

PRODUCERS UNDER PRESSURE?

What role do producers' costs play in determining inflation?

By Jessie Romero

Between June 2017 and June 2018, trucking transportation costs in the United States increased 7.7 percent. Steel, aluminum, and copper were all up more than 10 percent. Wheat prices climbed more than 20 percent, and food processors paid 13 percent more for chickens. Yet in many cases, rising costs for businesses were not reflected in the prices paid by consumers. Finished appliances were up only 1.1 percent over the same period; food prices increased just 1.4 percent. Companies including Sysco, Procter & Gamble, and Unilever all have reported difficulty raising prices in the U.S. market.

How long will that last? Overall, the prices producers pay for inputs, as measured by components of the Bureau of Labor Statistics' Producer Price Index (PPI), have been outpacing consumer prices for more than a year (see chart

below), which had led some observers to predict that more rapid inflation is imminent. But while the PPI does paint a picture of the costs facing various industries, it isn't necessarily a good predictor of consumer measures of inflation, such as the Consumer Price Index (CPI). In part, that's because the indexes are designed to measure different things; in part, it reflects that firms make pricing decisions based on many factors in addition to input prices. And even to the extent the PPI does help predict consumer price changes in the short run, in the long run, the overall level of prices depends on monetary policy.

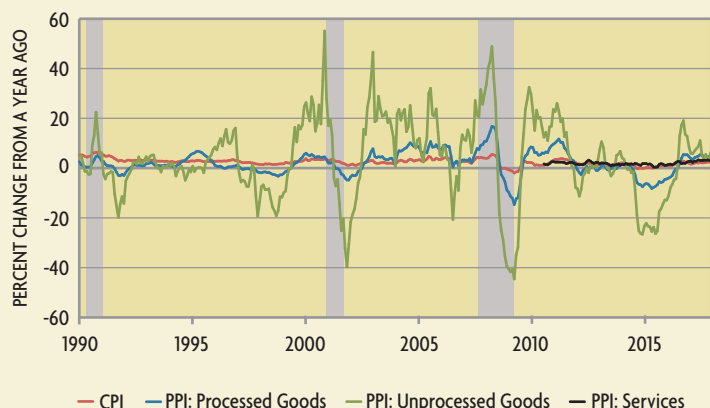
Piecing Together the PPI

To calculate the PPI, the Bureau of Labor Statistics (BLS) surveys a sample of firms about the revenue they receive on more than 10,000 goods and services, from rivets to refrigerators to radio advertising. The BLS then aggregates that information into two main categories: final demand and intermediate demand. Final demand is the revenue domestic producers receive for the goods and services they sell to consumers, to the government, to businesses for capital investment, and for export — in other words, for goods and services that are not used as inputs to create other domestic products. Intermediate demand is the revenue domestic producers receive for goods and services that are sold as inputs into other domestic products. When a retailer sells a refrigerator to a homeowner, the retailer's revenue is counted in final demand; when the manufacturer sold the refrigerator to the retailer, the manufacturer's revenue was counted in intermediate demand, as was the revenue received by the companies that supplied the manufacturer.

The BLS has two different systems for categorizing intermediate demand. In the "commodity type" system, the BLS calculates separate indexes for processed goods, such as tires or cement; unprocessed goods, such as crude

Ups and Downs

Swings in the PPI don't necessarily translate into changes in the CPI



NOTE: Data on Services for Intermediate Demand are available beginning in 2010. Shaded areas denote recessions.

SOURCE: Bureau of Labor Statistics via Federal Reserve Economic Data (FRED)

petroleum or gravel; and services, such as warehousing or financial services. In the “production flow” system, the BLS calculates indexes for goods and services in four stages. Stage 1 goods are the first in the process; stage 4 goods are finished products and are sold to final demand.

Because the PPI for final demand includes goods and services sold for personal consumption, there is a high degree of overlap between items covered by that portion of the PPI for final demand and its more famous sibling, the CPI — the refrigerator sold in the above example would be included in both. But, as the names suggest, the fundamental difference between the two indexes is that the PPI measures prices from the producer’s perspective while the CPI measures prices from the consumer’s perspective. This leads to a number of differences in the ways data are collected. For example, the PPI does not include sales and excise taxes since these are not revenues that accrue to a producer, but taxes are included in the CPI since they’re part of what a consumer pays.

