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The Parts Are More Than the Whole: Separating Goods and Services to Predict Core Inflation

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Economists have not been altogether successful in their efforts to forecast "core" inflation—an inflation measure that typically excludes volatile food and energy prices. One possible explanation is that the models used to make these forecasts fail to distinguish the forces influencing price changes in core services from those affecting price changes in core goods. While core services inflation depends on long-run inflation expectations and the degree of slack in the labor market, core goods inflation depends on short-run inflation expectations and import prices. By using a composite model that combines these different sets of explanatory variables, the authors of this study are able to improve upon the inflation forecasts produced by a standard model.

In its amendment to the Federal Reserve Act of 1913, the U.S. Congress directed the Federal Reserve "to promote . . . the goals of maximum employment, stable prices, and moderate long-term interest rates."[1] Because price stability—the second of these goals—is critical to achieving full employment and low long-term interest rates, the Fed monitors inflation carefully. Indeed, Fed policymakers seek to forecast the path of inflation one to two years ahead—a strategy rooted in the knowledge that monetary policy actions affect the economy only with long and variable lags. Predicting the behavior of inflation over this extended time horizon, however, is easier said than done, since inflation tends to fluctuate markedly in response to external events.

For this reason, policymakers have long been interested in identifying less volatile inflation measures that provide a better guide to the *underlying* rate of inflation. One approach has been the development of "core inflation" measures—measures that either exclude the price changes of volatile items or include only a specific segment of the cross section of price changes. Among measures of core inflation, the series excluding food and energy prices is probably the best-known example.[2] Unfortunately, however, the models developed to forecast core inflation—such as Phillips curve models—do not have a particularly good track record.

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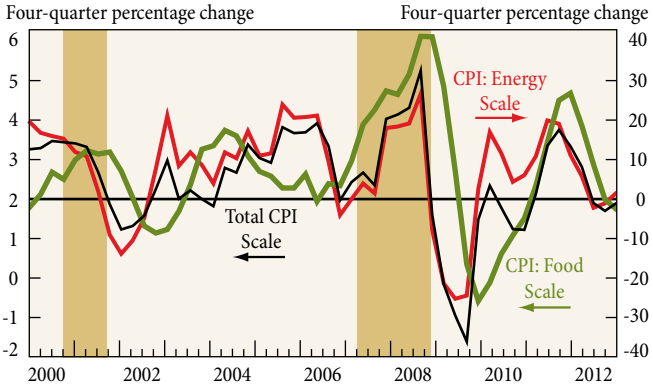
[1] The Federal Reserve Reform Act of 1977, cited in Board of Governors of the Federal Reserve System, *The Federal Reserve System: Purposes and Functions*, 9th ed. Washington, D.C., June 2005, p. 15.

[2] The measure of core inflation excluding food and energy is published by the Bureau of Labor Statistics. Other well-known measures of core inflation include the median and trimmed-mean.

Chart 1

Consumer Price Inflation and Its Food and Energy Components

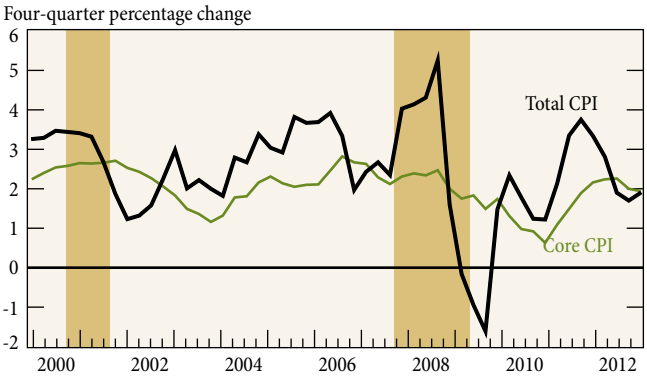


Source: U.S. Bureau of Labor Statistics.

Note: *CPI* is consumer price index.

Chart 2

Consumer Price Index: Total versus Core Inflation



Source: U.S. Bureau of Labor Statistics.

Note: *CPI* is consumer price index.

