehicle Transit Systems
6	485119	Other Urban Transit Systems
6	485210	Interurban and Rural Bus Transportation
6	485310	Taxi Service
6	485320	Limousine Service
6	485410	School and Employee Bus Transportation
6	485510	Charter Bus Industry
6	485991	Special Needs Transportation
6	485999	All Other Transit and Ground Passenger Transportation
1	486110	Pipeline Transportation of Crude Oil
6	486210	Pipeline Transportation of Natural Gas
1	486910	Pipeline Transportation of Refined Petroleum Products
6	486990	All Other Pipeline Transportation
6	487110	Scenic and Sightseeing Transportation, Land
6	487210	Scenic and Sightseeing Transportation, Water
6	487990	Scenic and Sightseeing Transportation, Other
7	488111	Air Traffic Control
1	488119	Other Airport Operations
1	488190	Other Support Activities for Air Transportation
6	488210	Support Activities for Rail Transportation

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	488310	Port and Harbor Operations
1	488320	Marine Cargo Handling
1	488330	Navigational Services to Shipping
6	488390	Other Support Activities for Water Transportation
6	488410	Motor Vehicle Towing
6	488490	Other Support Activities for Road Transportation
1	488510	Freight Transportation Arrangement
6	488991	Packing and Crating
6	488999	All Other Support Activities for Transportation
1	491110	Postal Service
1	492110	Couriers
1	492210	Local Messengers and Local Delivery
1	493110	General Warehousing and Storage
1	493120	Refrigerated Warehousing and Storage

1	493130	Farm Product Warehousing and Storage
6	493190	Other Warehousing and Storage
1	511110	Newspaper Publishers
1	511120	Periodical Publishers
1	511130	Book Publishers
1	511140	Directory and Mailing List Publishers
1	511191	Greeting Card Publishers
1	511199	All Other Publishers
1	511210	Software Publishers
6	512110	Motion Picture and Video Production
6	512120	Motion Picture and Video Distribution
6	512131	Motion Picture Theaters (except Drive-Ins)
6	512132	Drive-In Motion Picture Theaters
6	512191	Teleproduction and Other Postproduction Services
6	512199	Other Motion Picture and Video Industries
6	512210	Record Production
6	512220	Integrated Record Production/Distribution
6	512230	Music Publishers
6	512240	Sound Recording Studios
6	512290	Other Sound Recording Industries
1	515111	Radio Networks
1	515112	Radio Stations
1	515120	Television Broadcasting
1	515210	Cable and Other Subscription Programming
6	516110	Internet Publishing and Broadcasting
1	517110	Wired Telecommunications Carriers
1	517211	Paging
1	517212	Cellular and Other Wireless Telecommunications
6	517310	Telecommunications Resellers
6	517410	Satellite Telecommunications
1	517510	Cable and Other Program Distribution
6	517910	Other Telecommunications

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
1	518111	Internet Service Providers
1	518112	Web Search Portals
1	518210	Data Processing, Hosting, and Related Services
6	519110	News Syndicates
7	519120	Libraries and Archives
7	519190	All Other Information Services
7	521110	Monetary Authorities - Central Bank
1	522110	Commercial Banking
1	522120	Savings Institutions
6	522130	Credit Unions
4	522190	Other Depository Intermediation
4	522210	Credit Card Issuing
6	522220	Sales Financing
6	522291	Consumer Lending
6	522292	Real Estate Credit
6	522293	International Trade Financing
6	522294	Secondary Market Financing
6	522298	All Other Nondepository Credit Intermediation

6	522310	Mortgage and Nonmortgage Loan Brokers
6	522320	Financial Transactions Processing, Reserve, and Clearinghouse Activities
6	522390	Other Activities Related to Credit Intermediation
1	523110	Investment Banking and Securities Dealing
1	523120	Securities Brokerage
6	523130	Commodity Contracts Dealing
6	523140	Commodity Contracts Brokerage
6	523210	Securities and Commodity Exchanges
6	523910	Miscellaneous Intermediation
1	523920	Portfolio Management
1	523930	Investment Advice
6	523991	Trust, Fiduciary, and Custody Activities
6	523999	Miscellaneous Financial Investment Activities
1	524113	Direct Life Insurance Carriers
1	524114	Direct Health and Medical Insurance Carriers
1	524126	Direct Property and Casualty Insurance Carriers
6	524127	Direct Title Insurance Carriers
6	524128	Other Direct Insurance (except Life, Health, and Medical) Carriers
6	524130	Reinsurance Carriers
1	524210	Insurance Agencies and Brokerages
4	524291	Claims Adjusting
4	524292	Third Party Administration of Insurance and Pension Funds
4	524298	All Other Insurance Related Services
7	525110	Pension Funds
7	525120	Health and Welfare Funds
7	525190	Other Insurance Funds
7	525910	Open-End Investment Funds
7	525920	Trusts, Estates, and Agency Accounts

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
7	525930	Real Estate Investment Trusts
7	525990	Other Financial Vehicles
6	531110	Lessors of Residential Buildings and Dwellings
1	531120	Lessors of Nonresidential Buildings (except Miniwarehouses)
1	531130	Lessors of Miniwarehouses and Self-Storage Units
6	531190	Lessors of Other Real Estate Property
1	531210	Offices of Real Estate Agents and Brokers
1	531311	Residential Property Managers
1	531312	Nonresidential Property Managers
1	531320	Offices of Real Estate Appraisers
4	531390	Other Activities Related to Real Estate
1	532111	Passenger Car Rental
6	532112	Passenger Car Leasing
1	532120	Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing
6	532210	Consumer Electronics and Appliances Rental
6	532220	Formal Wear and Costume Rental
6	532230	Video Tape and Disc Rental
6	532291	Home Health Equipment Rental
6	532292	Recreational Goods Rental
6	532299	All Other Consumer Goods Rental
6	532310	General Rental Centers
4	532411	Commercial air, rail, and water transportation equipment rental and leasing

