How and When to Use Contract Price Mechanisms

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U.S. Bureau of Labor Statistics (BLS)
Producer Price Index (PPI)
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Goals

- To help you understand how to use price index data to specify price adjustment in contracts.
- How to avoid “pitfalls”!
- Hopefully this is one “take away” that can help you be more effective at your jobs.

Bureau of Labor Statistics (BLS)
Data in the Headlines

The New York Times

Wages Rise as U.S. Unemployment Rate Falls Below 5%

Is the American worker finally getting a raise?

THE WALL STREET JOURNAL.

Drugmakers' Pricing Power Remains Strong

Price increases continue despite pushback from insurers, U.S. lawmakers

Forbes

June Job Report Eases U.S. Economic Concerns Following Brexit

Get the data behind the headlines at

DATA.BLS.GOV

BLS Index Data Coverage Summary

PPI

Nearly all goods and most services

ECI

Labor costs

MXP

Imported and exported goods

CPI

Household goods and services

BLS Index Data Uses Summary

ECI

- Accounting for labor costs
- For service industries with CPI/PPI noncoverage

CPI

- To track general inflation use the CPI-U, all items
- Accounting for prices of goods and services households buy
- Areas of PPI noncoverage
- When the region influences long-run prices

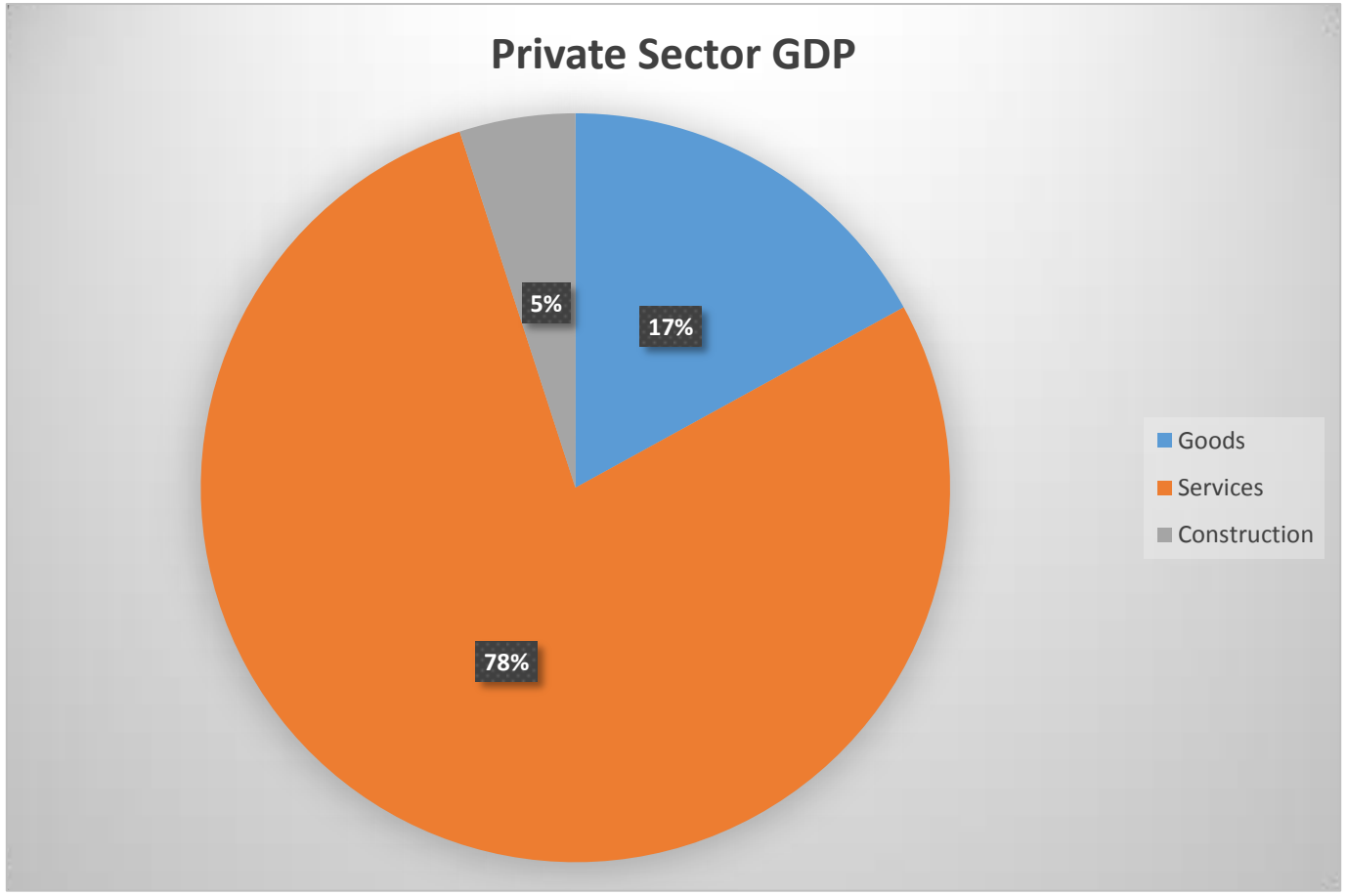
MXP

- Prices for imported goods and prices for goods specifically exported
- Analysis of U.S. vs. foreign price competitiveness