One potential explanation for this weak performance is that measures of core inflation track a wide array of goods and services whose prices change in response to different factors. In this edition of *Current Issues*, we explore this hypothesis by developing separate models for the core goods and core services components of the core consumer price index (CPI). The evidence we present strongly suggests that the forces influencing the rate of change for core services prices are quite different from those influencing the rate for core goods prices. In particular, while core services inflation depends on long-run inflation expectations and tightness or slack in the labor market, core goods inflation depends on short-run inflation expectations and import prices. We use the different sets of explanatory variables to construct forecasts of overall core CPI inflation that combine the forecasts of these two models. While the analysis is preliminary, we find that our composite model yields forecasts that are markedly more accurate than those produced by a standard Phillips curve model, which makes no such differentiation.[3]

Background

Total CPI inflation is quite volatile, owing in large part to sharp swings in food and energy prices (Chart 1). Very often these swings have been driven by external events rather than domestic economic conditions. While the Fed targets total inflation in seeking to meet the goal of price stability, analysts find it useful for policy purposes to monitor a measure of underlying inflation that filters out such volatility, such as the conventional core measure of inflation that excludes food and energy prices. This core inflation measure captures lower-frequency changes in the general price level and has also proved to be a more accurate predictor of total inflation than has past total inflation (Chart 2).

Core inflation can be broken out into two broad categories: core goods (commodities less food and energy commodities) and core services (services less energy services). Doing so, as shown in Chart 3, reveals two quite different series. Not only do the absolute levels of the two series differ but, over the past decade, movements in the two inflation rates have been inversely correlated.

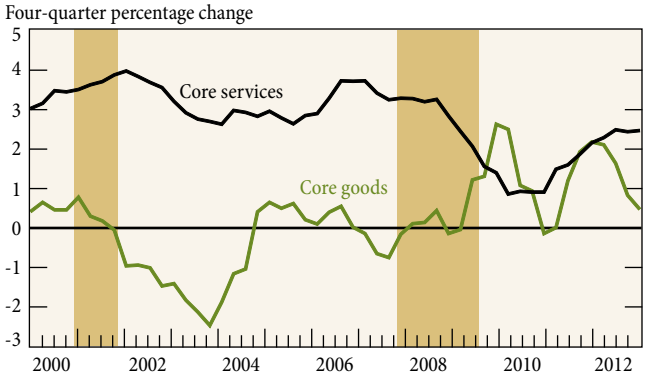
The divergent behavior of goods and services inflation raises the possibility that their determinants may also differ. To explore this idea further, we examine the relationship over the period since 1985 between each of the inflation series shown in Chart 3 and two variables considered to be important components of Phillips curve models and other empirical models of inflation: long-run inflation expectations and an activity gap variable. Activity gap variables measure resource utilization, or the extent of slack in an economy. One widely used activity gap variable is the unemployment gap—the difference between the actual unemployment rate and the Congressional Budget Office's estimate of the level of unemployment consistent with stable inflation, known as the NAIRU.[4] An unemployment rate above the NAIRU would indicate that the economy is operating with excess slack, and would hence lead analysts to predict a decline in inflation. A second activity gap variable is the output gap—the difference

[3] The Phillips curve model is a widely used tool for explaining and forecasting inflation. It takes its name from the economist A. W. Phillips, who documented that nominal wages grow faster in periods when the unemployment rate is low. Subsequent work recast this relationship as one between price inflation and unemployment. Modern Phillips curve models include a role for inflation expectations and a supply shock variable that captures the effects of external factors on the inflation rate.

[4] The acronym stands for "non-accelerating inflation rate of unemployment."

Chart 3

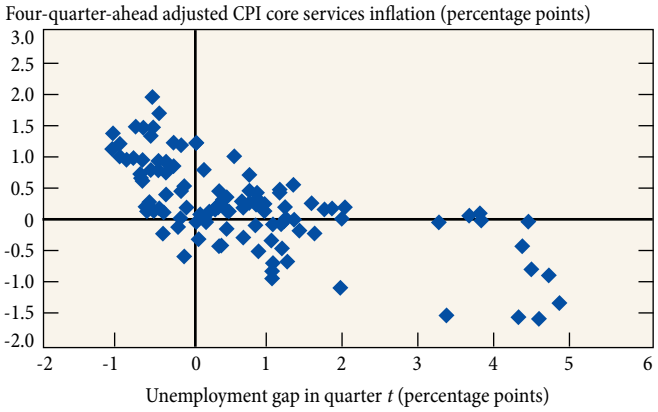
Inflation Breakdown: Core Goods and Core Services



Source: U.S. Bureau of Labor Statistics.

