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Cross-Cutting Topics

United States Producer Price Index Enhancement: Adding Services and  
Construction to PPI's Primary Index Aggregation Structures

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\*NOTE: The material contained in this paper is largely a reordering and recompilation of material found in other sources on the BLS website and written by U.S. PPI program staff members including most prominently Jonathan C. Weinhausen, an economist in the program's Branch of Index Methods and Analysis.



## Introduction

The purpose of this paper is to present the experience of the Producer Price Index Program (PPI) at the U.S. Bureau of Labor Statistics in creating new primary aggregation indexes that reflect price changes in goods, services, and construction that will replace the longstanding goods-based Stage of Processing indexes (SOP) with the release of January 2014 data in February 2014. The transition from the SOP aggregation model to the Final Demand-Intermediate Demand model (FD-ID) is a significant milestone for PPI as it represents the program's culmination of a decades-long expansion into coverage of various service industries and commodities and more recent expansion of coverage into nonresidential construction. The shift from the SOP system to the FD-ID system is the first major change in the analytical focus of the PPI News Release since 1978, when PPI shifted focus from the All Commodities Index to the Finished Goods Price Index and the other goods-based SOP price indexes.<sup>1</sup> The SOP system is composed of price indexes for goods sold as personal consumption and capital investment, and to intermediate demand (business inputs). The FD-ID aggregation system expands coverage beyond that of the stage-of-processing system through the addition of services, construction, exports, and government purchases. It measures price change for goods, services, and construction sold to final demand (personal consumption, capital investment, government, and export) and to intermediate demand (business purchases, excluding capital investment).

Prior to presenting information about the new PPI aggregation structure itself, this paper places it in the context of a description of the PPI program followed by a brief description of the history leading to the creation of the FD-ID model. The paper will describe the components of the new aggregation structure and their purposes. It will provide some initial results and how they contrast with PPI's current goods-only aggregate indexes. Finally, it will discuss the challenges BLS faces in educating users about this major change in PPI outputs and especially the program's monthly News Release.

### 1. Description of the US Producer Price Index Survey

The Producer Price Index is a family of indexes that measure the average change over time in the selling prices received by domestic producers for their output. PPIs measure price change from the perspective of the seller. This contrasts with other measures, such as the Consumer Price Index (CPI), that measure price change from the purchaser's perspective. Sellers' and purchasers' prices may differ due to government subsidies, sales and excise taxes, and distribution costs. Each month, BLS currently releases over 9,500 PPIs for individual products and groups of products. PPIs are available for the output of almost all industries in the goods-

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<sup>1</sup> The All Commodities Index is an aggregate index for all of PPI's commodity price indexes, which in this case means primarily goods. Prior to 2009, PPI did not produce commodity price indexes for services and when they were added in preparation for creation of the FD-ID model, there was no change made in composition of the historical All Commodities Index. For more information on commodity price indexes for services, also known as Where-ever Provided Services (WEP services), see "[New wherever provided services and construction indexes](#)" published in the August 2009 issue of the Monthly Labor Review.

producing sectors of the U.S. economy—mining, manufacturing, agriculture, fishing, and forestry—as well as goods competitive with those made in the producing sectors, such as waste and scrap materials. The PPI program also covers 34% of the construction sector and 72% of the services sector, including utilities such as natural gas and electricity, based on 2007 Value of Shipments as measured by the U.S. Economic Census. BLS currently publishes indexes for over 150 selected services industries included in the following sectors: wholesale and retail trade; transportation and warehousing; information; finance and insurance; real estate brokering, rental and leasing; professional, scientific, and technical services; administrative, support, and waste management services; health care and social assistance; and accommodation. Although PPI coverage of the services sector and the construction sector of the U.S. economy is substantial, it remains incomplete and the U.S. PPI program continues to look for opportunities to expand coverage of services and nonresidential building construction as funding allows.

More than 100,000 price quotations per month are organized to support the publication of three *current* sets of PPIs:

- Stage-of-Processing Indexes (SOP) which organize products (primarily goods) by class of buyer and degree of fabrication
- Commodity Indexes, which organize products (goods and services) by similarity of end use or material composition, disregarding their industry of origin; uses PPI's own commodity classification structure; PPI publishes more than 3,700 commodity price indexes for goods and about 800 indexes for services (seasonally adjusted and not seasonally adjusted)
- Industry Net-Output Price Indexes – PPI samples the entire output of NAICS industries to derive price indexes for the net output of approximately 535 mining, forestry, utility, construction, manufacturing, and services industries; over 500 industry group indexes; and more than 4,000 indexes for specific within-industry product and service categories.

However, with the transition from the SOP to FD-ID system *as of January 2014*, PPI will publish over 600 indexes for aggregate measures of price change, including the aggregation system for final demand-intermediate demand (which in turn will subsume the former SOP price indexes). The FD-ID indexes have been available on an experimental basis on the BLS website since February 2011 to gather user input. Early this year, BLS confirmed plans to replace the SOP system with the FD-ID indexes, effective with the release of January 2014 data. When this is complete, the number of PPIs released by BLS monthly will rise from the current 9,500 to 10,100 indexes. The FD-ID model improves upon the SOP model in many ways including more than doubling PPI coverage of the US economy to over 75 percent of in-scope domestic production.

PPI's samples for Industry Net-Output Price Indexes are used to support all three primary outputs of the program – net output industry price indexes, commodity price indexes, and FD-ID aggregates (which now include all the former SOP price indexes as part of the expanded FD-ID structure). Currently, SOP indexes are organized into three major groupings – Finished Goods (including commodities that will not undergo further processing and are ready for sale to the final-demand user, i.e. consumer foods, other durable and nondurable goods, capital equipment); Intermediate Materials, Supplies, and Components; and Crude Materials for

Further Processing. Later in this paper, the Final Demand and Intermediate Demand groupings of the new FD-ID structure will be described in detail. BLS publishes both seasonally-adjusted and unadjusted indexes for all FD-ID series and selected commodity classification series.<sup>2</sup>

U.S. Producer Price Index data are widely used by the business community and the government. Three major uses are:

- *As an economic indicator* – The PPIs capture price movements prior to the retail level and thus may foreshadow subsequent prices for business and consumers. In fact, the PPI is one of seven BLS outputs designated as a Principal Federal Economic Indicator. The President, U.S. Congress, and the Federal Reserve of the United States employ these data in formulating fiscal and monetary policies.
- *As a deflator of other economic series* – As in most countries, the U.S. PPIs are used to adjust other economic time series for price changes and to translate those series into inflation-free dollars. Accordingly, the U.S. Bureau of Economic Analysis (BEA) is a major user of PPIs for deflation of selected areas of gross domestic product data.
- *As a basis for contract escalation* – PPIs are frequently cited in price escalation clauses of long-term sales or purchase contracts as a means of protecting both the buyer and seller from unanticipated surges or drops in prices. Businesses commonly include an escalation clause that accounts for increases in input prices. (See [PPI Escalation Guide for Contracting Parties](#).)