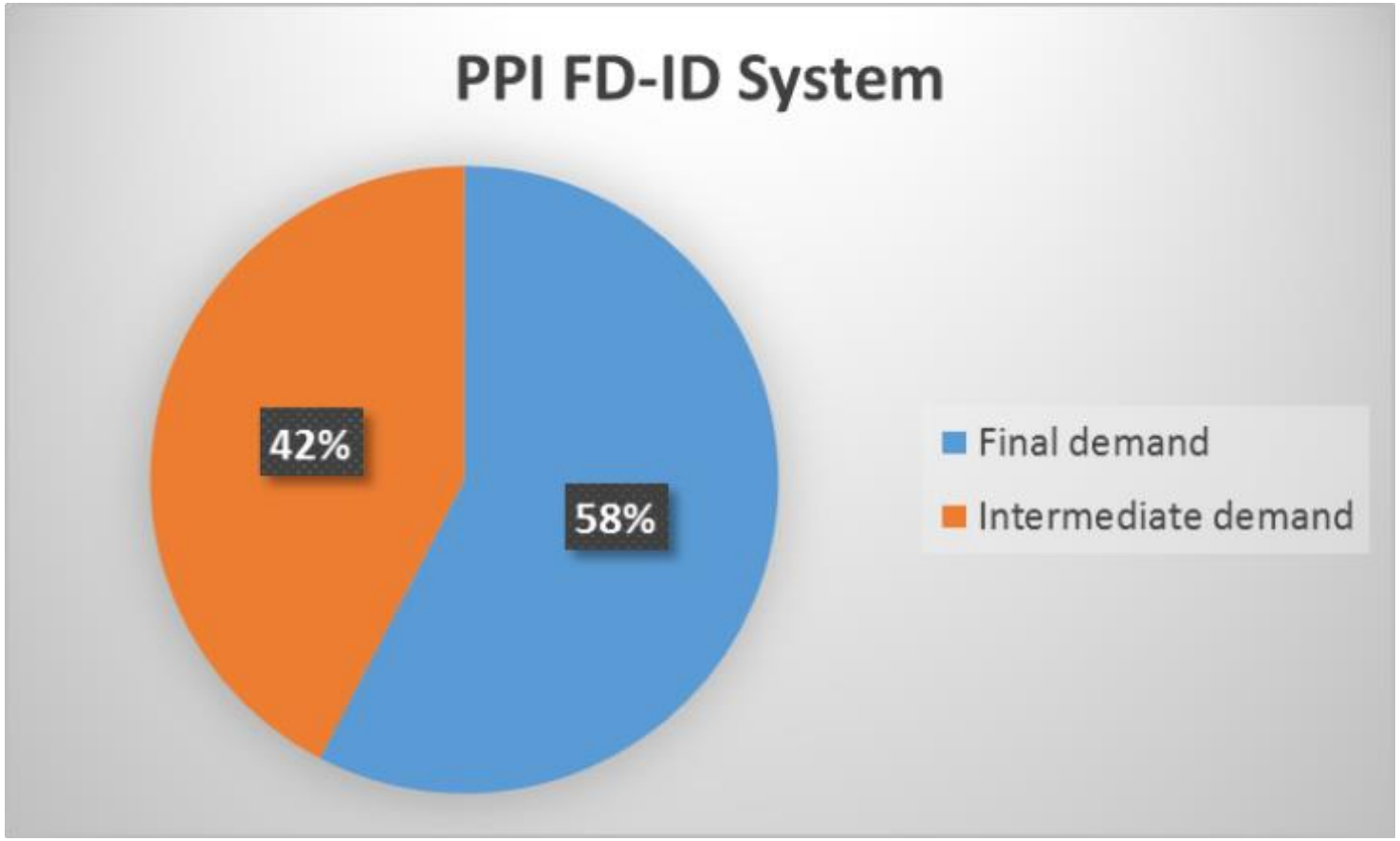
PPI

- Accounting for prices of nearly all goods and most services bought by households, businesses, and the government
- For general inflation, look to the FD-ID PPIs
- Supply chain analysis

Domestic Production by Sector



Establishments in the U.S. Sell What They Produce/Provide to:



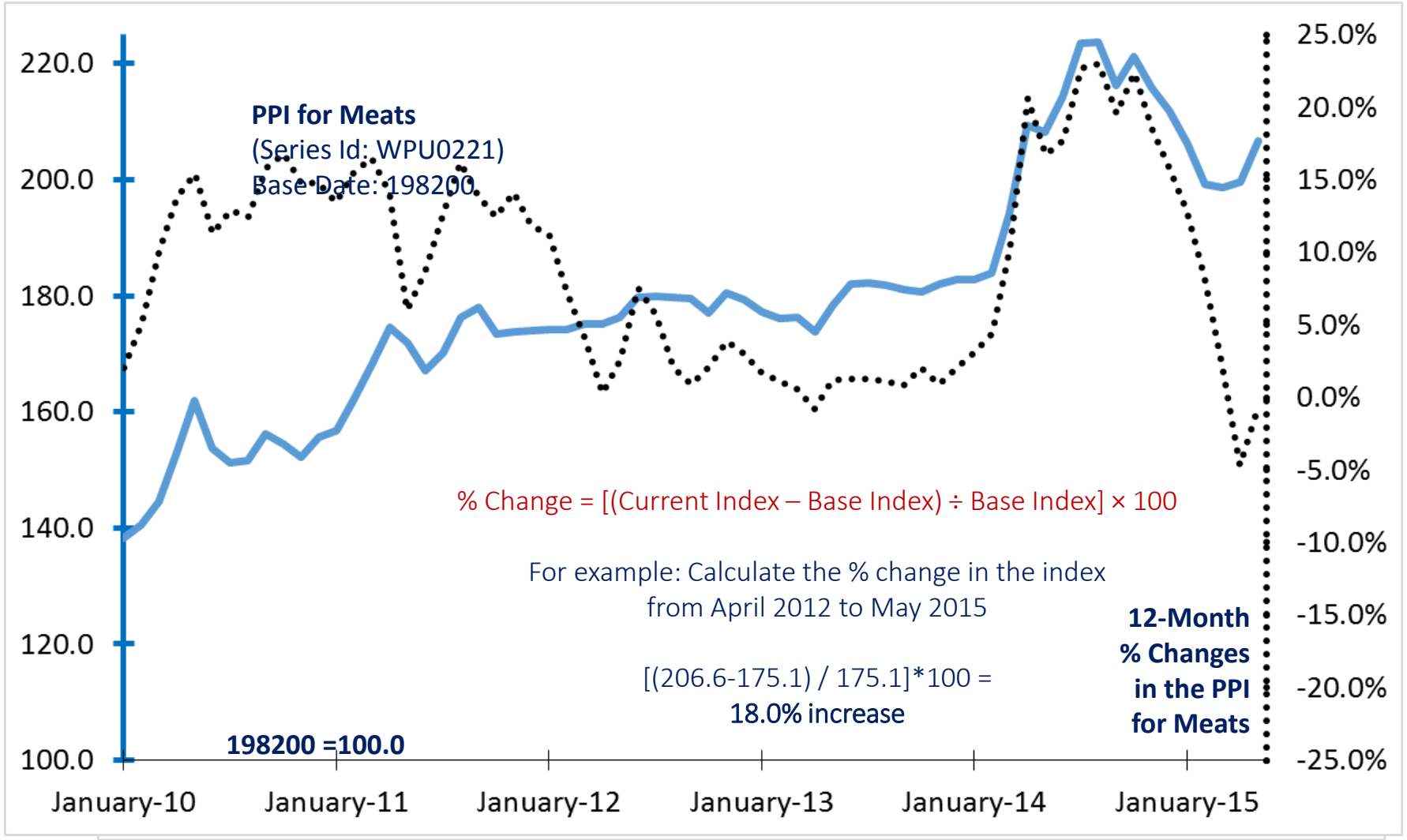
Example of PPI Indexes

Pharmaceutical preparations
- Pharmaceuticals affecting neoplasms, the endocrine system, & metabolic diseases
  - Cancer therapy products
  - Insulin/antidiabetes products
  - Hormones and oral contraceptives
- Pharmaceuticals acting on the central nervous system and the sense organs
  - Analgesics
    - Analgesics, over-the-counter
    - Analgesics, prescription
  - Psychotherapeutics
    - Antidepressants
    - Other psychotherapeutics, including tranquilizers
  - Anticonvulsants
  - Other central nervous system and sense organs
- Pharmaceuticals acting on the cardiovascular system
  - Anticoagulants
  - ACE inhibitors
  - Calcium channel blockers and other vasodilators
  - Other cardiovascular preparations
- Pharmaceuticals acting on the respiratory system

Understanding Indexes

- The CPI, PPI, and ECI index numbers published by BLS show the change in prices or costs over time from a base period, which is defined as 100.0.
  - An increase of 7.0 percent from the base period, for example, is shown as 107.0.
- Index numbers are not dollar values, but measures of change over time *relative* to their base period value of 100.0.
- Index movements are most useful when expressed as percent changes between various time periods; for example, 1-month or 12-month.