1	532412	Construction, Mining, and Forestry Machinery and Equipment Rental and Leasing
6	532420	Office Machinery and Equipment Rental and Leasing
6	532490	Other Commercial and Industrial Machinery and Equipment Rental and Leasing
6	533110	Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)
1	541110	Offices of Lawyers
6	541191	Title Abstract and Settlement Offices
6	541199	All Other Legal Services
1	541211	Offices of Certified Public Accountants
6	541213	Tax Preparation Services
4	541214	Payroll Services
1	541219	Other Accounting Services
1	541310	Architectural Services
6	541320	Landscape Architectural Services
1	541330	Engineering Services
6	541340	Drafting Services
6	541350	Building Inspection Services
6	541360	Geophysical Surveying and Mapping Services
6	541370	Surveying and Mapping (except Geophysical) Services
6	541380	Testing Laboratories
6	541410	Interior Design Services
6	541420	Industrial Design Services
6	541430	Graphic Design Services
6	541490	Other Specialized Design Services
6	541511	Custom Computer Programming Services

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
6	541512	Computer Systems Design Services
6	541513	Computer Facilities Management Services
6	541519	Other Computer Related Services
2	541610	Management Consulting Services
5	541611	Administrative Management and General Management Consulting Services
5	541612	Human Resources and Executive Search Consulting Services
5	541613	Marketing Consulting Services
5	541614	Process, Physical Distribution, and Logistics Consulting Services
5	541618	Other Management Consulting Services
6	541620	Environmental Consulting Services
6	541690	Other Scientific and Technical Consulting Services
7	541710	Research and Development in the Physical, Engineering, and Life Sciences
7	541720	Research and Development in the Social Sciences and Humanities
1	541810	Advertising Agencies
6	541820	Public Relations Agencies
6	541830	Media Buying Agencies
6	541840	Media Representatives
6	541850	Display Advertising
6	541860	Direct Mail Advertising
6	541870	Advertising Material Distribution Services
6	541890	Other Services Related to Advertising
6	541910	Marketing Research and Public Opinion Polling
6	541921	Photography Studios, Portrait
6	541922	Commercial Photography
6	541930	Translation and Interpretation Services
6	541940	Veterinary Services

6	541990	All Other Professional, Scientific, and Technical Services
7	551111	Offices of Bank Holding Companies
7	551112	Offices of Other Holding Companies
7	551114	Corporate, Subsidiary, and Regional Managing Offices
6	561110	Office Administrative Services
6	561210	Facilities Support Services
1	561310	Employment Placement Agencies
1	561320	Temporary Help Services
1	561330	Professional Employer Organizations
6	561410	Document Preparation Services
6	561421	Telephone Answering Services
6	561422	Telemarketing Bureaus
6	561431	Private Mail Centers
6	561439	Other Business Service Centers (including Copy Shops)
6	561440	Collection Agencies
6	561450	Credit Bureaus
6	561491	Repossession Services
6	561492	Court Reporting and Stenotype Services
6	561499	All Other Business Support Services
1	561510	Travel Agencies

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
6	561520	Tour operators
7	561591	Convention and Visitors Bureaus
6	561599	All Other Travel Arrangement and Reservation Services
6	561611	Investigation Services
1	561612	Security Guards and Patrol Services
6	561613	Armored Car Services
6	561621	Security Systems Services (except Locksmiths)
6	561622	Locksmiths
6	561710	Exterminating and Pest Control Services
1	561720	Janitorial Services
6	561730	Landscaping Services
6	561740	Carpet and Upholstery Cleaning Services
6	561790	Other Services to Buildings and Dwellings
6	561910	Packaging and Labeling Services
6	561920	Convention and Trade Show Organizers
6	561990	All Other Support Services
1	562111	Solid Waste Collection
6	562112	Hazardous Waste Collection
6	562119	Other Waste Collection
6	562211	Hazardous Waste Treatment and Disposal
6	562212	Solid Waste Landfill
6	562213	Solid Waste Combustors and Incinerators
6	562219	Other Nonhazardous Waste Treatment and Disposal
6	562910	Remediation Services
6	562920	Materials Recovery Facilities
6	562991	Septic Tank and Related Services
6	562998	All Other Miscellaneous Waste Management Services
7	611110	Elementary and Secondary Schools
6	611210	Junior Colleges
6	611310	Colleges, Universities, and Professional Schools

6	611410	Business and Secretarial Schools
1	611420	Computer Training
6	611430	Professional and Management Development Training
6	611511	Cosmetology and Barber Schools
6	611512	Flight Training
7	611513	Apprenticeship Training
6	611519	Other Technical and Trade Schools
6	611610	Fine Arts Schools
6	611620	Sports and Recreation Instruction
6	611630	Language Schools
6	611691	Exam Preparation and Tutoring
6	611692	Automobile Driving Schools
6	611699	All Other Miscellaneous Schools and Instruction
6	611710	Educational Support Services
1	621111	Offices of Physicians (except Mental Health Specialists)
4	621112	Offices of Physicians, Mental Health Specialists

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
6	621210	Offices of Dentists
6	621310	Offices of Chiropractors
6	621320	Offices of Optometrists
6	621330	Offices of Mental Health Practitioners (except Physicians)
6	621340	Offices of Physical, Occupational and Speech Therapists, and Audiologists
6	621391	Offices of Podiatrists
6	621399	Offices of All Other Miscellaneous Health Practitioners
6	621410	Family Planning Centers
6	621420	Outpatient Mental Health and Substance Abuse Centers
4	621491	HMO Medical Centers
6	621492	Kidney Dialysis Centers
4	621493	Freestanding Ambulatory Surgical and Emergency Centers
6	621498	All Other Outpatient Care Centers
1	621511	Medical Laboratories
1	621512	Diagnostic Imaging Centers
1	621610	Home Health Care Services
4	621910	Ambulance Services
1	621991	Blood and Organ Banks
6	621999	All Other Miscellaneous Ambulatory Health Care Services
1	622110	General Medical and Surgical Hospitals
1	622210	Psychiatric and Substance Abuse Hospitals
1	622310	Specialty (except Psychiatric and Substance Abuse) Hospitals
1	623110	Nursing Care Facilities
1	623210	Residential Mental Retardation Facilities
6	623220	Residential Mental Health and Substance Abuse Facilities
6	623311	Continuing Care Retirement Communities
6	623312	Homes for the Elderly
6	623990	Other Residential Care Facilities
7	624110	Child and Youth Services
7	624120	Services for the Elderly and Persons with Disabilities
7	624190	Other Individual and Family Services
7	624210	Community Food Services
7	624221	Temporary Shelters
7	624229	Other Community Housing Services