Chart 4

The Unemployment Gap and Adjusted CPI Core Services Inflation: 1985-2012

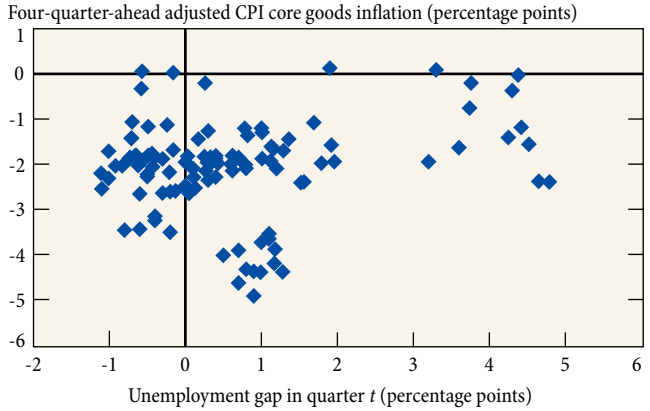


Sources: U.S. Bureau of Economic Analysis; U.S. Bureau of Labor Statistics; Congressional Budget Office.

Note: *CPI* is consumer price index.

Chart 5

The Unemployment Gap and Adjusted CPI Core Goods Inflation: 1985-2012



Sources: U.S. Bureau of Economic Analysis; U.S. Bureau of Labor Statistics; Congressional Budget Office.

Note: *CPI* is consumer price index.

between actual GDP and the economy's maximum sustainable level of output, or "potential GDP." An output level below potential is another sign of excess slack in the economy, and would also lead analysts to expect lower inflation.

To determine whether these variables do in fact help to explain the two broad categories of core inflation, we plot the prospective four-quarter-ahead inflation rates (period t to $t + 4$) of core services and core goods, respectively, less a measure of ten-year expected CPI inflation (period t), against the current unemployment gap (period t).[5] For core services (Chart 4), the scatter plot provides evidence that an increase in the unemployment gap is associated with a decrease in the inflation rate, although the relationship is nonlinear (that is, the decline in inflation diminishes as the unemployment gap increases). For core goods (Chart 5), the unemployment gap appears to play no role in the inflation process. Taken together, these data suggest that the behavior and determinants of core services inflation and core goods inflation differ.

Previous Literature

Although the literature distinguishing core goods inflation from core services inflation is limited, we can draw upon some earlier studies to motivate our analysis. In particular, these studies either assume that different processes govern the movements in goods inflation and services inflation or identify different determinants of the speed of price adjustment for individual goods and services included in aggregate consumer price indexes.

Peach, Rich, and Antoniades (1994) present a model-based analysis of the difference between goods inflation and services inflation for the United States. Their study estimates a vector error correction model (VECM) for goods inflation and services inflation based on the finding that a long-run relationship exists between the series.[6] However, because

[5] Detailed information on the data series used in our analysis can be found in the table on page 6.

[6] A principal feature of the model is that the two series do not deviate from each other in the long run; in addition, the time paths of the series are influenced by the extent of any deviation from long-run equilibrium. See Enders (2004) for a discussion of cointegration and vector error correction models.

the VECM has an atheoretical structure and includes only lagged values of goods inflation and services inflation in the specification, it is not suited to investigate whether the determinants of goods inflation and services inflation differ.

Clark (2004) conducts a qualitative analysis of divergent movements in core goods and services inflation as measured by the PCE (personal consumption expenditures) deflator.[7] He identifies a shift in 1994 in the gap between goods and services inflation, and concludes that the steeper decline in goods inflation stemmed largely from the dollar's strength and an increase in global competition. Clark's work implicitly assumes that different factors influence goods and services inflation.