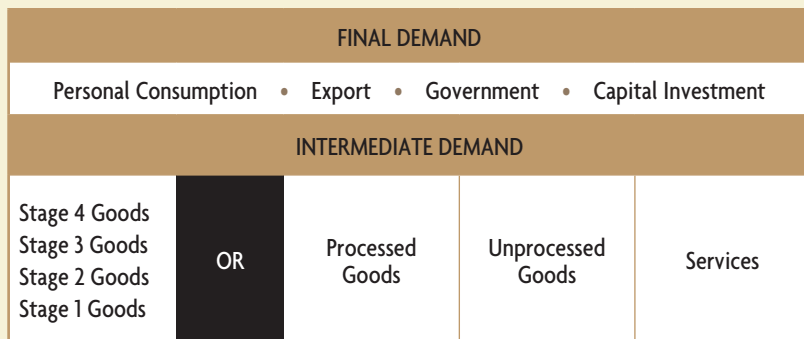
Another difference between the two indexes is that the CPI includes only the health care costs consumers pay themselves, while the PPI also includes health care paid for by a third party, such as an insurance company or the government. The PPI also includes the interest rate component of financial services, so changing rates change the index; interest rates don’t directly affect the CPI. In addition, owners’ equivalent rent — the amount homeowners would have to pay to rent rather than own their homes — is not included in the PPI, but it makes up about one-quarter of the CPI. An additional significant difference is that the PPI, by definition, does not cover imports since they are not domestically produced.

From Producers to Consumers

Do changes in the PPI predict changes in the CPI? “This is not an uncommon take on the PPI,” says Todd Clark,

An “Org Chart” for the Producer Price Index

The Bureau of Labor Statistics aggregates PPI data into multiple categories



a senior vice president at the Cleveland Fed. “And it’s not a crazy idea since one of the things the PPI measures is input prices. But the linkage isn’t actually that strong.”

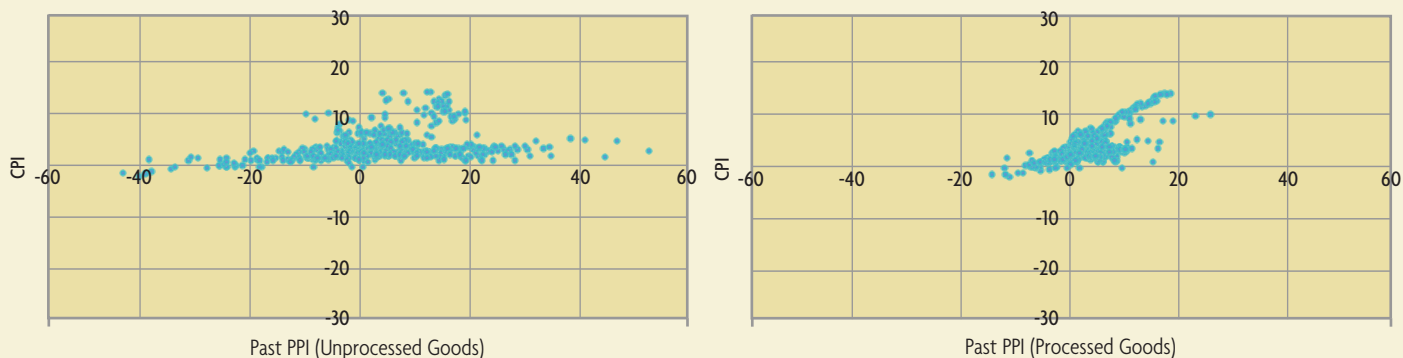
Clark first studied the relationship between the PPI and the CPI in a 1995 article. He found that, historically, changes in the PPI had to some extent preceded changes in the CPI, but he also found that the PPI was of little value in forecasting future values of the CPI, which suggested that the producer price changes weren’t necessarily driving the consumer price changes.

Clark’s research preceded major changes the BLS made to its aggregation system in 2014, but more recent research also suggests that changes in input prices are not a good predictor of future inflation. In a 2018 article, Mark Bognanni and Tristan Young, also with the Cleveland Fed, studied the predictive power of the ISM Manufacturing Price Index, another measure of input prices; it did help to improve forecasts of the PPI, but that did not translate into improving forecasts of changes in the index of Personal Consumption Expenditures, or PCE (the consumer inflation measure generally used by the Federal Open Market Committee).

Eyeballing the data also suggests that changes in the PPI for intermediate demand don’t have much of relationship to future values of the CPI; this is especially true for unprocessed goods. (See charts.)

Scattered

The CPI doesn’t have a strong relationship with previous values of the PPI



NOTE: The figures plot the CPI against the PPI for Intermediate Demand two quarters previously. Both series present percent changes from a year ago. Data are for 1975-2018.

SOURCE: Bureau of Labor Statistics via Federal Reserve Economic Data (FRED)

In a 2016 article, Jonathan Weinhaven, an economist at the BLS, found that price increases in earlier stages of intermediate demand did help predict price increases at later stages in the PPI. So why isn't there a stronger relationship between the CPI and the PPI? One reason might be that both measures are averages across a large number of different industries. There are some industries in which higher input prices do translate directly into higher consumer prices, but these "pass through" effects could be masked when they're averaged with industries with different cost structures. For example, increases in food-related PPIs tend to lead to increases in the CPI for food purchased in grocery stores but not for food purchased at restaurants, where service and preparation are a large part of the value.