U.S. PPIs are also used by labor, academia, and other kinds of organizations as well as members of the general public. This includes uses in economic analysis, econometric models, in forecasting, in market analysis, and academic research.

For an overview of the sampling and data collection processes employed by the U.S. PPI program, see the section entitled “Data Collection Units in PPI” from the paper presented at the 27<sup>th</sup> Meeting of the Voorburg Group entitled [Electronic Reporting: United States Producer Price Index Program’s Experience – Use of “Web Repricing”](#).

## 2. Background: Why an FD-ID Model?

The PPI has a longstanding history of focusing on providing appropriate aggregate producer price indexes to facilitate analysis of the US economy. The PPI began calculating Stage of Processing indexes in 1952 and in 1978 began using it as its key structure for analyzing producer prices at higher levels of aggregation. However, as mentioned earlier, SOP indexes aggregate indexes for processed and unprocessed goods. Since the late 1980s, PPI has allocated

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<sup>2</sup> Because PPI data are used for different purposes, BLS publishes seasonally-adjusted as well as unadjusted changes each month. All FD-ID indexes are indirectly seasonally-adjusted. In addition, certain 3-digit, 4-digit, and 6-digit commodity classification series are selected for seasonal adjustment if statistical tests indicate seasonality and if there is an economic rationale for the observed seasonality. Indexes for most 2-digit commodity groupings and 8-digit individual commodities, as well as all industry classification indexes, are published only as unadjusted data. Beginning with the annual seasonal adjustment process completed this past January-February 2013, seasonal adjustment includes services commodity classification index series (WEP services) that meet the seasonal adjustment tests. Seasonal adjustment of the Where-ever Provided Services Commodity indexes allows PPI to indirectly seasonally adjust all FD and ID indexes from their component data that include the WEP services indexes.

substantial resources toward coverage expansion of the services and construction sectors. This expansion effort culminated with the addition of Office of Dentists in 2010 and several new nonresidential building construction indexes added in the mid-2000s and the most recent additional of an index for new Healthcare Buildings construction with the publication of January 2013 data.<sup>3</sup> PPI now covers about 72% of services and 34% of construction as measured by 2007 Census Value of Shipments. See the Appendix to this paper for detailed information on the program's current coverage of services and nonresidential construction. Along with the expansion, it has been a long-term goal to eventually include services and construction in the program's key structure for analyzing producer prices when the program's coverage of services would be deemed at the appropriate level.<sup>4</sup> Much research went into determining how best to accomplish that objective and when it would be appropriate to do so. The development of the new FD-ID model is the culmination of that effort. The decision to move from the SOP to FD-ID this year was made possible both by the determination that the current level of services and construction coverage supports the transition and due to extensive outreach performed by BLS to our data users regarding the purposes and design of the FD-ID model.

In developing the experimental aggregation system, two main criteria were considered. First, the system should be designed in such a way as to alleviate or minimize problems resulting from multiple counting. Second, the system should be analytically useful.

Multiple counting can lead to overstated or understated measures of inflation. Multiple counting occurs when the price for a specific commodity and the inputs to production for that same commodity are included in an aggregate index. Before 1978, for example, the US PPI program highlighted the all commodities index as its primary aggregate index. This index aggregates prices for all goods sold in the economy, using weights that reflect sales to all portions of intermediate and final demand. The all commodities index was the subject of serious criticism when petroleum prices spiked in the 1970s. Price change, as measured by the all commodities index, was seen as exaggerated because the index included both gasoline sold for final demand and crude petroleum, the primary input used in the production of gasoline. Multiple counting was an important factor in the decision for the US PPI program to move from highlighting the all commodities index to calculating, publishing, and highlighting SOP indexes.

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<sup>3</sup> For more information on the publication of this new nonresidential building construction index and how it fits into the publication of construction price indexes, see <http://www.bls.gov/ppi/ppinaics236224.htm>.

<sup>4</sup> PPI recognized the need for higher level aggregate services separately from development of a new comprehensive aggregation model including goods, services, and construction. In 2007, PPI released a new set of net aggregate output industry indexes that crossed industry sectors, including three services indexes that are included in the text of the current PPI News Release, i.e. net output of total trade industries, net output of transportation and warehousing industries, and net output of services less trade, transportation, and warehousing (formerly called traditional services). With the transition to FD-ID, these indexes will still be published as part of the Net Output Industry Indexes but will no longer be highlighted in the PPI News Release, which will instead cover the new services aggregate indexes outlined later in this paper. Trends in the two sets of aggregate indexes will differ due to differences in methodology, weighting, and product mix between commodity PPIs and net output industry PPIs.

The SOP system substantially reduced multiple counting by separating goods into three stages: crude, intermediate, and finished. The system does, however, still have some multiple counting, specifically in its intermediate goods index. For example, a firm may extract iron ore and sell the ore to a second firm that manufactures steel. This steel then may be sold to a third firm that produces engine parts. These engine parts could then be sold to a fourth firm that manufactures engines. Finally, the engines may be sold to an automobile manufacturer that produces automobiles to sell to consumers. The prices for iron ore and automobiles would be included in the crude and finished goods indexes, respectively, but the intermediate goods index would include the prices for the steel, engine parts, and engines. Including prices from all three of these transactions in the intermediate goods index leads to multiple counting within the index.

The second criterion is that the aggregation system be analytically useful. The SOP system is more analytically useful than the all commodities index, as the system potentially allows price changes to be tracked through the various segments of the economy. In developing an aggregation system that incorporates prices for services and construction, the possible analytical functions of the system were considered.

Thus, the FD-ID aggregation system is designed to satisfy these two criteria. To avoid multiple counting, the system separates final-demand transactions from intermediate-demand transactions and, in some cases, voids instances of multiple counting. One of the reasons the system is useful for analysis is that it combines commodity indexes into meaningful final-demand and intermediate-demand aggregates. The new system is designed to be conceptually understandable, but also useful for more sophisticated analysis. Thus, the aggregates convey information about the types of commodities contributing to inflation at both the final-demand level and at earlier stages of production, and can be used to track price change through the economy (also known as “price transmission analysis”). We also wanted to make sure that the new structure included all commodities for which the US PPI currently has indexes, and to make sure any new structure is able to accommodate the addition of new indexes as they are developed.