The work of Bryan and Meyer (2010), focusing on the underlying determinants of CPI inflation, is closest in spirit to our analysis. However, instead of decomposing the CPI along the lines of goods and services prices, they subdivide the individual components of the CPI into two categories—"sticky" and "flexible." In practice, the majority of the sticky-price items are services, while the flexible-price items are largely goods. The authors estimate Phillips curve models for various flexible and sticky CPI inflation rates using two explanatory variables: an activity gap variable (the unemployment gap) and a proxy for adaptive inflation expectations based on lagged, or past, values of sticky- or flexible-price inflation relevant for the individual models. Bryan and Meyer find that flexible-price inflation is more responsive to the degree of economic slack than sticky-price inflation, while sticky-price inflation is more responsive to inflation expectations than flexible-price inflation. Their results not only indicate that variables can have markedly different predictive power for the price movements of different types of items, but also suggest that the variables may become less informative when used directly to explain movements in inflation at the aggregate level.

Inflation Models

Given the findings of earlier studies and our own results thus far, we adopt the approach of using separate models for core CPI services and goods inflation to explain the dynamics of aggregate core CPI inflation. In choosing explanatory variables, we view domestic factors as influencing services inflation primarily, while global factors play a larger role in the goods inflation process. Consequently, and in contrast to Bryan and Meyer, we allow for different model specifications for goods and services inflation.

More detailed information about our inflation models is provided in the accompanying box. First, we analyze four-quarter-ahead growth in core services prices using a nonlinear Phillips curve model that depends on long-run inflation expectations and the unemployment gap. Long-run inflation expectations are assumed to serve as a reasonable proxy for trend inflation and the public's view about the central bank's inflation goal. The unemployment gap—a factor shown earlier to influence inflation (Chart 4)—measures the extent to which there is slack or tightness in overall resource utilization.

Next, to explain four-quarter-ahead growth in core goods prices, we use a multivariate model that depends on lagged core goods inflation, relative import price inflation, and expected inflation. The lagged core goods inflation is an inertial component that captures persistence in the series. The relative import inflation term is our preferred choice for a supply shock variable, and its inclusion is consistent with Clark's (2004) evidence of a linkage between goods inflation and global competitiveness.[8] We also find a role for expected inflation in the goods inflation model. Drawing upon the work of Fuhrer, Olivei, and Tootell (2012), we considered inflation expectations over a short-run (one-year) horizon as well as long-run inflation expectations as candidate series and found that the former variable performed much better in predicting the growth of goods prices. Consequently, we include a measure of short-run inflation expectations rather than long-run inflation expectations in our model of the goods inflation process.

To provide a basis of comparison for our approach, we also consider an alternative model that estimates the aggregate core CPI series directly rather than estimating the separate components for core services and core goods. In particular, we estimate a standard "expectations-augmented Phillips curve" model that has been widely used as a tool to explain and to forecast movements in inflation. The model includes long-run inflation expectations, the unemployment gap, and relative import price inflation as the explanatory variables.

In addition to examining how well the models explain core goods and core services inflation using the data within the estimation period (the "within-sample" fit of the models), we evaluate how well they forecast the path of core goods and core services inflation outside the estimation period (the "out-of-sample" forecast performance). For this exercise, we construct out-of-sample forecasts starting in first-quarter 2005. For the core services inflation model and core goods inflation model, we use weights of 0.72 and 0.28, respectively, to construct a composite forecast of core CPI inflation. The weights reflect the relative share of core services and core goods in the core CPI in the fourth quarter of 2004.[9]

[7] The PCE deflator is another inflation measure that can be decomposed into core goods and core services categories. However, the core goods and core services categories for the PCE deflator are not readily available—as they are for the CPI—and must be calculated.

[8] We do not include the unemployment gap in the core goods inflation model. Clark's findings can also account for the lack of a relationship between goods inflation and an activity gap variable that provides a measure of the level of domestic rather than global resource utilization.

[9] The weight of core goods in the core CPI has been trending downward for some time. While it was 34 percent in 1985, it was just 26.1 percent in 2012.