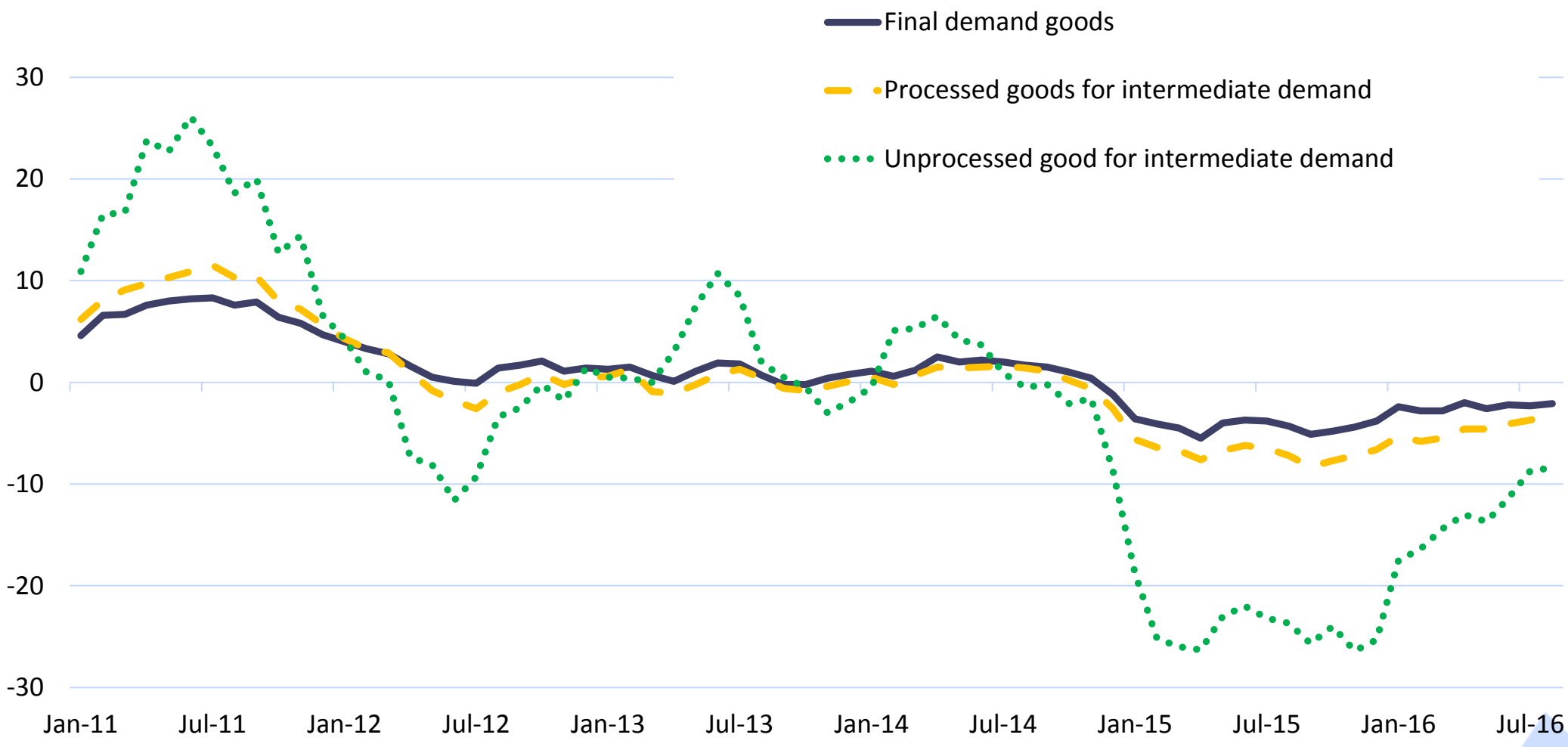
Understanding Index Data



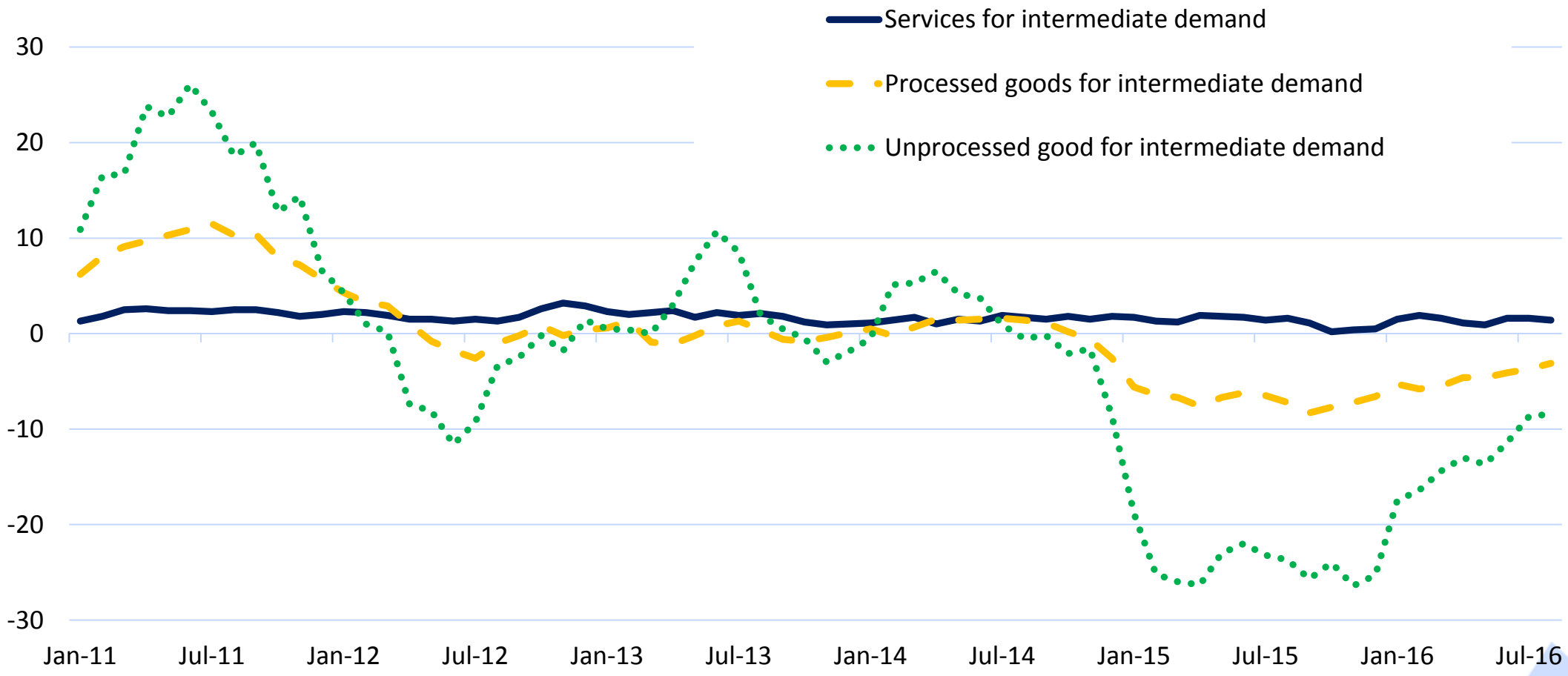
PPI Pricing Concepts

- Focus on price-determining variables; examples include:
  - Kind of buyer
  - Product or service
  - Transaction terms
  - Time of purchase
- Sales promotion techniques such as rebates or financing plans are reflected, as they affect the net proceeds of the producer.
- Changes in excise taxes are not reflected.
- Monitor changes in characteristics to detect changes in quality.