7	624230	Emergency and Other Relief Services
7	624310	Vocational Rehabilitation Services
6	624410	Child Day Care Services
6	711110	Theater Companies and Dinner Theaters
6	711120	Dance Companies
6	711130	Musical Groups and Artists
6	711190	Other Performing Arts Companies
6	711211	Sports Teams and Clubs
6	711212	Racetracks
6	711219	Other Spectator Sports
6	711310	Promoters of Performing Arts, Sports, and Similar Events with Facilities
6	711320	Promoters of Performing Arts, Sports, and Similar Events without Facilities

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
6	711410	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures
6	711510	Independent Artists, Writers, and Performers
6	712110	Museums
6	712120	Historical Sites
6	712130	Zoos and Botanical Gardens
6	712190	Nature Parks and Other Similar Institutions
1	713110	Amusement and Theme Parks
6	713120	Amusement Arcades
6	713210	Casinos (except Casino Hotels)
6	713290	Other Gambling Industries
1	713910	Golf Courses and Country Clubs
6	713920	Skiing Facilities
6	713930	Marinas
1	713940	Fitness and Recreational Sports Centers
6	713950	Bowling Centers
6	713990	All Other Amusement and Recreation Industries
1	721110	Hotels (except Casino Hotels) and Motels
1	721120	Casino Hotels
6	721191	Bed-and-Breakfast Inns
6	721199	All Other Traveler Accommodation
6	721211	RV (Recreational Vehicle) Parks and Campgrounds
6	721214	Recreational and Vacation Camps (except Campgrounds)
6	721310	Rooming and Boarding Houses
6	722110	Full-Service Restaurants
6	722211	Limited-Service Restaurants
6	722212	Cafeterias
6	722213	Snack and Nonalcoholic Beverage Bars
6	722310	Food Service Contractors
6	722320	Caterers
6	722330	Mobile Food Services
6	722410	Drinking Places (Alcoholic Beverages)
6	811111	General Automotive Repair
6	811112	Automotive Exhaust System Repair
6	811113	Automotive Transmission Repair
6	811118	Other Automotive Mechanical and Electrical Repair and Maintenance
6	811121	Automotive Body, Paint, and Interior Repair and Maintenance
6	811122	Automotive Glass Replacement Shops
6	811191	Automotive Oil Change and Lubrication Shops

6	811192	Car Washes
6	811198	All Other Automotive Repair and Maintenance
6	811211	Consumer Electronics Repair and Maintenance
6	811212	Computer and Office Machine Repair and Maintenance
6	811213	Communication Equipment Repair and Maintenance
6	811219	Other Electronic and Precision Equipment Repair and Maintenance
1	811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance
6	811411	Home and Garden Equipment Repair and Maintenance

List of six-digit NAICS industries by PPI index publication status*

Publication Status*	NAICS code	Industry Title
6	811412	Appliance Repair and Maintenance
6	811420	Reupholstery and Furniture Repair
6	811430	Footwear and Leather Goods Repair
6	811490	Other Personal and Household Goods Repair and Maintenance
6	812111	Barber Shops
6	812112	Beauty Salons
6	812113	Nail Salons
6	812191	Diet and Weight Reducing Centers
6	812199	Other Personal Care Services
6	812210	Funeral Homes and Funeral Services
6	812220	Cemeteries and Crematories
6	812310	Coin-Operated Laundries and Drycleaners
6	812320	Drycleaning and Laundry Services (except Coin-Operated)
6	812331	Linen Supply
6	812332	Industrial Launderers
6	812910	Pet Care (except Veterinary) Services
6	812921	Photofinishing Laboratories (except One-Hour)
6	812922	One-Hour Photofinishing
6	812930	Parking Lots and Garages
6	812990	All Other Personal Services
7	813110	Religious Organizations
7	813211	Grantmaking Foundations
7	813212	Voluntary Health Organizations
7	813219	Other Grantmaking and Giving Services
7	813311	Human Rights Organizations
7	813312	Environment, Conservation and Wildlife Organizations
7	813319	Other Social Advocacy Organizations
7	813410	Civic and Social Organizations
7	813910	Business Associations
7	813920	Professional Organizations
7	813930	Labor Unions and Similar Labor Organizations
7	813940	Political Organizations
7	813990	Other Similar Organizations (except Business, Professional, Labor, and Political Organizations)
7	814110	Private Households
7	921110	Executive Offices
7	921120	Legislative Bodies
7	921130	Public Finance Activities
7	921140	Executive and Legislative Offices, Combined
7	921150	American Indian and Alaska Native Tribal Governments
7	921190	Other General Government Support
7	922110	Courts

7	922120	Police Protection
7	922130	Legal Counsel and Prosecution
7	922140	Correctional Institutions
7	922150	Parole Offices and Probation Offices
7	922160	Fire Protection
List of six-digit NAICS industries by PPI index publication status*		
Publication Status*	NAICS code	Industry Title
7	922190	Other Justice, Public Order, and Safety Activities
7	923110	Administration of Education Programs
7	923120	Administration of Public Health Programs
7	923130	Administration of Human Resource Programs (except Education, Public Health, and Veterans' Affairs Programs)
7	923140	Administration of Veterans' Affairs
7	924110	Administration of Air and Water Resource and Solid Waste Management Programs
7	924120	Administration of Conservation Programs
7	925110	Administration of Housing Programs
7	925120	Administration of Urban Planning and Community and Rural Development
7	926110	Administration of General Economic Programs
7	926120	Regulation and Administration of Transportation Programs
7	926130	Regulation and Administration of Communications, Electric, Gas, and Other Utilities
7	926140	Regulation of Agricultural Marketing and Commodities
7	926150	Regulation, Licensing, and Inspection of Miscellaneous Commercial Sectors
7	927110	Space Research and Technology
7	928110	National Security
7	928120	International Affairs
*Publication Code	Description	
1	Currently published, 6-digit NAICS	
2	Currently published, higher level aggregate, 5-digit NAICS or higher	
3	In calculation, but not published due to low and declining establishment counts	
4	Not published, 6 digit NAICS split off from SIC, not yet sampled	
5	Not published, 6 digit NAICS covered by higher level NAICS aggregate that is published	
6	All other eligible 6-digit NAICS not currently published	
7	Not eligible for publication, no defined output	

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**Fitness of Use Criteria for Price Index Deflators in National Income Accounting
A Case Study: Mutual Stock Fund Management**

**Michael Holdway
U.S. Bureau of Labor Statistics**

Abstract:

Most statistical agencies in developed countries are working to expand the coverage of their price indexes to better represent the services sector. Relative to the durable and non-durable goods producing sectors, services often present measurement challenges that are difficult to address in an operational environment. This paper presents a case study of how the Producer Price Index program conceptualized and then executed a price measurement methodology for the output of the Investment Advice industry, while simultaneously testing the deflation properties of its methodology for fitness of use in the national accounts.