Core Inflation Models

The analysis considers several inflation models. The specification for the four-quarter-ahead growth in core services prices is given by:

$$ {}^{SERVICES}\pi_t^{t+4} = \alpha_0 + \alpha_1\left({}^{10\text{-}year}\pi_t^e\right) + \alpha_2\left[\ln\left(5.3 + u_t^{GAP}\right)\right] + \varepsilon_{t+4}, $$

where ${}^{SERVICES}\pi_t^{t+4}$ denotes the growth in core services prices between quarter t and $t+4$, ${}^{10\text{-}year}\pi_t^e$ is a measure of long-run inflation expectations, u_t^{GAP} is the unemployment gap, and ε_{t+4} is an error term. We follow Fuhrer, Olivei, and Tootell (2012) to model the nonlinear relationship between inflation and the unemployment gap, where the constant (5.3) is interpreted as the non-accelerating inflation rate of unemployment (NAIRU).

The specification for the four-quarter-ahead growth in core goods prices is given by:

$$ {}^{GOODS}\pi_t^{t+4} = \beta_0 + \beta_1\left({}^{GOODS}\pi_{t-4}^{t}\right) + \beta_2\left({}^{1\text{-}year}\pi_t^e\right) + \beta_3\left({}^{IMPORTS}\pi_{t-4}^{t} - {}^{GOODS}\pi_{t-4}^{t}\right) + \eta_{t+4}, $$

where ${}^{GOODS}\pi_t^{t+4}$ denotes the growth in core goods prices between quarter t and $t+4$, ${}^{1\text{-}year}\pi_t^e$ is a measure of short-run inflation expectations, $\left({}^{IMPORTS}\pi_{t-4}^{t} - {}^{GOODS}\pi_{t-4}^{t}\right)$ is the growth in relative import prices between quarter $t-4$ and t, and η_{t+4} is an error term.

As noted in the text, we adopt a standard Phillips curve model for direct estimation of the aggregate core CPI series. The specification includes the same measures of long-run inflation expectations, the unemployment gap, and relative import inflation used as explanatory variables in the equations above, with core CPI inflation serving as the analogue for core goods inflation in the relative import price inflation term from the second equation:

$$ {}^{CORE}\pi_t^{t+4} = \delta_0 + \delta_1\left({}^{10\text{-}year}\pi_t^e\right) + \delta_2\left[\ln\left(5.3 + u_t^{GAP}\right)\right] + \delta_3\left({}^{IMPORTS}\pi_{t-4}^{t} - {}^{CORE}\pi_{t-4}^{t}\right) + v_{t+4}. $$

Note that the specification in this third equation is consistent with Gordon's (1990) "triangle" model of inflation, which features an inertial component (measure of future expected inflation), a real activity measure, and a supply shock variable, and where v_{t+4} is an error term.

The estimation results for the various inflation models are presented below.

Table A1

Within-Sample Model Estimates

	${}^{SERVICES}\pi_t^{t+4}$ (Core Services)	${}^{GOODS}\pi_t^{t+4}$ (Core Goods)	${}^{CORE}\pi_t^{t+4}$ (Phillips Curve Model with Supply Shocks)	${}^{CORE}\pi_t^{t+4}$ (Phillips Curve Model without Supply Shocks)
$\overline{R}^2$	0.832	0.682	0.832	0.828
Constant	4.740** (0.871)	-1.337* (0.561)	2.152** (0.656)	2.494** (0.690)
$\left({}^{10\text{-}year}\pi_t^e\right)$	0.861** (0.094)		0.919** (0.118)	0.859** (0.100)
$\left[\ln\left(5.3 + u_t^{GAP}\right)\right]$	-2.303** (0.522)		-1.338** (0.428)	-1.432** (0.410)
$\left({}^{GOODS}\pi_{t-4}^{t}\right)$		0.510** (0.166)		
$\left({}^{1\text{-}year}\pi_t^e\right)$		0.622** (0.235)		
$\left({}^{IMPORTS}\pi_{t-4}^{t} - {}^{GOODS}\pi_{t-4}^{t}\right)$		0.093* (0.046)		
$\left({}^{IMPORTS}\pi_{t-4}^{t} - {}^{CORE}\pi_{t-4}^{t}\right)$			-0.006 (0.036)	

Note: Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors are reported in parentheses.

* Significant at the 5 percent level.