12-Month % Changes in the PPIs for Groupings of Goods along the Supply Chain
January 2011-August 2016



12-Month % Changes in the PPIs for Groupings of Business-to-Business Goods and Services, January 2011-August 2016



Types of PPIs

- PPI publishes four types of indexes:
  - Final demand-Intermediate demand (FD-ID)
  - Industry net output
  - Commodity
  - Net inputs to industry

Why use the PPI in Contracts?

- By using an *objective* measure of price change, free from possible manipulation by contracting parties, you may better maintain long-term relationship with buyers or sellers.

- According to the 2013 PPI User Survey, the value of the average contract escalated by the PPI is $115 million dollars.

Disclaimer

BLS staff can help you understand different price indexes, determine which index best fits your needs, and answer general questions about contract adjustment clauses. However, please keep in mind that a contract is a legal document, so BLS staff cannot help you write a contract or resolve contract disputes.

PPIs and Contract Price Adjustment

- A specific index should be cited by referring to "the Producer Price Index for" followed by the exact title and code.

Industry Data Example
Industry: Scheduled passenger air transportation
Product: Domestic
***Series ID**: PCU4811114811111

Commodity Data Example
Group: Fuels
Item: Gasoline
***Series ID**: WPU0571

*An explanation of Series ID codes is available in the Technical Note of the PPI Detailed Report or through the online database

- For the most up-to-date data, including revisions, access the databases at www.bls.gov/ppi/data.htm.

Calculating a Contract Price Adjustment

- Escalation agreements using the PPI usually involve changing the contract's base payment by the percent change in the level of the PPI between the reference period and a subsequent time period.
- Again, this is calculated by first determining the index point change between the two periods and *then the percent change*.
- Let's look at the percent change from January 2014 to 2015…

Producer Price Index Industry Data

Original Data Value

Series Id: PCU333---333---
Industry: Machinery manufacturing
Product: Machinery manufacturing
Base Date: 200312
Years: 2010 to 2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	120.2	120.2	120.2	120.4	120.4	120.3	120.5	120.6	120.8	120.8	120.9	121.1
2011	121.7	122.0	122.4	122.9	123.2	123.5	123.8	123.9	124.2	124.3	124.6	124.7
2012	125.1	125.6	125.8	126.0	126.1	126.1	126.3	126.4	126.5	126.6	126.8	127.0
2013	127.2	127.5	127.6	127.7	127.8	127.8	128.0	128.0	128.1	128.3	128.4	128.5
2014	129.0	129.4	129.5	129.8	129.9	130.0	130.2	130.2	130.4	130.4	130.5	130.6
2015	131.1	131.4										

Percent Change Formula

$$\frac{\left(\text{PPI for current period} - \text{PPI for previous period}\right)}{\text{PPI for previous period}} \times 100$$

$$\frac{(131.1 - 129.0)}{129.0} \times 100 = 1.6 \text{ percent}$$

Contracting Scenario

- You are a metal staircase manufacturer who regularly buys custom formed metal parts for your products from a machine shop.

Start by Listing the Input Costs of the Supplier

- **Choose an index** or indexes representing the costs for providing a particular product or service, *rather than* an index for the product itself.

  e.g. If contracting for purchases of metal parts, it would be advisable to tie the escalation clause to a PPI for metal sheet or scrap that is made into the part rather than a PPI for the finished part.

- **Research Inputs:**
  - Ask the supplier
  - Look up industry input data from Census.gov
  - BEA input-output table: "Use of commodities by industry valued at producers prices"
  - Browse trade publications
  - Web search

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Contracting Scenario: Supplier's Inputs

- Energy inputs 10%
- Metal inputs 85%
- Machinery maintenance & repair 5%

Contracting Scenario: Supplier's Inputs

- Energy inputs 10%
  - WPU0543 Industrial electric power
- Metal inputs 85%
  - WPU101707 Cold rolled steel sheet and strip
- Machinery maintenance & repair 5%
  - WPU551 Commercial and industrial machinery and equipment repair and maintenance

Write a Price Adjustment Clause Using Index Data

- Base terms
- Index specifications
- Calculation method
- Exceptions and caveats

Write the Base Terms for the Contract Price Adjustment

The base selling price for an order of 100 custom formed metal steps is set at $550.00 as of December 2013, to remain in effect for 1 year. December 2013 is hereafter called the reference base period. The base selling price shall be adjusted on March 1st of each subsequent year, based upon the percent changes (whether up or down) in the indexes described below, between the reference base period and December of the most recent year. All calculations for the index shall be based upon the latest version of data published as of February 20th each year.

Add Index Specifications to the Contract

…in the indexes described below, between the reference base period and December of the most recent year. All calculations for the index shall be based upon the latest version of data published as of February 20th each year.

From the U.S. Bureau of Labor Statistics website (data.bls.gov):

- **ENERGY:** *Producer Price Index (PPI) for Fuels and related products and power: Industrial electric power (WPU0543)*
- **METALS:** *PPI for Metal and metal products: Cold rolled steel sheet and strip (WPU101707)*
- **MACHINERY MAINTENANCE:** *PPI for Repair and maintenance services: Commercial and industrial machinery and equipment repair and maintenance (WPU551)*

Calculating a Price Adjustment Using One Index

- Escalation agreements using the PPI usually involve changing the contract's base price by the percent change in the level of the PPI between the reference base period and the time period of the price adjustment.
- Here is the basic formula using a single index:

New price = Old price x (current period index/base period index)
= $550.00 x (224.2/221.6)
= $550.00 x 1.012
= $556.60 (this is also a 1.2% increase, although we didn't explicitly calculate it)

Calculating Price Adjustment by Creating a Composite Index

Data from data.bls.gov/cgi-bin/srgate and *PPI Detailed Report* January 2015	Energy	Metals	Machinery maintenance	Composite
Base price = $550.00	10%	85%	5%	100%
Dec value for the recent year (as of Feb 20th)	214.7	224.2	115.4	
÷ by base period series value (Dec 2013)	200.5	221.6	113.4	
equals:	1.071	1.012	1.018	
x by 100 to yield re-based current series value	107.1	101.2	101.8	
x by assigned weight	10.71	86.02	5.09	
equals:	Subtracting 100 gives you a 1.8% increase ⇨			101.8
x by original base price				55,990
÷ by 100 to yield adjusted new price				**$559.90**

Include an Example of Calculation Mechanics in the Contract

…

Commercial and industrial machinery and equipment repair and maintenance

(WPU551)

Data from data.bls.gov/cgi-bin/srgate and *PPI Detailed Report* January 2015	Energy	Metals	Machinery maintenance	Composite
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Are You the Buyer or the Seller?

- A long-term contract was established in December 2013 to for the sale of steel bars (Commodity code 101704). The 2013 value of the contract was $100,000.

- What is the contract price in December 2015?

Are You the Buyer or the Seller?