The views expressed are those of the author and do not reflect the policies of the U.S. Bureau of Labor Statistics.

Introduction

Statistical agencies continue to expand their coverage into the services sector which has led to a constructive dialogue with national income accounting practitioners. The dialogue has often focused on the fitness of certain price indexes for separating price change from quantity change. The deflation properties of a price index are partly dependent on how statistical agencies respond operationally to the conceptually difficult price measurement challenges presented by service industries such as finance, consulting or medical care. Several criteria can be used to assess the accuracy and relevance of deflators that vary according to the complexity of the price measurement challenge. Some of the basic tenets followed by the Producer Price Index (PPI) program to review fitness of use are listed below.

- 1 *Price measures are operationally defined*
The PPI model is based on industry revenue functions holding input requirements fixed.
Constant quality indexes are a function of input requirements

- 2 *Criteria used to test the assumptions in I.*
Modeling the relationship between the revenue function and the price mechanism used to quantify price change.
Changes in output quality are related to changes in input requirements relative to a reference period. (Violation of the fixed inputs assumption require a valuation adjustment that approximates the marginal cost difference between the current and reference period input requirements)

The minimum framework in section I and the validating criteria in section II may seem obvious, but appropriate measures of output prices for many service industries are widely recognized as problematic in the price literature.

The following review will explore some of the issues that the PPI has confronted in its assessment of the deflation properties of a price index for the output of the Investment Advice industry. Investment Advice was chosen as a case study partly because a reliable secondary data source was identified and available to empirically test the robustness of the PPI's chosen price mechanism using the criteria of section II-a. The criteria in section II-b, appropriate measures of quality change for Investment Advice output, are more difficult to quantify and test in a brief review and are therefore left for future research.

Conceptualizing the Price Measurement Problem

The Producer Price Index (PPI) program has included Investment Advice (IA) among the industries slated for coverage as part its on-going expansion into the services sector. Mutual fund portfolio management, the focus of this review, is the most important IA service, accounting for almost 70 percent of industry revenues.³ The Investment Company Institute (ICI), an industry trade association, defines the services provided by mutual fund portfolio

³ The U.S. Bureau of Census estimated total IA (SIC 6282) revenues in 1997 were \$53 billion. The Investment Company Institute estimated that, in the same year, mutual fund portfolio management revenues were \$36.5 billion.

management as *making investment decisions that are based on extensive knowledge and research of market conditions and the financial performance of individual companies and specific securities. As economic conditions change, the manager may adjust the mix of a fund's investments to adopt a more aggressive or defensive posture to meet its investment objectives.*⁴

Prior to the publication of an IA price index the following conceptual measurement challenges should be resolved:

- What is the correct unit of measure for investment advice output?
- What is the correct unit of measure for investment advice output prices?

A resolution of these questions is complicated by an industry pricing strategy that ties investment advice revenue to changing portfolio asset values. In other words, exogenous factors such as a volatile and unpredictable equity market have a potentially strong influence on nominal price and revenue change at the establishment and industry level.

The Relationship Between Mutual Funds and Investment Advisors

Mutual funds are owned by shareholders that elect a board of directors to oversee operations and determine a fund's investment goals (described later). The board of directors has the responsibility of contracting for the services of a separate legal entity known as an investment advisor (also called mutual fund manager).⁵ Investment advisors are paid by mutual funds to select and manage the securities that make up a fund's portfolio consistent with its stated investment objective. Investment advisors are currently contracted by mutual funds to manage more than \$7.0 trillion in portfolio assets. The advisor's fee is usually the largest mutual fund expense and the only one considered in this review.

Mutual Funds Broadly Defined

A mutual fund is an investment company that pools money from shareholders to acquire a diversified portfolio of securities. Mutual fund portfolios are structured to meet stated investment objectives that carry an implied risk profile. Both investment objectives and the methods used to meet objectives vary according to the type of fund. The ICI estimates that there were more than 8,000 mutual funds in the year 2000 that could be categorized into four basic sectors.⁶ They are listed by order of importance in table 1.

Table 1

Mutual Fund Type	Assets Under Management*
Stock Fund	\$3.962 trillion (57%)

⁴ "Guide to Mutual Funds", published by the Investment Company Institute and available on-line at www.ici.org/.

⁵ According to the ICI "Virtually every mutual fund is externally managed and thus relies upon outside businesses to provide services to shareholders."

⁶ The ICI estimated the total number of Open-end mutual funds in the U.S. at 8,027 and the total number of non-U.S. funds at 45,423. Interestingly, the only country with more mutual funds than the U.S. is Korea with 11,677. In terms of assets, U.S. funds were valued at \$7.26 trillion as of Sept. 2000 while non-U.S. funds were valued at \$4.88 trillion.

Money Market Fund	\$1.845 trillion (26%)
Bond Fund	\$0.808 trillion (12%)
Hybrid (stock and bond) Fund	\$0.349 trillion (5%)

**From ICI membership survey that includes approx. 95% of domestic mutual fund assets*

Because four sectors are inadequate measures of fund diversity, the ICI further disaggregates mutual funds into investment objective categories. For instance, stock funds are assigned by ICI to one of 33 categories determined by a portfolio's equity composition. Examples of several ICI investment categories used to classify stock funds are listed below:

- Aggressive Growth Funds: Invest primarily in common stocks of small companies.
- Growth Funds: Invest primarily in common stocks of well-established companies
- Emerging Market Funds: Invest primarily in companies based in developing regions of the world.
- Income-equity Funds: Invest primarily in companies with a consistent record of dividend payments.