Like the SOP system, FD-ID indexes are constructed from commodity-based producer output price indexes. Commodities are allocated to aggregate indexes primarily based on type of buyer. The main source of data used to determine the type of buyer is the “Use of commodities by industries, before redefinition” table from the Benchmark Input-Output Accounts of the U.S., published by the Bureau of Economic Analysis at the U.S. Department of Commerce. (“Commodity” is used as a generic term to cover goods, services, and construction.) In many cases, the same commodity is purchased by different types of buyers. As a result, commodities are often included in several FD-ID indexes. For example, regular gasoline is purchased for personal consumption, export, government use, and business use. The U.S. PPI program publishes only one commodity index for regular gasoline (wpu057104), reflecting sales to all types of buyers, and this index is used in all aggregations regardless of whether the gasoline is sold for personal consumption, as an export, to government, or to businesses. Proportions based on BEA “Use of Commodities” data are used to allocate the

correct portion of the total weight of gasoline to each use category. In cases when buyer type is an important price determining characteristic, indexes are created based on specific buyer type. For example, within the PPI category for loan services, separate indexes for consumer loans and business loans were constructed. The next section of this paper provides more detailed information on the Final Demand and Intermediate Demand components of the new aggregation system.

### 3. FD-ID Model Components and Uses

#### Final Demand (FD):

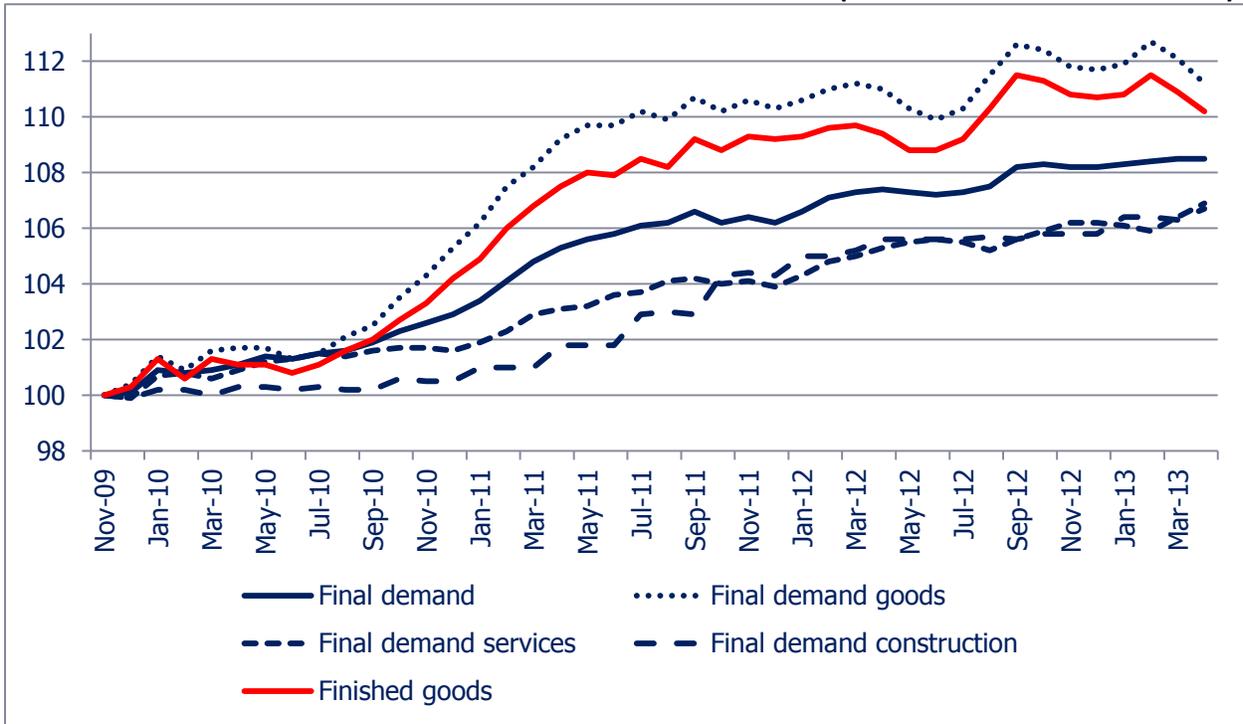
The final demand portion of the FD-ID structure measures price change for commodities sold as personal consumption, capital investment, to government, and as exports. The system is composed of six main price indexes:

- Final demand goods;
- Final demand trade services;
- Final demand transportation and warehousing services;
- Final demand services excluding trade, transportation, and warehousing;
- Final demand construction; and
- Overall final demand.

The *final demand goods index* measures price change for both unprocessed and processed goods sold to final demand. Fresh fruits sold to consumers and computers sold as capital investment are examples of transactions included in the final demand goods price index. The *final demand trade services index* measures price change for the retailing and wholesaling of merchandise sold to final demand, generally without transformation. (Trade indexes measure changes in margins received by wholesalers and retailers.) The *final demand transportation and warehousing services index* tracks price change for transportation of passengers, as well as transportation of cargo sold to final demand, and also includes prices for warehousing and storage of goods sold to final demand. The *final demand services less trade, transportation, and warehousing index* measures price change for all services other than trade and transportation sold to final demand. Publishing, banking, lodging, and health care are examples of these services. The *final demand construction index* tracks price change for new nonresidential building construction and maintenance and repair construction sold to final demand. Construction of office buildings is an example of a commodity that would be included in the final demand construction index. Lastly, the *overall final demand index* tracks price change for all types of commodities sold to final demand by combining the five final demand component indexes described above. Each of the five final demand component indexes also has one or more sub-groupings for which aggregate indexes are also calculated and published.

Below you will see results for new the Final Demand index and its main components contrasted with the Finished Goods Index. The latter has served as the “headline” statistic in the PPI News Release since 1978; with the completion of the transition to FD-ID in January 2014, the overall Final Demand Index will become the “headline” statistic in the PPI News Release:

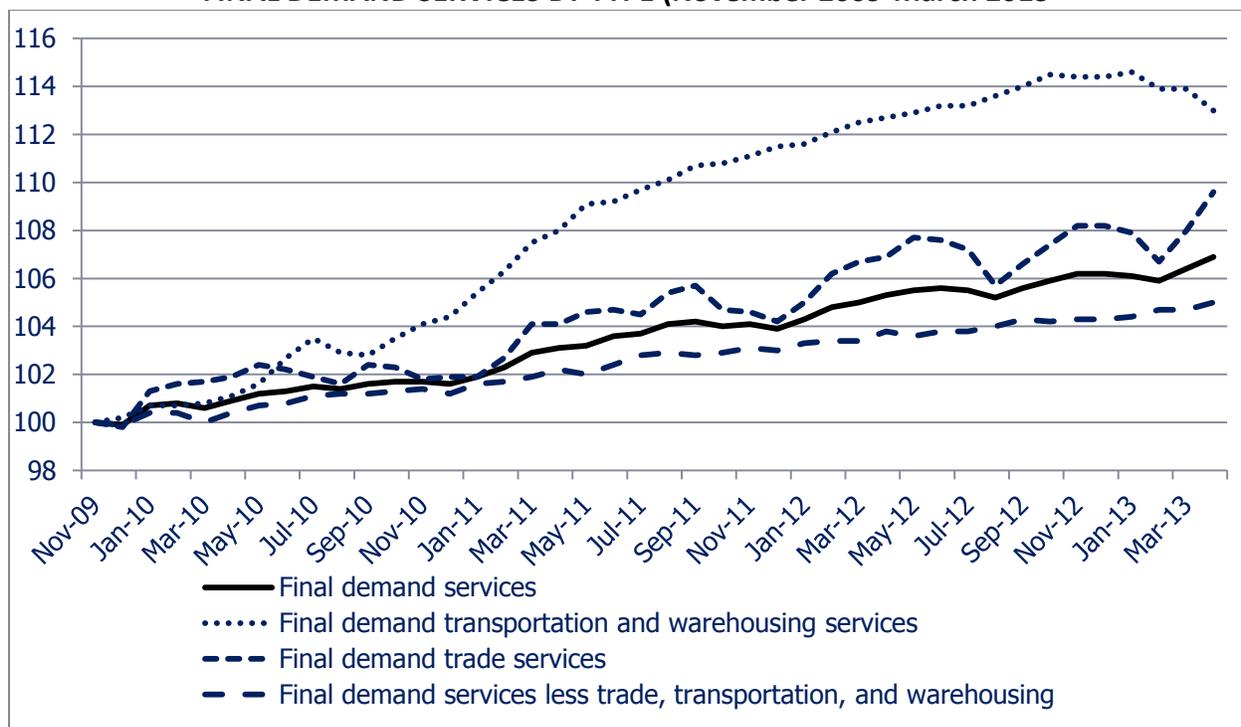
**FINAL DEMAND AND COMPONENTS VERSUS FINISHED GOODS (November 2009-March 2013)**



You can see from this chart that over the sample period final demand inflation has been lower than finished goods inflation. Prices for energy and food rose sharply over this period in contrast to slower rates of increase for services and construction.

In addition, the graph at the top of the next page shows results for the components of final demand services over the same period of time. Prices for transportation services rose substantially during this period when compared with other services. This reflects the price pass through of higher energy prices to transportation:

### FINAL DEMAND SERVICES BY TYPE (November 2009-March 2013)



#### Intermediate Demand (ID):

The intermediate demand portion of the FD-ID system tracks price change for goods, services, and construction products sold to businesses as inputs to production, excluding capital investment. The system includes two *parallel* treatments of intermediate demand. The first treatment organizes intermediate demand commodities by type. The second organizes intermediate demand commodities into production stages, with the explicit goal of developing a forward-flow model of production and price change. The first treatment uses an approach that is similar to the current SOP system and thus will be easier for many basic data users to use. The second treatment uses an approach that lends itself better to price transmission analysis and avoids any multiple counting. In the end, the program decided to provide both treatments to meet the needs of all its data users.

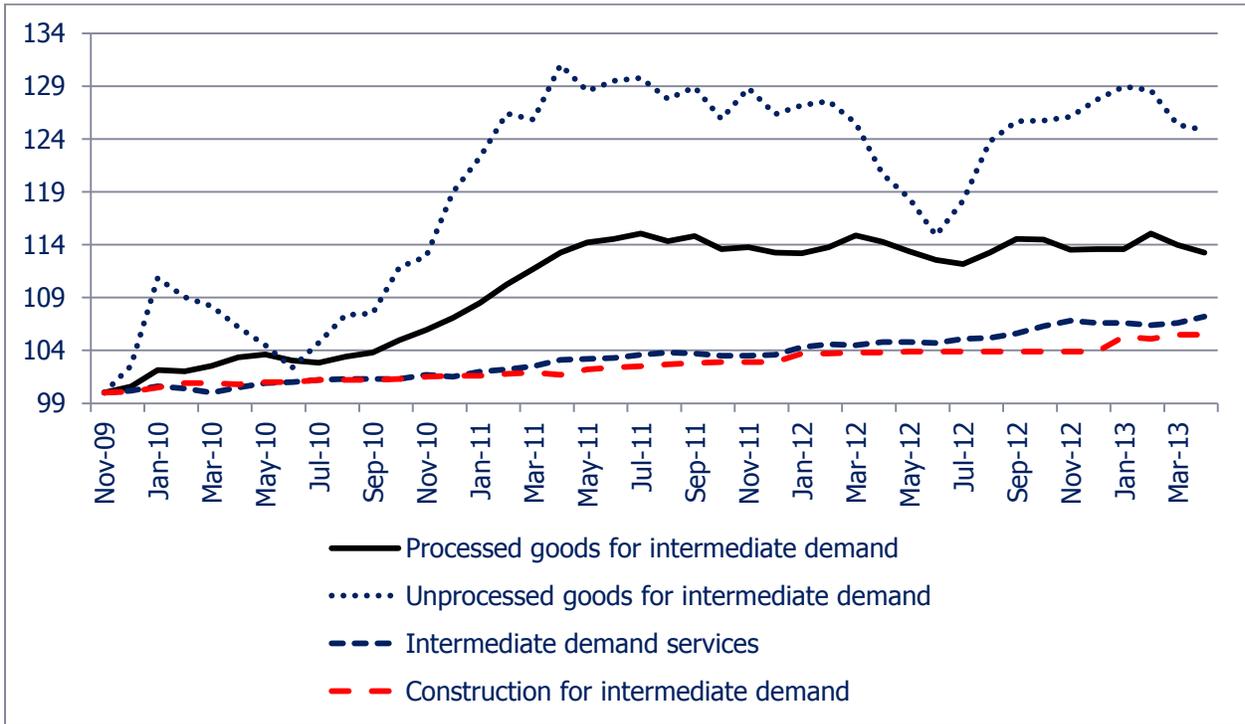
*Intermediate Demand by Commodity Type:* The intermediate demand by commodity type portion of the system organizes commodities by similarity of product. The system is composed of six main price indexes:

- Unprocessed goods for intermediate demand;
- Processed goods for intermediate demand;
- Intermediate demand trade services;
- Intermediate demand transportation and warehousing services;
- Intermediate demand services less trade, transportation, and warehousing; and
- Intermediate demand construction.