Using the price change of the product itself to adjust the contract price:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	204.0	201.5	200.2	202.6	197.8	198.8	198.1	197.1	193.8	199.6	201.4	202.6
2014	204.2	204.2	203.4	205.1	205.9	206.5	208.6	208.5	209.7	209.9	209.1	207.1
2015	202.2	195.0	193.5	189.8	187.4	187.1	186.4	184.9	181.5	178.2	170.9	165.2

A $100,000 steel bars contract escalated by the PPI for *Hot rolled steel bars, plates, and structural shapes* between December 2013 and December 2015, would result in a new price of $81,540. This reflects an 18.5 percent decrease.

$100,000 x (165.2/202.6) = $81,540

Are You the Buyer or the Seller?

Using the price change of the of the major material input of the product to adjust the contract price:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	122.0	122.0	122.2	131.2	132.8	130.0	129.6	125.4	126.3	127.6	127.6	126.9
2014	133.3	133.3	133.5	142.8	144.9	145.5	139.6	134.5	130.0	131.1	130.3	126.3
2015	133.2	133.2	133.5	134.5	139.1	138.9	134.5	123.8	126.3	126.3	136.3	123.9

A $100,000 steel bars contract, adjusted by the PPI for *Iron ores*, which are the main material input for steel, between December 2013 and December 2015, would result in a new price of $97,636. This reflects a 2.4 percent decrease.

$100,000 x (123.9/126.9) = $97,636

Input Cost Price Adjustment: BEA Input Output (I-O) Use of Commodities by Industries Data

- The Use Table:
  - Compiled by the Bureau of Economic Analysis.
  - Shows the set and dollar value of all products consumed by and industry as inputs to production (excluding capital investment).
- Can be used for contract price adjustment purposes to determine significant products an industry consumes.

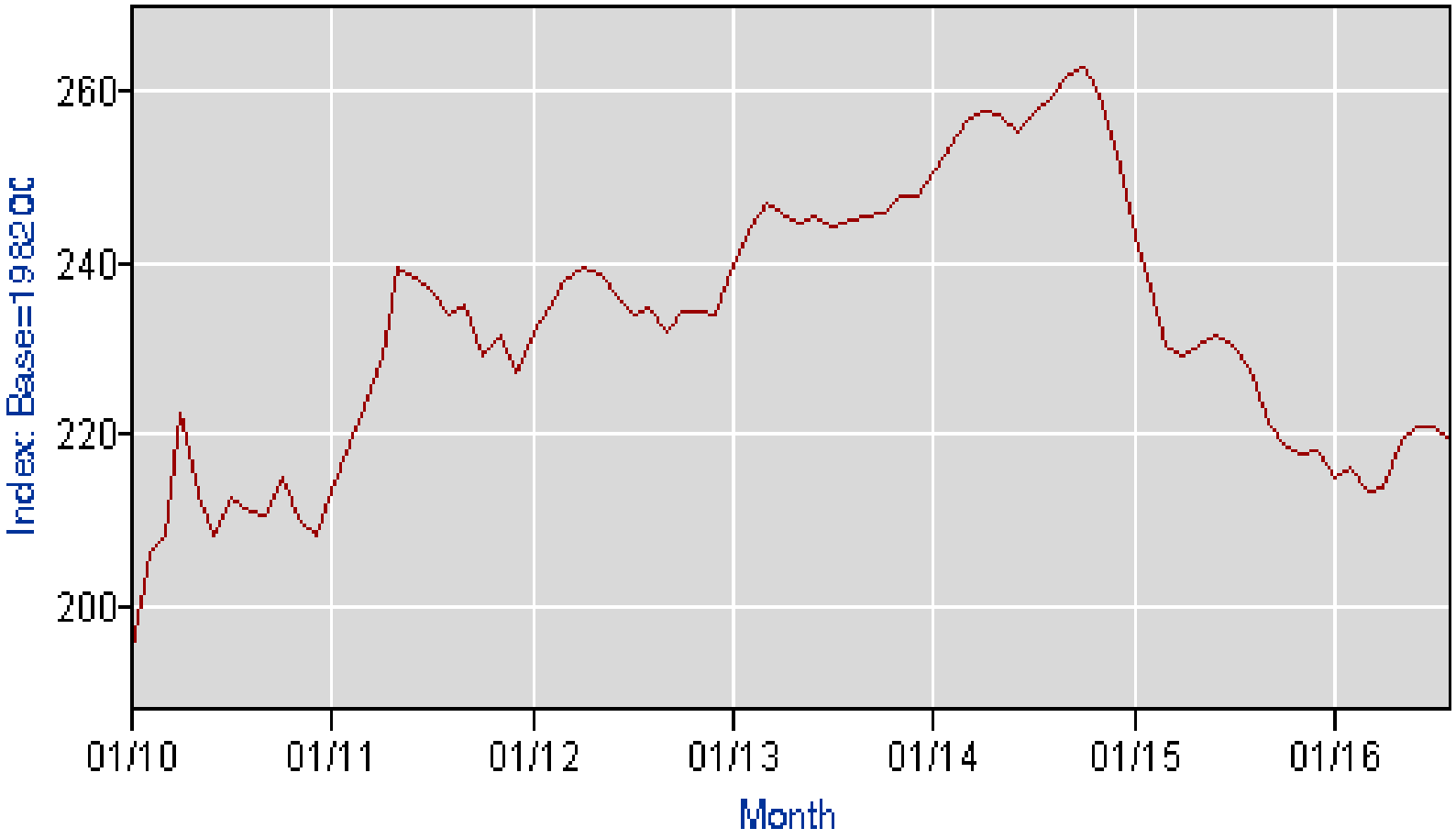
Input Cost Price Adjustment Example: Plastic Bottle Manufacturing--I-O Use Data (Selected Values)

Product Code	Product Title	Use (in millions)	Percent of Total Use
325211	Plastics material and resin manufacturing	4004	49.6
326110	Plastics packaging materials and unlaminated film and sheet manufacturing	681	8.4
325190	Other basic organic chemical manufacturing	605	7.5
221100	Electric power generation, transmission, and distribution	425	5.3
420000	Wholesale trade	416	5.2
322210	Paperboard container manufacturing	192	2.4
541300	Architectural, engineering, and related services	150	1.9
550000	Management of companies and enterprises	148	1.8
484000	Truck transportation	121	1.5
482000	Rail transportation	93	1.2
↓	↓	↓	↓
↓	↓	↓	↓
511200	Software publishers	1	0.0
517A00	Satellite, telecommunications resellers, and all other telecommunications	1	0.0