The ICI's categorization of stock funds are still somewhat general and may be further refined to describe those funds that specialize in narrowly defined sectors such as biotech, communications, or semiconductors. The proliferation of investment objectives offered by the mutual fund industry continues to grow to meet the requirements of individual and institutional investors.⁷

A fund's investment objective determines whether the type of investment advice services paid for are active or passive. An example of a passively managed fund is one with a portfolio that duplicates the securities underlying a tracking or benchmark index such as the S&P 500. As you might expect, passively managed index funds pay lower investment advice fees than actively managed funds.⁸ In both cases, the investment advice fee almost always is stated in terms of basis points or a percentage of portfolio assets that can be expressed as:

$$\text{IAFEE} = \text{BP} * \text{PV}$$

Where IAFEE is the investment advice fee, BP is basis points and PV is portfolio value. It is the investment advice fee that is of primary interest to the PPI program.

Some Requirements for a Conceptually Correct Price for IA Services

In determining the conceptually correct price and subsequent measure of price change for IA services, the PPI's pricing framework must be considered. The PPI is based on a fixed-input output price index (FIOPI) model. The FIOPI is designed to compare producer revenues in different time periods, holding inputs and technology constant. In the PPI's Laspeyres formula, input requirements are fixed by the reference period's revenue function. Because the PPI cannot capture the universe of transactions that account for an industry's revenue, individual transactions are sampled. The preferred price in the PPI framework is one that reflects changes in industry revenues holding inputs fixed. Therefore, one of the litmus tests for a conceptually "correct" IA

⁷ According to ICI, from 1990 to year-end 2000, the number of mutual funds grew from 2,900 to 8,200.

⁸ Large index funds based on the S&P 500 tend to pay portfolio management fees of 0.30 percent or less, while it is not unusual for actively managed funds to pay management fees of 1 percent or more.

price is that changes in price are proportionate to changes in revenue, restricted by the aforementioned assumptions of the PPI model.⁹

Determining the correct price for IA services also is dependent on the accurate identification and measurement of output. Implicit in this requirement is an understanding of the industry's basic production process. The inputs that flow into the production process and then are transformed to output substantially determine the nature of the service produced and the transaction that the PPI should sample. Many of the inputs provided by investment advisors to maximize output can be thought of as soft inputs, which include analytical skills and market, industry and company knowledge.¹⁰ The relative quantities of soft inputs may change over time as they are used to develop portfolio strategies that best respond to events in the marketplace. As for output, industry experts seem to have a consistent general definition of the output services provided by investment advisors, which they describe as *creating a portfolio that blends different types of stocks and bonds to achieve the maximum return for a given level of risk*.¹¹ The industry definition suggests that portfolio values may be an appropriate option for measuring relative changes in nominal IA output.

Availability of Price Data for IA Services

Mutual fund advisors generally can provide the PPI program with the following types of information:

- The investment advice fee stated in basis points.
- The rate of growth in the value of invested assets over specified time periods.
- The portfolio asset value as of specified points in time.

Different price relatives can be constructed using this information. The most obvious measures are described in the examples below.

Example A:

If a change in the nominal price of IA services is defined as a change in basis points then a price relative (PR_{BP})

can be stated as:¹²

⁹ The proper adjustment for quality change or even what constitutes investment advice quality change will not be addressed in this review, but quality change in the FIOPI model occurs only when the fixed inputs requirement is violated. Such violations require an adjustment equal to the change in marginal cost plus normal markup associated with the new input requirements. The valuation or identification of changing input requirements present some interesting conceptual challenges for investment advice services that may be explored in a follow-up review.

¹⁰ In this context, maximizing output revenues is equivalent to maximizing the portfolio's yield or rate of return. This view is consistent with the industry pricing practice of charging fees based on a percentage of portfolio assets. If the fee percentage is stable, nominal revenue for IA services change proportionally with a portfolio's rate of return.

¹¹ www.university.smartmoney.com/Departments/Investing101. Morningstar and the Investment Company Institute offer similar descriptions of mutual fund advice.

¹² The most basic index of price change is expressed as a percentage that shows how the current price differs from a reference or base period price. The comparison price, BP_c , is divided by the base price, BP_b , to form the ratio BP_c/BP_b . This ratio is the price relative and a basic index number is obtained by multiplying the price relative by 100. The price change represented by an index number is usually expressed as a percentage change rather than a change in the level of the index as: $[(Index_c - Index_b) / Index_b] * 100$.

$$\mathbf{PR}_{\mathbf{BP}} = \frac{\mathbf{BP}_t}{\mathbf{BP}_{t-1}}$$

$\mathbf{PR}_{\mathbf{BP}}$ may not, however, capture the complete transaction price that the industry has established as a rate times a value. Because basis points often are static for extended periods of time, $\mathbf{PR}_{\mathbf{BP}}$ is likely to deviate from the "price" implied by a rate times a changing value. A recent GAO report (see references) to Congress stated that, "The fees that the advisor and other service providers deduct from the fund's assets represent the price of the services they perform." The report found that from 1990 to 1998 mutual stock fund assets grew 833 percent and mutual fund advisor revenues grew 801 percent. Since investment advisors explicitly price their services through fees stated as a percent of asset values that change proportionally with asset growth rates, one can argue that $\mathbf{PR}_{\mathbf{BP}}$ should be adjusted for growth rates, as illustrated in example B.

Example B.

If a change in the nominal price of IA services is defined as the ratio of basis points adjusted by the growth rate (\mathbf{GR}_t) of a reference period portfolio, then a price relative ($\mathbf{PR}_{\mathbf{BPR}}$) can be stated as:

$$\mathbf{PR}_{\mathbf{BPR}} = \frac{\mathbf{BP}_t}{\mathbf{BP}_{t-1}} (1 + \mathbf{GR}_t)$$

If the assumptions of the FIOPI model are not violated, then it appears that example B passes the previously mentioned litmus test, namely, that the relevant transaction price is one that has a proportional relationship to changes in nominal revenue, holding inputs fixed. Alternatively, an explicit valuation of the advisor's fee could incorporate the actual portfolio values in two periods as in example C.

Example C.