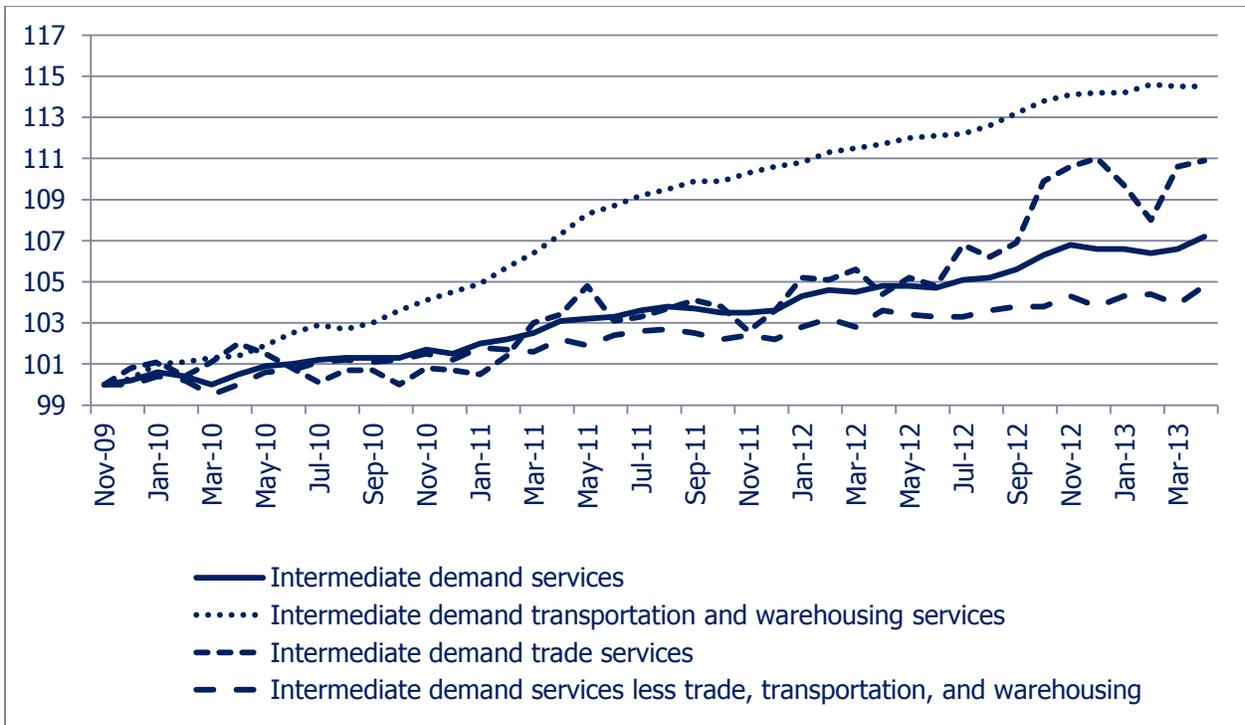
The *unprocessed goods for intermediate demand price index* measures price change for goods sold to businesses as inputs to production that have undergone no fabrication. Crude petroleum sold to refineries is an example of an unprocessed good sold to intermediate demand. The *processed goods for intermediate demand index* tracks price change for fabricated goods sold as business inputs. Examples include car parts sold to car manufacturers and gasoline sold to trucking companies. The *index for trade services for intermediate demand* measures price change for the services of retailing and wholesaling goods purchased by businesses as inputs to production. The *intermediate demand transportation and warehousing services index* measures price change for business travel, as well as transportation and warehousing of cargo sold to intermediate demand. The *intermediate demand services less trade, transportation, and warehousing price index* tracks price change for non-trade and non-transportation services purchased by firms as inputs to production. Legal and accounting services purchased by businesses are examples of intermediate services excluding trade, transportation, and warehousing. Finally, the *construction for intermediate demand index* measures price change for construction purchased by firms as inputs to production. Given that new construction is categorized in the final demand portion of the economy as capital investment, the construction for intermediate demand index only tracks price change for maintenance and repair construction purchased by firms.

On the next page, there are two charts that depict results for the Intermediate Demand by Commodity Type indexes from November 2009 through March 2013. The first chart shows the four main indexes in this treatment of intermediate demand, while the second chart shows the main components of intermediate demand services. Prices for unprocessed goods have increased relatively rapidly during this period, largely driven by higher commodity prices. The index for Processed Goods for Intermediate Demand during this period appears to reflect the pass through of some of the input cost increases. In contrast to intermediate demand goods, services and construction exhibit only a slight increase during this period. We can see from looking at the components of Intermediate Demand Services that most of the increase in that index during this period came from higher prices for intermediate demand transportation services, largely reflecting the impact on this sector of rising energy prices.

**INTERMEDIATE DEMAND BY COMMODITY TYPE (November 2009 – March 2013)**



**SERVICES FOR INTERMEDIATE DEMAND (November 2009 – March 2013)**



*Intermediate Demand – Production Flow Treatment:* The production flow treatment of intermediate demand is a stage-based system of price indexes. These indexes can be used to

study price transmission across stages of production and final demand. This system is constructed in a manner that maximizes forward flow of production between stages, while minimizing back-flow of production. The production flow treatment contains four main indexes:

- Intermediate demand stage 1;
- Intermediate demand stage 2;
- Intermediate demand stage 3; and
- Intermediate demand stage 4.

The main sources of data used to develop the production flow indexes were the BEA “Use of commodities by industries, before redefinition” table and the “Make of commodities by industries, before redefinition” table from the Benchmark Input-Output Accounts of the U.S.<sup>5</sup>

Indexes for the four stages were developed by first assigning each industry in the economy to one of four stages of production. Industries were assigned to stages with the goal of maximizing net forward flow between stages. Net forward flow is defined as (forward shipments of the industry stage + inputs received from previous stages of process) – (backward shipments of the industry stage + inputs received from forward stages of process). The U.S. PPI program implemented a two-step procedure to attempt to maximize net forward flow. In the first step, a set of rules was used to assign industries to stages and select the appropriate number of stages for the system. The set of rules used to assign industries to the four stages is summarized as follows:

1. Assign an industry to stage 4 if shipments sold to final demand  $\geq$  75 percent of industry production.
2. Assign an industry to stage 3 if shipments sold to final demand and to stage 4  $\geq$  65 percent of industry production and shipments sold to final demand  $<$  75 percent of production.
3. Assign an industry to stage 2 if shipments sold to final demand, to stage 4, and to stage 3  $\geq$  65 percent of industry production; and shipments sold to final demand and to stage 4  $<$  65 percent of production; and shipments sold to final demand  $<$  75 percent.
4. Assign industry to stage 1 if it does not meet conditions 1, 2, or 3.

Before selecting the number of stages and set of rules just described, we examined many different sets of rules and numbers of stages. We eventually chose the aforementioned system because it performed very well in terms of maximizing net forward flow and minimizing internal flow.