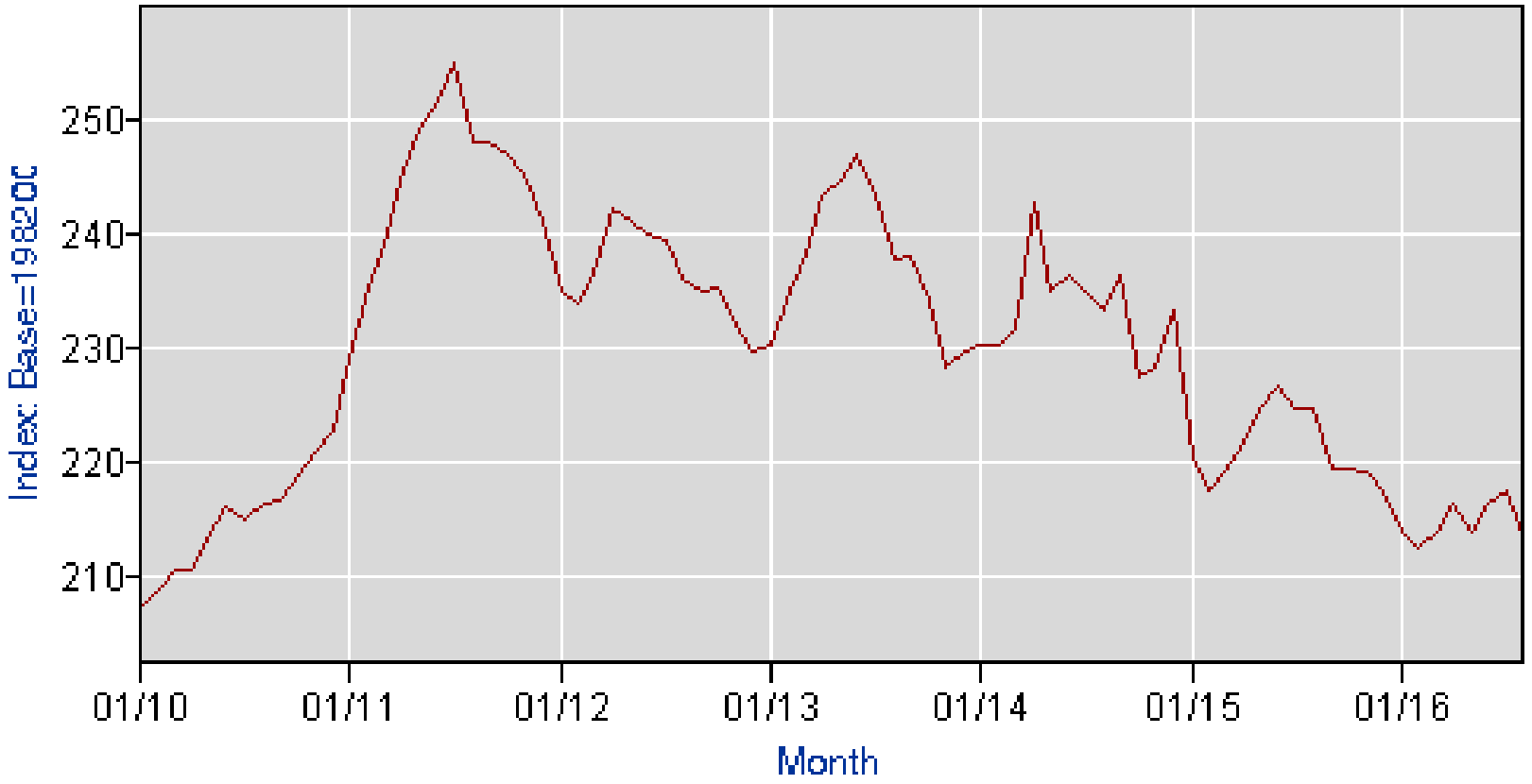
Input Cost Price Adjustment Example: Plastic Bottle Manufacturing-- Price Indexes

- Once you identify the inputs to your production and their purchase prices, you then identify the appropriate price indexes.
  - PPI produces price indexes for the vast majority of goods and many of services produced in the United States.
- Assume a soda manufacturing company wants to develop contracts to adjust its purchase price of plastic bottles.
  - PPI Commodity index: 066 (Plastic Resins and Material)
  - PPI Commodity index: 061403 (Other basic organic chemicals)

Input Cost Price Adjustment Example: PPI Commodity index 066 (Plastic Resins and Material)



Input Cost Price Adjustment Example: PPI Commodity index 061403 (Other basic organic chemicals)

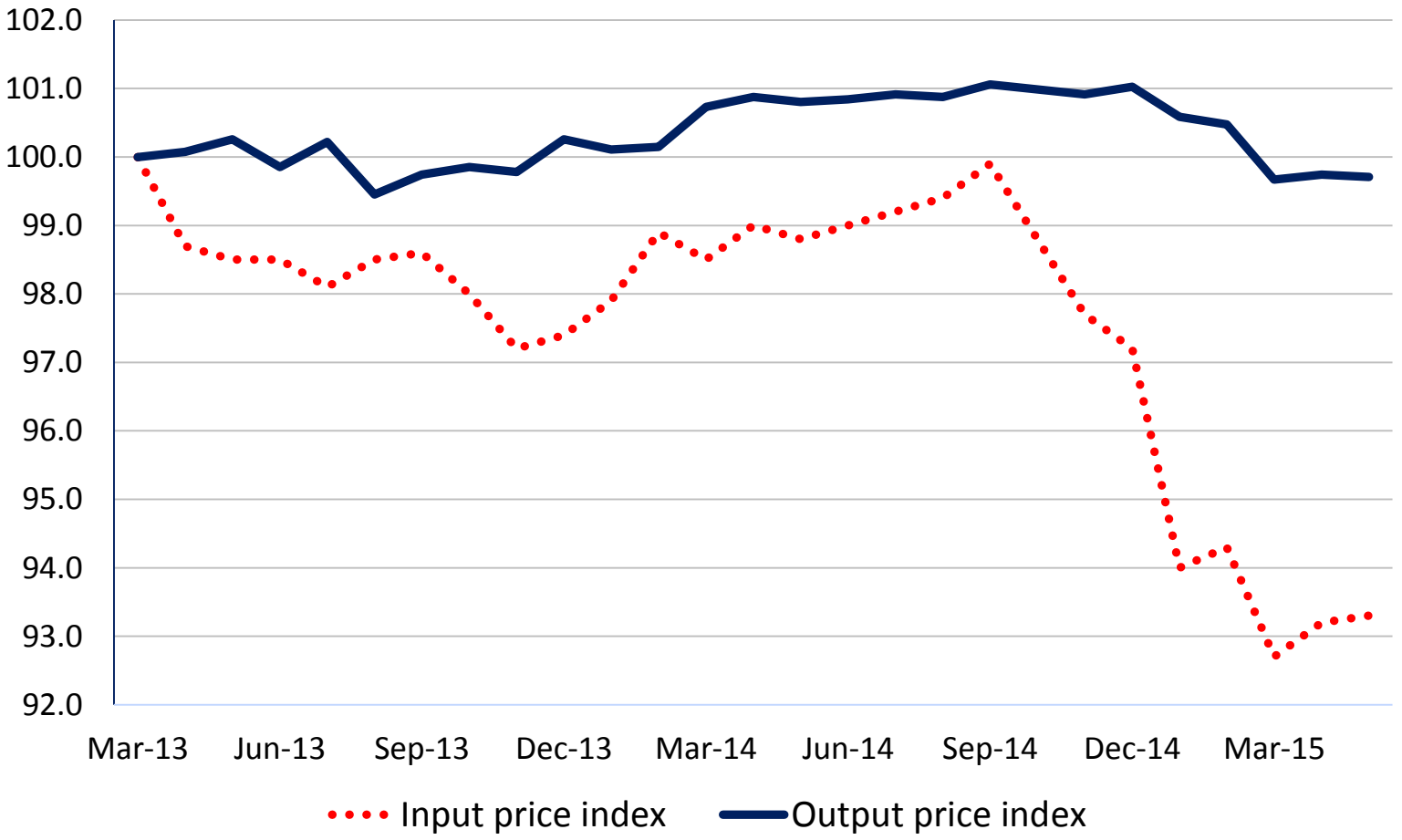


PPI Industry
Input vs. Output Indexes

- *Net output indexes* measure the average change in prices industries receive for their output