** Significant at the 1 percent level.

Table A2

Out-of-Sample Model Forecast Accuracy: Mean Squared Error

	$(0.72)({}^{SERVICES}\pi_t^{t+4}) + (0.28)({}^{GOODS}\pi_t^{t+4})$ (Composite Model)	${}^{CORE}\pi_t^{t+4}$ (Phillips Curve Model)
2005:Q1-2006:Q1 through 2011:Q4-2012:Q4	0.212	0.357

Data Sources

Description	Source
Ten-year CPI inflation expectations	Board of Governors of the Federal Reserve System, FRB/US model of the economy, PTR series. For the period 1992:Q1 to 2011:Q4, this series is drawn from the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters
CPI: All items less food and energy	Bureau of Labor Statistics
CPI: Commodities less food and energy commodities	Bureau of Labor Statistics
CPI: Services less energy services	Bureau of Labor Statistics
Unemployment rate	Bureau of Labor Statistics
NAIRU	Congressional Budget Office
Import price index: All imports	Bureau of Labor Statistics
Import price index: Nonpetroleum imports	Bureau of Labor Statistics
One-year CPI inflation expectations	Blue Chip

Note: *CPI* is consumer price index; *NAIRU* is non-accelerating inflation rate of unemployment.

Estimation Results and Forecast Performance

We estimate the three models using quarterly data from first-quarter 1985 to fourth-quarter 2012, with the four-quarter growth in core CPI services prices, core CPI goods prices, and core CPI prices covering the period first-quarter 1986 through fourth-quarter 2012.

We begin by discussing the within-sample estimation results presented in Table A1 of the box, focusing initially on the models for services inflation and goods inflation. The long-run expected inflation variable and the unemployment rate gap were defined previously. The short-run expected inflation variable is a measure of the Blue Chip forecasters' one-year expected CPI inflation rate, while relative import price inflation measures the growth in nonpetroleum import prices relative to core goods prices. Further details on the data are provided in the table above.

While the different price indexes do not lend themselves to a direct comparison of performance across models, we can nevertheless comment on some of the observed features and properties. Table A1 reports the relevant parameter estimates and their associated standard errors, as well as statistics that provide a useful measure of the extent to which an estimated model fits the data.[10]

The results from the estimated core services inflation model largely confirm the visual impression given by the Chart 4 scatterplot of a nonlinear Phillips curve. As shown, the fit of the model to the data is quite good and there is a strong relationship between core services inflation and long-run inflation expectations. Moreover, we cannot reject the hypothesis that there is a one-to-one correspondence between movements in this variable and core services inflation. In addition, an important nonlinear relationship exists between core services inflation and the unemployment gap, indicating that the impact of a change in the unemployment gap on core services inflation depends on the level of the unemployment gap. To understand the nature of the estimated nonlinearity more clearly, consider the following comparison, which is based on the same (absolute) percentage point change in the unemployment gap: If the unemployment gap were to move from -1 percentage point to -3 percentage points, then the four-quarter growth rate of core services prices would increase by 1.5 percentage points. If the unemployment gap were to move from 3 percentage points to 1 percentage point, then the four-quarter growth rate of core services prices would increase by only 0.6 percentage point.[11]

The results for the core goods inflation model show that the explanatory variables again provide a good fit to the data. A very different set of factors, however, appear to be influencing the behavior of this series. We find that core goods inflation depends on its past value, with the estimated coefficient on this term indicating a modest degree of persistence in the series. Relative import price inflation—growth in nonpetroleum import prices less core goods inflation—also plays a role, suggesting that goods prices may act as a linkage between supply shocks and core inflation. Last, we find evidence of a relationship between core goods inflation and short-run (one-year) inflation expectations. This result is consistent with Fuhrer, Olivei, and Tootell (2012), who find an important role for short-run inflation expectations in the core inflation process.