After the assignment of industries to stages by sale of output, the second step in the procedure to maximize net forward flow was to examine the effects on net forward flow of moving individual industries to stages to which they were not originally assigned. In cases in which

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<sup>5</sup> For Benchmark Input-Output data from the U.S. Bureau of Economic Analysis, visit the BEA Website at [http://www.bea.gov/industry/index.htm#benchmark\\_io](http://www.bea.gov/industry/index.htm#benchmark_io).

there were substantial gains to net forward flow, industries were moved to the new stage. The PPI production-flow-based system exhibits strong forward flow and little backflow. After weighting, 83.6 percent of transactions in the system are forward flowing, 5.7 percent are back flowing, and 10.7 percent are internally flowing.

The final step in constructing stages for the production-flow-based intermediate demand indexes was to determine the commodities to be included and weights to be used in the intermediate demand production flow indexes. The production flow indexes track prices for inputs consumed by industries in each of the four stages of production, as opposed to prices for the output produced by industries in each of the four stages of production. The BEA Use table was used to determine the commodities consumed by industries in each of the four stages. *These indexes also exclude the weight for inputs both produced and consumed within an industry production stage, thereby eliminating any multiple counting of price change.* The fourth stage intermediate demand index, for example, tracks price change for inputs consumed, not produced, by industries included in the fourth stage of production. Recall that industries classified in the fourth stage of production mostly produce goods and services sold to final demand. The stage 4 intermediate demand index therefore measures price change for the inputs to production of industries that produce primarily final demand goods, services, and construction (stage 4 producers).

Examples of heavily weighted goods-producing industries in stage 4 include the manufacture of light trucks and utility vehicles, automobiles, and pharmaceuticals. Retail trade, food service and drinking places, and hospitals are examples of heavily weighted service industries included in stage 4. Stage 4 also includes all new construction industries. Examples of goods consumed by stage 4 industries include motor vehicle parts, commercial electric power, plastic construction products, biological products, and beef and veal. Engineering services, machinery and equipment wholesaling, long distance motor carrying, and legal services constitute examples of services consumed by stage 4 industries.

Examples of highly weighted goods-producing industries included in stage 3 are motor vehicle parts manufacturing, animal (except poultry) slaughtering and processing, and semiconductor manufacturing. Services industries classified in stage 3 include wholesale trade; insurance carriers; architecture, engineering, and related services; and hotels and motels. Examples of goods consumed by stage 3 industries include slaughter steers and heifers, industrial electric power, and hot rolled steel bars, plates, and structural shapes. Services commonly consumed by stage 3 industries include commissions from sales of property and casualty insurance, business loans, temporary help services, and administrative and general management consulting services.

Petroleum refineries; electricity generation, transmission, and distribution; natural gas distribution; cattle ranching and farming; and plastic materials and resin manufacturing are among the goods-based industries assigned to stage 2. Services industries that are heavily weighted in stage 2 include management of companies and enterprises; non-depository credit intermediation and related activities; insurance agencies, brokerages, and related activities; and

services to buildings and dwellings. Goods commonly purchased by stage 2 industries include crude petroleum, natural gas, formula feeds, and primary basic organic chemicals. Services that are heavily weighted in the intermediate demand stage 2 index are legal services, business loans, and cellular phone and other wireless telecommunication.

Goods producing industries in stage 1 include oil and gas extraction, paper mills, and grain farming. Real estate, legal services, and advertising services are examples of highly weighted services industries included in stage 1. Examples of goods consumed by stage 1 industries are commercial and industrial electric power and gasoline. Services commonly consumed by stage 1 industries include solid waste collection, chemicals and allied products wholesaling, and guestroom or unit rental. Please note that all inputs purchased by stage 1 industries are by definition produced either within stage 1 or by latter stages of processing, leaving stage 1 less useful for price transmission analysis.

In companion presentation for this Voorburg Group paper, there are several slides with graphs that show the potential of the kind of analysis that this treatment of Intermediate Demand allows.<sup>6</sup>

### Summary of FD-ID Improvements

When the U.S. PPI program completes the transition from the SOP system to the FD-ID system as the analytical focus of the PPI News Releases and other related publications in January 2014, it will arguably be of greater significance than the earlier shift to the SOP system in 1978. Overall, the FD-ID system improves upon the SOP system in several significant areas. First, the FD-ID system provides more complete coverage as compared to the SOP system through the addition of services, construction, exports, and government purchases. The FD-ID system provides for a roughly 50-percent expansion of coverage related to final demand goods, through the introduction of indexes for government purchases and exports of goods. The final demand portion of this system also includes, for the first time, indexes tracking changes in prices for services to final demand—trade services, transportation and warehousing services, and other services for final demand—as well as an index for final demand construction. Within the intermediate portion of the FD-ID systems, two parallel treatments are now provided. Under the commodity-type treatment of intermediate demand, the indexes for unprocessed goods for intermediate demand and processed goods for intermediate demand (formerly titled under SOP, crude goods for further processing and intermediate materials, supplies, and components, respectively) are augmented with a set of indexes tracking services sold to intermediate demand – business purchases of trade, transportation and warehousing, and other services. An index tracking prices for maintenance and repair construction for intermediate demand is also introduced. Providing more complete coverage allows for more accurate inflation analysis for the US economy. Second, through stage creation and net weighting, the 4-stage production flow treatment of intermediate demand eliminates multiple

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<sup>6</sup> There will be an article published later this fall in the Bureau of Labor Statistics *Monthly Labor Review* that will provide detailed results and analysis from the FD-ID indexes released on an “experimental” basis from November 2009 through June 2012. Contact Jonathan C. Weinhagen at [Weinhagen.Jonathan@bls.gov](mailto:Weinhagen.Jonathan@bls.gov) if you want to be placed on the notification list when this article is published.

counting problems found in the processed goods portions of intermediate demand within both the SOP and FD-ID systems, again, leading to more accurate inflation analysis. Finally, the production flow treatment of intermediate demand facilitates potential price transmission analysis.

#### **4. Transition Challenges and Next Steps**

Even though this represents a highly significant improvement in the U.S. PPI's family of outputs, it presents challenges to both data users in terms of needing to become acquainted with the new methodology and the purposes and limitations of the new indexes and to BLS in terms of making sure that the transition is well-planned and seen as effective. This section of the paper provides information on how the PPI program has met those challenges since development work first began on this new model through the crucial last phase of preparing data users for completion of the transition including the new look and content of the PPI News Releases.