- *Net input indexes* measure the average change in prices industries pay for inputs (excluding capital investment, labor, and imports)

Paint and Coating Manufacturing (NAICS 325510)
PPI Input vs. Output Price Index



PPI Industry Input Index Structure

Inputs to 325510, Paint and Coating Manufacturing, excluding labor, capital investment, and imports
Goods inputs
Food
Energy
Goods excluding food and energy
Services inputs
Trade services
Transportation and warehousing services
Services less trade, transportation, and warehousing
Maintenance and repair construction

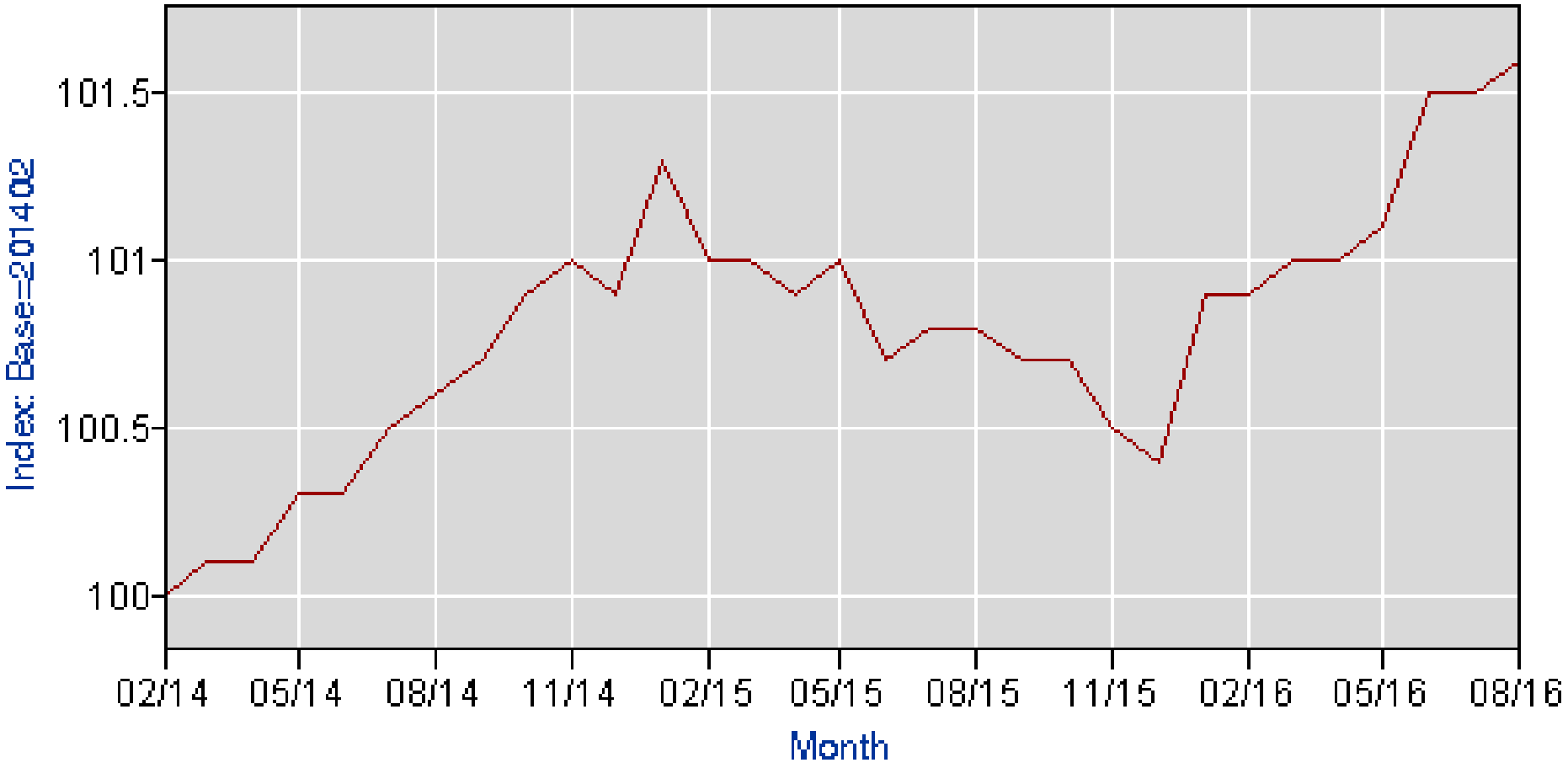
PPI Inputs to Industry indexes

- PPI inputs to industry indexes measure change in total input costs (excluding capital investment, labor and imports) for a given industry.
- Not currently available for all industries.
- Uses:
  - Help determine how a specific company's input costs are changing relative to its industry.
  - For adjusting prices of contracts with suppliers.
  - To justify changing price charged to customers.

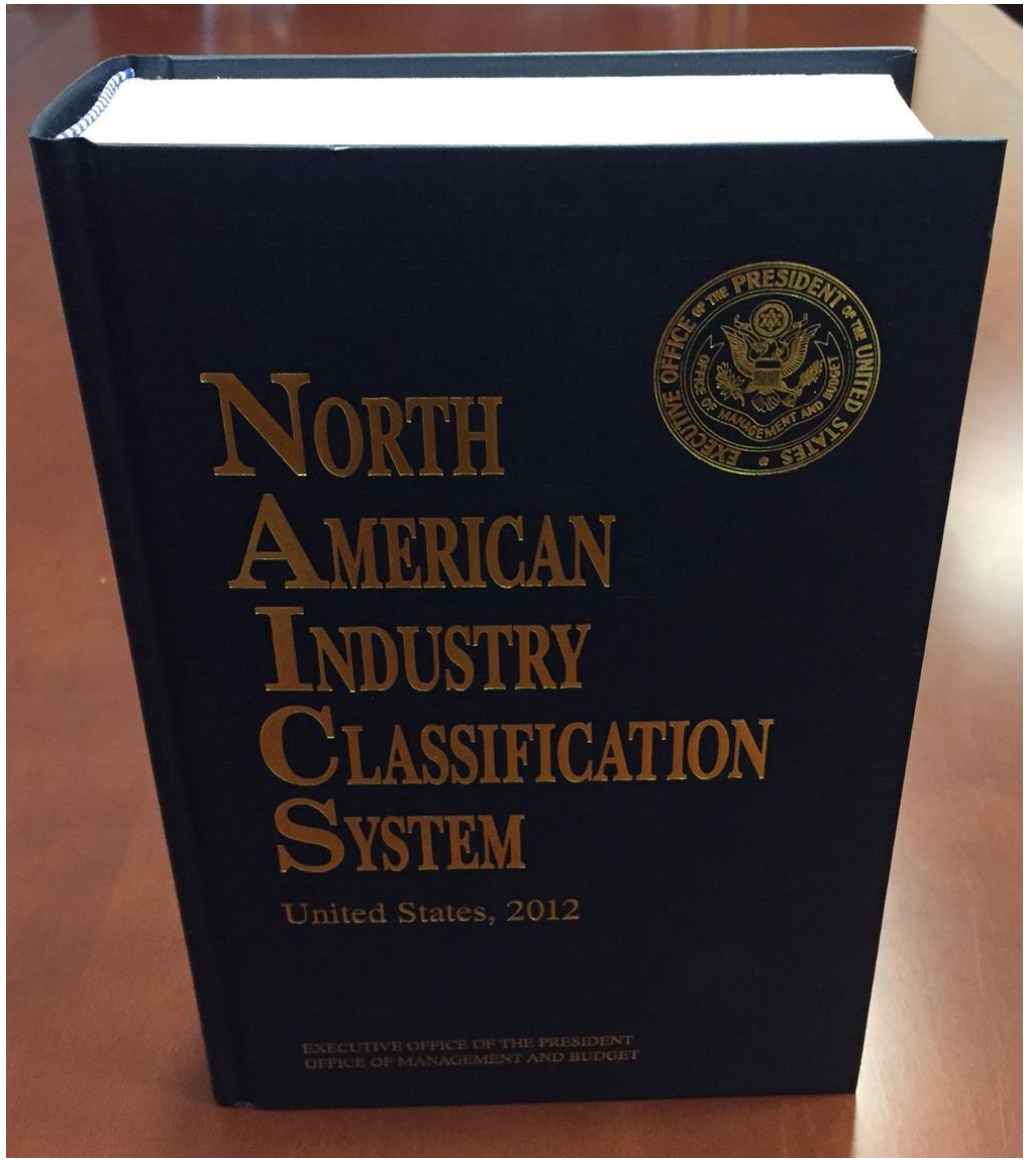
Example: Inputs to Aircraft Manufacturing-- I-O Use Data (Selected Values)