If a change in the nominal price of IA services is defined by the ratio of current and reference period prices determined by $\mathbf{BP} * \mathbf{PV}$, then a price relative ($\mathbf{PR}_{\mathbf{BPV}}$) could be stated as:

$$\mathbf{PR}_{\mathbf{BPV}} = \frac{\mathbf{BP}_t \mathbf{PV}_t}{\mathbf{BP}_{t-1} \mathbf{PV}_{t-1}}$$

The asset value of PV_t includes the portfolio growth rate relative to PV_{t-1} as in example B, but does not control for inflows or outflows, which it seems clear should be excluded from measures of price change.¹³ Because flows of funds are included, PR_{BPV} has the undesirable property of entangling output change with price change.

Deflation Properties for Nominal Measures of IA Price Change

The price relatives described in examples A, B and C were constructed from the types of data that can be provided to the PPI by the IA industry. Measures of real output will differ depending on which measure of price change is used to deflate nominal revenue in the national accounts. To summarize, three price relatives that can be calculated using information readily available from industry reporters in the PPI's monthly production environment are:

- A ratio of basis points: PR_{BP}
- A ratio of basis points adjusted by growth in the *value of funds invested at the start of the period*: PR_{BPR}
- A ratio of basis points adjusted by portfolio growth including inflows and outflows of funds: PR_{BPV}

To illustrate the deflation properties for each of the price relatives assume that the services provided by the IA industry are limited to a single portfolio. Hypothetical data are presented below to establish a reference point for different measures of IA revenue change.

<i>2.1 Reference Period (t-1)</i>	<i>Comparison Period (t)</i>
PV=\$10,000,000	PV=\$11,000,000
BP=25 (0.0025%)	BP=25 (0.0025%)
	GR=0.06 (6%)
	NFF=\$400,000

The reference and comparison period data are used in example D to construct price indexes based on the three measures of price change. Note that BP is unchanged, but the comparison period portfolio value has grown \$1 million due to a growth rate (GR) of 6 percent and a net flow of funds (NFF) equal to \$400,000. Relative to the reference period value, net flow of funds may represent new accounts or additional share purchases from current shareholders or both.¹⁴

Example D.

¹³ Relative to the reference period portfolio, flow of funds represent more or less investment advice output (new input requirements) depending on whether the flows are positive or negative.

¹⁴ Shareholder redemptions also influence the net flow of funds value.

$$I_{BP} = \frac{BP_t}{BP_{t-1}}$$

$$= 1.00$$

$$I_{BPR} = \frac{BP_t}{BP_{t-1}}(1+GR)$$

$$= 1.06$$

$$I_{BPV} = \frac{BP_t PV_t}{BP_{t-1} PV_{t-1}}$$

$$= 1.10$$

Nominal revenue is deflated by an appropriate price index to estimate a measure of real output. Deflation should answer the question, how much of the change in IA revenue, $BP_t PV_t - BP_{t-1} PV_{t-1}$, is due to price change and how much, if any, is due to output (real) change? The deflation properties for each of the price indexes are compared in example E.

Example E.

2.1.1.1.1.1 Reference Period IA Revenue

$$BP_{t-1} PV_{t-1} = \$10,000,000 * 0.0025 = \$25,000$$

Comparison Period IA Revenue

$$BP_t PV_t = \$11,000,000 * 0.0025 = \$27,500$$

<u>Deflator</u>	<u>CS/Deflator)</u>	=	<u>DC\$</u>
$I_{BP} = 1.00$	$27,500/1.00$	=	27,500
$I_{BPR} = 1.06$	$27,500/1.06$	=	26,000
$I_{BPV} = 1.10$	$27,500/1.10$	=	25,000

Real Change in Output

$$I_{BP} : DC\$-RS=2,500$$

$$I_{BPR} : DC\$-RS=1,000$$

$$I_{BPV} : DC\$-RS=0$$

CS=nominal comparison period revenue; DC\$=deflated comparison period revenue;

RS=reference period revenue

Because BP is unchanged between t-1 and t, the I_{BP} deflator treats any change in IA revenue as change in output. Conversely, I_{BPV} treats any change in IA revenue as price change (inflation). Only I_{BPR} isolates output change, defined by flow of funds, from price change. This output change is measured in the example as a \$1,000 increase in revenue (\$26,000 - \$25,000) which equals the \$400,000 flow of funds * 25 basis points. There may be other price deflators that could isolate changes in investment advice output but the range of deflators included in example E are constructed only from data that are directly available to the PPI program from mutual fund investment advisors.

An Empirical View

The choice of I_{BPR} as the "best" deflator in the previous section was based on the premise that, at a minimum, the real difference between investment advice revenues in two periods should be equal to the change in revenue due to

net flows. However, a more rigorous test of the deflation properties of I_{BPR} is possible. The test is based on two data sources. The first is an unpublished price index from a PPI sample of IA fees for Money Market Funds, Bond Funds, Stock Funds and Hybrid Funds. To simplify, only IA fees for stock funds are considered.¹⁵ The second data source is from an ICI report that tracks more than 4,300 portfolio values on a monthly basis that account for more than 90 percent of the assets of U.S. based mutual stock funds. The ICI report separates the dollar value of net flows (new sales, redemptions and net exchanges), which can be used to estimate changes in the value of IA output as described above. Because the PPI's coverage of mutual stock fund advisors is based on a relatively small sample, it will be interesting to see if the deflation properties of the PPI yield a measure of real revenue that approximates the measure implied by the ICI data.¹⁶ Note that any changes in the PPI's stock fund advice index due to the BP pricing component must be excluded from comparisons with ICI growth rates (recall that $I_{BPR} = \frac{BP_t}{BP_{t-1}}(1+GR)$).¹⁷ The comparison period extends over a 12-month period that begins on Jul-00, which corresponds with the PPI's base date for the IA index.

Table 2: ICI Growth Rate for Mutual Stock Fund Portfolio Assets

A	B	C
Reference Period	Comparison Period	Comparison Period
Mutual Stock Fund Assets July-00	Mutual Stock Fund Assets Jul-01	Mutual Stock Fund Net Flows Jul-00
(billions)	Including Net Flows (billions)	to Jul-01 (billions)
4244.1	3590.1	143.0

From "Mutual Fund Facts and Figures, Monthly Assets, Flows and Sales",

www.ici.org/facts_figures/current_statistics

¹⁵ Limiting the test to stock fund advisors is in some ways more challenging because their revenues will tend to be more volatile due to the relative volatility of stock fund asset values.