This process began with extensive internal BLS review of the proposed model and its purposes in 2007-08, followed by initial introduction of the concepts to the program's major stakeholders in other US government agencies. These first contacts resulted in some changes to the model, but most importantly made it very clear that stakeholders could not fully react to the usefulness and contents of the model without first seeing results from actual index calculations. Accordingly, the PPI program made it a goal to calculate indexes using the new model and make them available on an "experimental" basis to all PPI data users. As mentioned earlier, this meant that PPI had to first complete the addition of commodity price indexes for services, i.e. the Where-ever Provided (WEP) services indexes, to PPI's commodity price indexes because the FD-ID model is built from PPI's commodity indexes. (Where-ever provided price indexes measure price change for services and construction regardless of the producer's industry of origin, similar to where-ever made commodity price indexes for goods.) It was decided early on that it would be beneficial to our data users to actually release WEP services price indexes as soon as they could be incorporated into our commodity PPIs; this occurred with release of July 2009 data on August 18, 2009. It also allowed users to become more familiar with these new indexes prior to their use in building the FD-ID aggregate indexes.

In February 2011, we were ready to begin publishing the FD-ID indexes as experimental. The data were published experimentally to allow data users to analyze the structure and data. The data could be accessed in new tables which were added to the monthly PPI Detailed Reports and also available through the BLS data repository. We created an extensive webpage to provide information about the new indexes including initial sections pertaining to:

- Methodology
- Relative Importances
- Coverage Limitations
- How to Obtain Data

This release was the centerpiece of an extensive outreach program that the PPI program began in 2010 to ensure that the new PPI aggregation system meets data user and stakeholder needs. We can look at this outreach program as having two phases – the first to provide data to the public and to meet with stakeholders to educate and obtain feedback about the FD-ID model, and the second phase to perform outreach related to moving forward with the actual transition from the SOP system to the FD-ID system with the release of PPI data for January 2014.

During Phase 1, we performed outreach on several fronts. First, materials with more details on the methodology used in putting FD-ID together were produced and made available to users, including articles released on the web and in the *Monthly Labor Review*. Second, PPI program staff met individually with major US data users including staff at the Federal Reserve, the Treasury Department, the Council of Economic Advisors, the Bureau of Economic Analysis, and the Census Bureau. Presentations were also given at conferences or meetings of data users such as the National Association of Business Economists. In September 2011, the PPI program hosted a workshop with representatives from all of our major stakeholders to discuss reactions to the new model and the initial results and to gather feedback from cross-organizational discussions.

Overall, we were pleased with the results of this effort – we obtained unanimous support for updating the PPI aggregation system to include services and construction. Users supported the approach PPI took in developing the FD-ID structure and found no fundamental issues with the approach. Interestingly to us, they saw value in both treatments of intermediate demand. We did receive suggestions for some relatively minor changes, which we were able to address.

Phase 1 laid the foundation for the program to prepare to move forward with the transition from the SOP to the FD-ID system. We put together a transition plan and began to implement it in the fall of 2012. In order to proceed with transition, we needed to decide how seasonal adjustment would be handled. Typically, in BLS, we need five years of data to test for seasonal adjustment. This would not be the case for the WEP services indexes or for those new FD-ID indexes that were not continuations of current SOP indexes until the end of 2014. After some analysis and discussion with experts, we decided that we could try testing for seasonality with the 3-4 years of data available and see if it would gain the approval of BLS experts. Based on this work, we were able to move forward with the first seasonal adjustment of WEP services indexes and indirect adjustment for the FD-ID aggregate indexes with the publication of January 2013 data this past February. With the release of this data, an additional section on Seasonal Adjustment was added to the webpage for the “experimental” indexes. In addition, this allowed us to recommend to senior BLS management that we target completion of the transition from SOP to FD-ID with the release of January 2014 outputs. This recommendation received approval after an extensive briefing was done for BLS Commissioner Erica Groshen and Deputy Commissioner Jack Galvin at the end of June 2013.

Despite the outreach done during Phase 1, we immediately recognized that the transition was going to require even more extensive outreach because it will represent a large change for data users, especially for the media and the general U.S. public. While the transition is a major

improvement for our users, they are likely to experience “growing pains” so to speak and will require education and support. Accordingly, we have performed or are planning to perform the following in the months leading up to the release of January 2014 data in February 2014:

- Posted notices announcing the transition in the PPI News Release for July 2013 data and in the PPI Detailed Report; these notices will be repeated in the releases for August 2013 through December 2013
- Placed notices announcing the transition on the main PPI and BLS websites
- Prepared a version of the News Release that presents the new aggregation system including text, updated Technical Note, and the new set of Release publication tables; release it to data users on our “experimental” webpage in the six months prior to the completion of the transition (releases for July 2013-December 2013) – posted approximately two weeks after each current News Release; intended to allow the press and other data users to become familiar with the new content prior to the completion of the transition. The first one was posted on August 29, 2013 at [http://www.bls.gov/ppi/fdid\\_exp\\_release\\_201307.pdf](http://www.bls.gov/ppi/fdid_exp_release_201307.pdf). Reference this to see the structure of the new Final Demand and Intermediate Demand indexes as reflected in Tables 1-7. Comparing this version of the release with the current News Release for each month will readily allow users to see improvements but also how the “headline” story may differ. For example, in July, the headline in the current Release noted that the PPI for finished goods was unchanged, seasonally adjusted, while the headline in the parallel Release would have focused on the index for Final Demand, which rose 0.4 percent in July, seasonally adjusted.<sup>7</sup>
- Use of PPI Update, an email subscription list, to make subscribers aware of the upcoming change and resources available to assist them
- Use of the BLS Twitter account to inform potential data users
- Presentations on FD-ID at a series of briefings/meetings planned in upcoming months including those specifically directed at the media
- Publication of informational Federal Register Notice
- Publication of two papers in the *Monthly Labor Review* that analyze data from the FD-ID system
- Work with our partners in the Economic Analysis & Information offices in BLS regional offices as well as in the BLS Office of Publications and Special Studies to inform data users and the press

Among the two MLR papers that will be published this fall is one entitled “Comparing New Final Demand Indexes and other Government Price Indexes.” To provide a complete picture of final demand inflation, and to allow data users to analyze final demand inflation at its component source, the FD-ID system also includes separate indexes tracking price change for outputs sold

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<sup>7</sup> This is a pretty stark example of what users may face in getting acclimated to the new analytical focus of the PPI News Release. As shown earlier in this paper, the results over time are not nearly so vivid. Nevertheless, it is representative of what users, especially the media, will need to internalize as they shift their reporting on PPIs beginning in January 2014. Note that to assist in the transition the text in the new PPI News Release will continue to include discussion of the “special grouping” Finished Goods in the Final Demand section of the Release.

to personal consumption, capital investment, export, and government respectively. The PPIs for personal consumption and exports are designed to measure price change for roughly the same portion of the economy as the U.S. Consumer Price Index (CPI) and the U.S. Export Price Index (XPI) produced by the BLS International Price Program, respectively. The PPI for overall final demand measures price change for approximately the same portion of the economy as the Bureau of Economic Analysis (BEA) price indexes for gross domestic product (GDP) and gross domestic purchases. This raises questions about methodological similarities and differences. The fact is that there are important differences and thus PPI decided that it was important to provide users with information that could help them understand the uses of the new special grouping producer price indexes and avoid improper use of them as proxies for the related CPI, XPI, and BEA price measures. This MLR article is thus an important part of PPI's efforts to prepare data users for the prominence of FD-ID indexes starting next year.