Product Code	Product Title	Use (in millions)	Percent of Total Use
336412	Aircraft engine and engine parts manufacturing	10361	18.9
336413	Other aircraft parts and auxiliary equipment manufacturing	10300	18.7
334413	Semiconductor and related device manufacturing	3272	6.0
420000	Wholesale trade	2541	4.6
331110	Iron and steel mills and ferroalloy manufacturing	2343	4.3
33291A	Valve and fittings other than plumbing	1145	2.1
33451A	Watch, clock, and other measuring and controlling device manufacturing	1068	1.9
334511	Search, detection, and navigation instruments manufacturing	1041	1.9
541100	Legal services	843	1.5
332600	Spring and wire product manufacturing	812	1.5
334220	Broadcast and wireless communications equipment	801	1.5
335930	Wiring device manufacturing	762	1.4
↓	↓	↓	↓
↓	↓	↓	↓
332320	Ornamental and architectural metal products manufacturing	1	0.0

Example: Inputs to Aircraft Manufacturing– Producer Price Index



North American Industry Classification System (NAICS)



PPI Industry Input Index Structure

Inputs to 315, apparel manufacturing, excluding labor and capital investment
Domestically-produced inputs
Goods inputs
Services inputs
Maintenance and repair construction
Imported goods inputs

Risk and Its Drivers

- Is it appropriate to tie the total contract price to a main driver?
- Are material inputs to production the only drivers of risk?

PPI Price Adjustment Pitfalls to Avoid

- Using seasonally-adjusted indexes - generally NOT appropriate in adjustment clauses
  - Buyers and sellers are facing actual prices
  - Most adjustments are done on an annual basis
  - Seasonally-adjusted data is subject to multiple revisions
- Using trade margin (retail or wholesale) indexes in place of product indexes (see www.bls.gov/ppi/ppifocus.htm)
  - e.g. A PPI for electronics stores is not a substitute for a computers PPI

PPI Price Adjustment Pitfalls to Avoid

- Using the PPI for *All Commodities* or *Industrial Commodities*
  - These have inherent issues of double-counting.
  - FD-ID indexes replaced these for overall inflation measures.

PPI Price Adjustment Pitfalls to Avoid

Pitfalls	Solutions
Not accounting for revisions and errors	• Wait for revised data before adjusting prices • Recalculate upon the release of revision • Only readjust if the percentage change is a certain amount different • Do nothing (If you always adjust from the base, you'll make up for it next adjustment)
Not accounting for missing or discontinued data	• Allow for the use of the next higher aggregate index (if it makes sense) • Allow a proxy index • Replace the index with its re-code • Compare the deleted code with new indexes available
Not keeping in touch with PPI	• Sign up for PPI Notices (www.bls.gov/ppi/update.htm) • Try retrieving your index a couple times a year; if it becomes unavailable, check recent PPI Detailed Reports for resampling (www.bls.gov/ppi/ppi_dr.htm)

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- U.S. STANDARD INDUSTRIAL CLASSIFICATION (SIC)

NEW

Escalation Guide for Contracting Parties

Business firms in search of effective methods for coping with changes in prices often employ price adjustment (escalation) clauses in long-term sales and purchase contracts. BLS estimates that agreements with a lifetime worth in the trillions of dollars are currently escalated using the Producer Price Index (PPI) family of indexes, either alone or in conjunction with other sources of economic data.[1]

Because they measure price changes objectively, both at the aggregated level and for particular products, free from possible manipulation by either of the contracting parties, PPIs calculated by the Bureau of Labor Statistics (BLS) are widely recognized among business people, economists, statisticians, and accountants as useful in price adjustment clauses.

This document provides guidance on the development of escalation clauses in contracts that are to be tied to PPI data. Such clauses should be written with great care to avoid serious problems when contract adjustments are implemented. The information in this Guide is based on BLS staff experience in handling issues that have been brought to their attention in connection with actual escalation clauses.

The role of the BLS is to provide requested data and to explain their underlying methodology and limitations. The BLS does not encourage or discourage the use of price adjustment measures in purchase agreements, sales agreements, and contracts. The BLS does not directly assist in writing contracts, nor does it provide advice regarding disputes arising from contract interpretation. Because index methodology and publication conventions could be crucial in developing escalation clauses, this Guide is intended to alert users to potential problems arising in these areas.[2]

This Guide is divided into three sections. First, an overview of the PPI system describes the major categories and groupings of the several thousand indexes that are published each month. Then, guidelines for assisting in the development of escalation clauses are outlined. Finally, a practical example of provisions that might be incorporated into a contract is presented, based on the guidelines discussed, along with an example of the price adjustment calculations that would be needed to implement these provisions.

This Guide provides summary information on a number of issues relating to PPI. For a more detailed review of PPI concepts and methods, see the *BLS Handbook of Methods, Chapter 14: Producer Prices*.

The Structure of Producer Price Indexes

Producer price indexes measure the average change in prices received by domestic producers for their output. A PPI is an output price

PPI Publication Resources

- Dissemination tools
  - PPI data release at 8:30 a.m. on release day provides indexes for the previous month.
  - Data is on-line, announcements also on Twitter.
  - Analysis articles provide insight into trends and methodology.

- PPIs are subject to revision four months after being first published:
  - For instance, any revisions to January data first published in February will appear with the May data release in June.
  - Revisions take into account late survey reports and corrections by respondents.

Collecting price data is difficult!

The quality and credibility of the BLS data you use depends crucially on actions taken by you and your colleagues to support the relevance and accuracy of BLS data.

Contact Information

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