¹⁶ The PPI sample includes 72 mutual stock fund advisors.

¹⁷ The PPI requested each mutual fund advisor to report changes in BP and calculate the growth rate for a reference period portfolio excluding net flows. The growth rate calculation is similar to how mutual funds report performance measures in their prospectus.

Table 2 presents data from ICI that measures the growth rate of essentially the entire value of mutual stock fund assets from Jul-00 to Jul-01, excluding net flows. This net growth rate can be estimated as follows:

$$(B-C)/A \text{ or } (3590.1-143.0)/4244.1 = 0.81221$$

ICI growth rates indicate that mutual stock fund assets fell about 19 percent during a particularly volatile period that saw general declines in most equity markets. The ICI data does not directly measure the change in investment advice revenue or prices during this period, but if BP is unchanged, then an imputed investment advice price index for stock funds will be proportionally equivalent to the change in stock fund asset growth reported by ICI. Table 3 presents aggregate PPI data used to construct the asset growth rate component of its stock fund advisors index, excluding flow of funds.

Table 3: PPI Growth Rate for Mutual Stock Fund Portfolio Assets

A	B
Reference Period	Comparison Period
Mutual Stock Fund Assets July-00	Mutual Stock Fund Assets Jul-01
(billions)	Excludes Net Flows (billions)
979.3	789.1

Using the same ratio as in table 2, the net growth rate of stock fund assets sampled by the PPI can be stated as:

$$B/A \text{ or } 789.1/979.3 = 0.80579.$$

The PPI measure indicates that stock fund asset values fell about 20 percent compared to the ICI measure of 19 percent.¹⁸ While both the ICI and PPI exhibit significant declines, the PPI measure declines more rapidly. Part of the difference between PPI and ICI growth rates is that ICI surveys over 90 percent of mutual stock funds with reference period asset values of more than \$4 trillion, while the PPI sample included funds with reference period assets of only \$980 billion. However, another and perhaps more important factor is that the ICI flow of funds does not control for the entry of new funds. In the reference period the ICI survey included 4,134 stock funds, but in the

¹⁸ The PPI for stock fund advisors actually declined to 0.8188 during this time period due to a small increase (1.59 percent) in the BP component of the pricing formula. The average weighted BP in the reference period was approximately 51.

comparison period the number of funds had grown to 4,644. The 12 percent growth in funds, which represent new entrants (with relatively small asset values) relative to the reference period, at least partly contributes to the slower negative growth rate of the ICI relative to the PPI.

Summary

The PPI strategy for constructing price indexes for mutual fund advisors explicitly recognizes the industry practice of pricing services based on a rate times a portfolio value. One of the benefits of this strategy is that nominal fluctuations in equity markets are not transmitted to the national accounts as changes in real output.¹⁹ While a certain amount of ambiguity remains, which should be expected when comparisons are made between different data sets, the ICI and PPI data are so close, it appears that the PPI has been able to effectively operationalize the industry

pricing mechanism of $I_{BPR} = \frac{BP_t}{BP_{t-1}}(1+GR)$. In so doing, the PPI has also met the industry revenue-pricing

mechanism fitness of use criteria described in the opening section. However, I_{BPR} does not directly address the conceptually difficult issue of identifying and measuring quality change in IA output. Quality change measures for investment advice will have to at least consider the implications of the efficient markets theory or even more specifically the concept of quality change in the context of Malkiel's (1999) updated release of "Random Walk Down Wall Street". A search for the most appropriate methodology that quantifies investment advice quality change in a FIOPI framework may be explored in a follow-up paper.

¹⁹ National income accountants would likely consider the transmittal of the often volatile swings in equity markets to changes in real output as inappropriate. A deflator based on I_{BPR} removes this volatility, while still allowing net flows to enter the national accounts as changes in real output.

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Plans for New PPI Service Sector Aggregation Indexes

Draft Paper
May 19, 2006

Authors
Roslyn Swick
Maureen Doherty

U.S. Bureau of Labor Statistics
2 Massachusetts Avenue NE
Washington DC 20212

This paper has been prepared for presentation to the Federal Economic Statistics Advisory Committee (FESAC) on June 9, 2006. It represents work in progress and does not represent any agency's final positions on issues addressed. The FESAC is a Federal Advisory Committee sponsored jointly by the Bureau of Labor Statistics of the U.S. Department of Labor and by the Bureau of Economic Analysis and the Bureau of the Census of the U.S. Department of Commerce.

Plans for New PPI Service Sector Aggregation Indexes

During the fall 2005 FESAC presentation on the Future of the PPI, it was noted that current systems limited the PPI program's abilities to incorporate services data into broad economic aggregation structures. Since that meeting, and in response to concerns expressed that the timing of systems development will mean that such aggregation measures will not be published until at least 2010, the PPI staff conducted a study to analyze current data and systems capabilities to determine if there are any meaningful service aggregate indexes that could be calculated using the current system.

The PPI currently calculates and publishes index values net output indexes for many NAICS sub-sectors, industry groups and 5-digit NAICS industries in addition to the publication of 6-digit national industries. In a net output aggregate index, the component industry indexes are assigned weights that exclude all shipments to other industries within that aggregation. This weighting methodology eliminates the problem of multiple counting of price changes within that aggregation. Aggregate indexes are calculated and published for the mining and manufacturing sectors; however, the PPI does not currently calculate or publish aggregate net output indexes for any other sectors. The PPI program does calculate and publish sub-sector and industry group indexes for any of aggregates for which there is adequate coverage.

Planning is underway to begin calculating and publishing sector indexes in each sector where we have adequate coverage. In addition, the PPI does not currently calculate any aggregate indexes that cross sectors. The PPI does publish a table that displays some service industry net output index in special groupings; however, an aggregate net output index is not calculated for the group as a whole. In order to expand data availability, we plan to begin calculating and publishing indexes for these aggregations in January 2007. We have also identified a few additional aggregations that we feel might help to meet user needs. Most of the new indexes are in the services; however, this analysis also identified an additional mining and manufacturing related index that could be calculated. The new net output aggregate indexes that the PPI program is proposing to calculate and publish are listed below followed by a draft of the table that will include these indexes. As we work out the details over the next few months, this proposal may be altered slightly.