Overall, BLS and PPI are excited about reaching this significant milestone in the program's history and look forward to building on this achievement to meet stakeholder needs for analysis of price inflation at the producer level for all aspects of the U.S. domestic economy.

## APPENDIX

- A. This first part of the appendix provides details on the United States Producer Price Index program's current coverage. This table summarizes coverage of in-scope 2007 Census Value of Shipments (VOS) by North American Industry Classification System (NAICS) sector and selected aggregations:

NAICS Sector	In-scope 2007 VOS (thousands of US dollars)	Percentage of In-Scope VOS covered by PPI	Relative contribution to Total In-Scope VOS
11 - Agriculture, Forestry, Fishing, and Hunting	385,445,665	70.83%	1.80%
21 – Mining	420,504,910	99.71%	1.96%
22 – Utilities	582,646,418	98.30%	2.72%
23 – Construction	1,339,927,418	34.02%	6.26%
31-33 – Manufacturing	5,315,280,323	99.32%	24.78%
42 - Wholesale Trade	1,006,101,516	99.98%	4.69%
44-45 - Retail Trade	1,190,056,456	84.11%	5.55%
48-49 - Transportation and Warehousing	848,011,806	90.05%	3.95%
51 – Information	1,079,861,208	87.51%	5.03%
52 - Finance and Insurance	3,425,826,635	76.03%	15.97%
53 - Real Estate and Rental and Leasing	655,290,931	60.17%	3.06%
54 - Professional, Scientific, and Technical Services	1,436,883,726	51.71%	6.70%
55 - Management of Companies and Enterprises	Out of Scope	Out of Scope	Out of Scope
56 - Administrative and Support and Waste Management and Remediation Services	678,343,662	48.38%	3.16%
61 - Educational Services	240,668,593	1.30%	1.12%
62X – Healthcare only	1,605,771,994	85.08%	7.49%
62 - Healthcare and Social Assistance	1,644,248,508	83.09%	7.67%
71 - Arts, Entertainment, and Recreation	218,006,539	26.75%	1.02%
72 - Accommodation and Food Services	622,403,061	28.34%	2.90%
81 - Other Services (except Public Administration)	356,168,224	8.37%	1.66%
92 - Public Administration	Out of Scope	Out of Scope	Out of Scope
<b>Mining and Agriculture</b>	805,950,575	85.90%	3.76%
<b>Manufacturing</b>	5,315,280,323	99.32%	24.78%
<b>Goods</b>	6,121,230,898	97.56%	28.54%
<b>Services and Utilities</b>	13,984,508,283	71.45%	65.20%
<b>Services only (excluding utilities)</b>	13,401,861,865	70.28%	62.48%
<b>Construction</b>	1,339,927,418	34.02%	6.26%
			1.80%
<b>All</b>	21,445,666,599	76.56%	1.96%

The following industries are considered out-of-scope for PPI:

- 521110, Monetary Authorities – Central Bank
- Sector 525, Funds, Trusts, and Other Financial Vehicles
- Sector 55, Management of Companies and Enterprises
- 611110, Elementary and Secondary Schools (partial-only public schools are OOS)
- Sector 624, Social Assistance (except 624410, Child Day Care Services)
- Sector 813, Religious, Grantmaking, Civic, Professional, and Similar Organizations (except 813410, Civic and Social Organizations; 813910, Business Associations; 813920, Professional Organizations)
- Sector 814, Private Households
- Sector 92, Public Administration

The following chart lists in-scope industries, excluding construction, with 2007 VOS greater than \$50 billion for which PPI does **not** currently have coverage. In addition, there are 15 uncovered industries within NAICS Sector 621 (Ambulatory Health Care Services) that *combined* account for \$180.8 billion, which would place that part of sector 621 third in the chart below.

NAICS	Title	2007 VOS (thousands of dollars)
522290	Other Nondepository Credit Intermediation	344,734,858
722511	Full-Service Restaurants*	196,264,012
722513	Limited-Service Restaurants*	154,564,357
611210 & 611310	Junior Colleges & Colleges, Universities and Professional Schools**	151,744,082
522220	Sales Financing	127,268,566
541512	Computer Systems Design Services	127,046,026
531110	Lessors of Residential Buildings and Dwellings*	104,604,196
541511	Custom Computer Programming Services	92,469,134
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)	76,034,193
512110	Motion Picture and Video Production	61,897,655
561730	Landscaping Services	60,995,756
522130	Credit Unions	55,537,857
522210	Credit Card Issuing	54,944,246

\*In an effort to minimize duplicative collection, CPI's coverage of the restaurant sector and survey of residential rent equivalency likely preclude PPI from developing coverage of NAICS 722511, 722513, and 531110.

\*\*The revenue figures for Junior Colleges and Colleges, Universities and Professional Schools were provided by the National Center for Education Statistics (NCES), as Census does not publish revenue figures for these industries. The NCES data is not broken out between the two NAICS industries, so the VOS total listed is the combined total for both NAICS 611210 and 611310.

Remaining significant gaps in construction coverage include: Retail, lodging, communication, & higher education buildings; highway, street, and bridge construction; other selected infrastructure construction; and remaining specialty trade contractors that account for the remaining 39% of the value of Nonresidential Construction By Trade within the scope of PPI that the program does not have coverage for now.

B. For easy reference of readers included in this Appendix are hyperlinks to the following FD-ID materials:

1. The Experimental Aggregation webpage which has access to all FD-ID materials released since February 2011:  
<http://www.bls.gov/ppi/experimentalaggregation.htm>
2. Monthly Labor Review article: "A new, experimental system of indexes from the PPI program", February 2011:  
<http://www.bls.gov/opub/mlr/2011/02/art1full.pdf>
3. PPI notice regarding the expansion of seasonal adjustment to WEP services and "experimental" aggregation indexes, February 2013:  
<http://www.bls.gov/ppi/seasonalwep.htm>
4. Notice on timing of transition from SOP to FD-ID indexes:  
<http://www.bls.gov/ppi/fdidtransition.htm>
5. First version of "experimental" PPI News Release reflecting FD-ID:  
[http://www.bls.gov/ppi/fdid\\_exp\\_release\\_201307.pdf](http://www.bls.gov/ppi/fdid_exp_release_201307.pdf)

For further information on this new system, please contact Jon Weinhagen at [Weinhagen.Jonathan@bls.gov](mailto:Weinhagen.Jonathan@bls.gov) or (202) 691-7709.