The relationship, or lack thereof, between the PPI and CPI also reflects the measurement differences. For example, the exclusion of imports, which account for about 15 percent of GDP, means that the PPI doesn't reflect any cost savings producers achieve from buying intermediate inputs overseas. Nor does it reflect cost increases if imports become more expensive, for example because of tariffs. (See "Tariffs and Trade Disputes," page 10.)

In addition, growing global trade in intermediate inputs means that the baskets of goods measured in the CPI and the PPI have less and less in common over time. In a recent working paper, Shang-Jin Wei and Yinxi Xie of Columbia University documented a growing divergence between producer price indexes and consumer price indexes in most industrialized countries, including the United States, beginning around 2001. They attributed this divergence to the increasingly global nature of many companies' supply chains.

Making the Markup

While there is some evidence that producers pass on cost increases, intermediate input costs are just one factor in a firm's pricing decisions. A firm also has to consider labor and capital costs and the competitive landscape, all of which affect how much a firm marks up the prices of its goods over intermediate input costs. "If all these conditions were static, then yes, one might expect to see a consistent and stable relationship between the prices of materials inputs and the prices of finished goods," says Alex Wolman, vice president for monetary and macroeconomic research at the Richmond Fed. "But of course, these conditions aren't static."

One of the most important considerations is the customer. While it won't come as a huge surprise to most shoppers, a large body of research has demonstrated that different firms charge different prices for essentially the same goods, and that the same firm may charge different prices at different times. Nicholas Trachter of the Richmond Fed, with collaborators elsewhere, has shown how this price dispersion can arise based on the variation in consumers' abilities and

willingness to shop around, and how stores employ pricing strategies in response. The more costly it is for a consumer to search for a different seller, either because other sellers are hard to find or because the consumer is unwilling to spend much time searching, the higher the price a given firm can charge.

In this respect, the Internet might be one factor making it more difficult for producers to raise prices, both by making it easier for customers to shop around and by making it easier for new companies to set up shop. Procter & Gamble, for example, announced last year it was cutting prices on its Gillette razors by up to 20 percent in response to competition from online retailers. Fed Chairman Jerome Powell attributed low inflation in part to the "Amazon effect" in his semiannual testimony before the Senate Banking Committee in March. (The Internet isn't the first technology to affect prices; see "The Great Telegraph Breakthrough of 1866," page 28.)

Another factor potentially limiting firms' abilities to pass on cost increases is the concentration of the retail sector: In 2017, the five largest retailers in the United States accounted for 36 percent of the 100 largest retailers' total U.S. sales. And when retailers get large enough, they may be able to exercise what's known as monopsony power, where they are effectively the only buyer and can dictate terms and prices to their suppliers.

Many manufacturers have reported being forced to sell their products at lower prices lest they lose their place on a store's shelves. Some companies might even get large enough for this to affect the economy as a whole. In the early 2000s, for example, Jerry Hausman of the Massachusetts Institute of Technology estimated that Walmart and its ilk had lowered annual food price inflation by three-quarters of a percentage point.

Retail isn't the only sector that's highly concentrated; concentration has been increasing across all public firms since the late 1990s. (See "Are Markets Too Concentrated?" *Econ Focus*, First Quarter 2018.) Intuitively, one would expect greater market concentration to enable firms to raise prices, but economists studying market power have come to conflicting conclusions about the extent to which markups have increased economy-wide. One way that increasing market concentration could coexist with low prices is if the firms that have grown large are also the firms that have built their strategy around low prices — and thus exert their influence over their suppliers rather than their customers.

In the Long Run

Another reason producers might not be willing or able to pass on higher input costs could be the virtuous circle of inflation expectations. Economists have found that one of the most important determinants of future inflation is what people expect inflation to be. So if firms believe the central bank is committed to keeping inflation low and

stable, they won't try to raise prices beyond that rate — which, in turn, contributes to keeping inflation low and stable. (See “Great Expectations,” page 40.) Most measures of inflation expectations have ticked up in recent months, but they remain relatively low and well-aligned with the Fed's 2 percent target for the inflation rate.

Even if firms in sectors with rising input costs were to pass on those costs to consumers, it wouldn't necessarily lead to inflation in the sense that monetary policymakers use the word, to mean a persistent increase in prices across the entire economy. In the short run, changing supply and demand conditions might lead to higher prices for certain goods and services. But in the long run, under this definition, inflation is determined by monetary policy, and those

supply and demand conditions affect only relative prices of the particular goods and services. “If apples get more expensive relative to oranges, that's not inflation,” says Clark. “Inflation is when prices increase for both apples and oranges — and everything else.”

The relationship between the PPI and CPI illustrates the complex interactions between costs and competition that influence firms' pricing decisions. And while the PPI might not be a perfect harbinger of what's to come, it's still a valuable indicator for policymakers. “It's one of many tools we can use to assess the overall state of the economy and where we are in the business cycle,” Clark says. “It's useful even if it's not predictive of the inflation measure we've chosen to target.” **EF**

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