Total Mining, Utilities and Manufacturing – This index is a cross sector aggregate index that represents the net output of the Mining, Utilities and Manufacturing sectors.

Wholesale Trade and Retail Trade – These are two new aggregate net output indexes that represent the net output for the wholesale trade sector and the retail trade sector.

Total Trades -- In addition, this is another new cross sector aggregate index that represents the net output of the combined wholesale and retail trade sectors.

Transportation – This index is a sub-sector, net output aggregate index that represents the output of all the transportation industries. These industries are found in NAICS 48.

Delivery and Warehouse industries – This index is a sub-sector, net output aggregate index that represents the combination of delivery service industries and the warehousing and storage industries. The delivery service industries include the US postal service, courier services and local messengers services.

Transportation and Warehousing -- This index is a sector, net output aggregate index that represents all the NAICS 48 and 49 industries. This sector also includes Postal Service and Courier Services.

Selected Health Care – This index is a net output aggregate index for all the health care services that are currently priced in the PPI. This index represents the net output of the NAICS 621, 622 and 623 sub-sectors.

Information – This is a sector, net output aggregate index that represents the net output of the information sector. This index includes industry data from NAICS sub-sectors 511, 515, 517 and 518.

Other Selected Traditional Services– This is a cross sector, net output aggregate index that represents the various service industries that are priced in the PPI but not included in other sector aggregations. The sectors and industries which are included in this index are:

- Finance
- Insurance
- Administrative and support
- Professional services
- Real estate and rental and leasing
- Amusement and recreation
- Accommodation

Total Tradition Services – This is a cross sector, net output aggregate index that represents the net output of all the services currently priced in the PPI. These services included in this aggregate index include the industry data aggregated into the Selected Health Care index, the Information sector index and the Other Selected Services indexes.

Table 4. Producer price indexes for the net output of selected industries and industry groups, not seasonally adjusted

Industry code	Industry 1/	Index base
	Total mining, utilities, and manufacturing industries	12/06
	Total mining industries.....	12/84
211	Oil and gas extraction.....	12/85
212	Mining (except oil & gas).....	12/03
213	Mining support activities.....	12/03
	Utilities	12/06
221	Utilities.....	12/03
	Total manufacturing industries.....	12/84
311	Food mfg.....	12/84
312	Beverage & tobacco mfg.....	12/03
313	Textile mills.....	12/03
314	Textile product mills.....	12/03
315	Apparel manufacturing.....	12/03
316	Leather & allied product mfg.....	12/84
321	Wood products manufacturing.....	12/03
322	Paper manufacturing.....	12/03
323	Printing and related support activities....	12/03
324	Petroleum and coal products mfg.....	12/84
325	Chemical mfg.....	12/84
326	Plastics and rubber products mfg.....	12/84
327	Nonmetallic mineral product mfg.....	12/84
331	Primary metal mfg.....	12/84
332	Fabricated metal product mfg.....	12/84
333	Machinery mfg.....	12/03
334	Computer & electronic product mfg.....	12/03
335	Electrical equip, appliance & component mfg.	12/03
336	Transportation equipment mfg.....	12/03
337	Furniture & related product mfg.....	12/84
339	Miscellaneous mfg.....	12/03
	Total trade industries.....	12/06
	Wholesale trade industries.....	12/06
423	Merchant wholesalers, durable goods.....	06/04
424	Merchant wholesalers, nondurable goods.....	06/05
425	Wholesale trade agents and brokers.....	06/05
	Retail trade industries	12/06
441	Motor vehicle and parts dealers.....	12/03
442	Furniture and home furnishings stores.....	12/03
443	Electronics and appliance stores.....	12/03
444	Bldg material and garden equip and supp dealers.....	12/03
445	Food and beverage stores.....	12/99
446	Health and personal care stores.....	12/03
447	Gasoline stations.....	06/01
448	Clothing and clothing accessories stores...	12/03
451	Sporting goods, hobby, book and music stores	12/03
452	General merchandise stores.....	12/03
454	Nonstore retailers.....	12/03

Industry code	Industry 1/	Index base
	Transportation and warehousing industries....	12/06
	Transportation industries.....	12/06
481	Air transportation.....	12/92
482	Rail transportation.....	12/96
483	Water transportation.....	12/03
484	Truck transportation.....	12/03
486110	Pipeline transportation of crude oil.....	06/86
486910	Pipeline transportation of refined petroleum products.....	06/86
488	Transportation support activities.....	12/03
	Delivery and warehouse industries	12/06
491	Postal service.....	06/89
492	Couriers and messengers.....	12/03
493	Warehousing and storage.....	12/06
	Total traditional service industries	12/06
	Selected health care industries.....	12/06
6211	Offices of physicians.....	12/96
6215	Medical and diagnostic laboratories.....	12/03
6216	Home health care services.....	12/96
622	Hospitals.....	12/92
6231	Nursing care facilities.....	12/03
62321	Residential mental retardation facilities...	12/03
	Information	12/06
511	Publishing industries, except Internet.....	12/03
515	Broadcasting, except Internet.....	12/03
517	Telecommunications.....	12/03
5181	Internet service providers and web search portals	06/04
5182	Data processing and related services.....	12/03
	Other selected traditional service industries	12/06
5221	Depository credit intermediation.....	12/03
523	Security, commodity contracts and like activity.....	12/03
524	Insurance carriers and related activities...	12/03
53112	Lessors of nonres bldg (exc miniwarehouse)	12/03
53113	Lessors of miniwarehouse and self storage units	12/03
5312	Offices of real estate agents and brokers...	12/03
5321	Automotive equipment rental and leasing.....	06/01
532412	Const/mining/forestry equip rental and leasing	12/03
5411	Legal services.....	12/96
5412	Accounting, tax preparation, bookkeeping and payroll services.....	12/06
5413	Architectural, engineering and related services.....	12/96
5416	Management, scientific and technical consulting services	12/06
54181	Advertising agencies.....	12/03
5613	Employment services.....	12/96
56151	Travel agencies.....	12/03
56172	Janitorial services.....	12/03
5621	Waste collection.....	12/03
71311	Amusement and theme parks	12/05
71391	Golf courses and country clubs	12/05
71394	Fitness and recreational sports centers.....	12/04
721	Accommodation.....	12/96