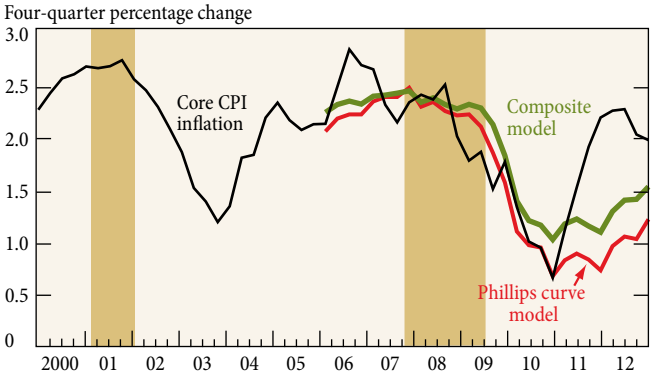
The estimation results for the Phillips curve model of aggregate core CPI inflation yield several interesting findings. As before, the within-sample fit of the model to the data is quite high. In addition, we again observe an important nonlinear relationship between core inflation and labor market conditions, although the effect is a bit muted compared with the core services inflation model—even after accounting for a 72 percent contribution weight. There is also strong evidence of a role for long-run inflation expectations.

[10] Because there is overlap of the dependent variable in the regression equations (four-quarter-ahead growth rates that are observed on a quarterly basis), the regression residuals will be serially correlated. While the regression equations can be consistently estimated using the method of ordinary least squares (OLS), we use the Newey-West (1987) variance-covariance estimator to adjust the OLS standard errors for serial correlation of the residuals.

[11] The Congressional Budget Office estimate of the unemployment gap for fourth-quarter 2012 is 2.8 percentage points.

Chart 6

Out-of-Sample Forecast: Model Estimated through 2004:Q4



Sources: U.S. Bureau of Labor Statistics; U.S. Congressional Budget Office; authors' calculations.

Note: *CPI* is consumer price index.

Finally, we note that one feature in the core goods inflation model is absent from the core inflation model: specifically, the effect of supply shocks that were associated with the relative import price inflation variable is both economically and statistically insignificant.

To mitigate any concerns arising from the inclusion of a statistically insignificant variable, we re-estimate the Phillips curve model for aggregate core CPI inflation without the relative import inflation term. As the table shows, the overall fit of the model and the estimation results change very little. While the effect of the unemployment gap variable is slightly larger and the effect of long-run inflation expectations is slightly smaller, the variables continue to play an important role in the aggregate core inflation process. Note, too, that the model very much parallels the specification of the core services inflation model.

Next, we evaluate the out-of-sample forecast performance of the models starting in first-quarter 2005, a period preceding the onset of the Great Recession by a couple of years. For this exercise, we retain estimates of each of the models' parameters through the fourth quarter of 2004 and then generate four-quarter-ahead inflation forecasts starting with the period from first-quarter 2005 to first-quarter 2006.[12] The technique used to construct the forecasts depends on whether a lag of the dependent variable appears as an explanatory variable in the model. In the case of core goods inflation, no actual values of inflation over the forecast period are included. Rather, the exercise uses the actual paths of long-run inflation expectations and the four-quarter growth in import prices to generate inflation forecasts that are then used to forecast the subsequent values of inflation. For core services inflation, the forecasts are constructed using the actual paths of long-run inflation expectations and the unemployment gap.[13] In this manner, we generate a sequence of inflation forecasts covering the period first-quarter 2006 through fourth-quarter 2012.

A similar approach is adopted in the case of the Phillips curve models for aggregate core CPI inflation. In assessing the out-of-sample forecast performance of these models, we observe that the Phillips curve model that includes relative import price inflation as an explanatory variable performs much worse than the model that excludes the term. Consequently, we only report the results from the latter model to conserve space.

How well do our models perform in forecasting core CPI inflation? In Chart 6, actual core CPI inflation is plotted against the forecasts from the composite model—the model that exploits the differences in the determinants of the inflation process for core goods and core services—and the Phillips curve model for the post-2004 period. The associated mean squared errors (MSEs) of the models' forecasts—a measure of forecast accuracy—are reported in Table A2 of the box. As the chart indicates, the forecasts produced by the two models generally track the slowing in core CPI inflation through fourth-quarter 2009–fourth-quarter 2010, but the models' subsequent performance diverges noticeably. While there is little consensus about the factors underlying the increase in core inflation during the next eight quarters and both models on average under-predict core inflation in this period, the composite forecast series has done a better job picking up the subsequent rebound. The improvement in forecast performance is confirmed by Table A2, where the composite model reduces the MSE of the forecast by about 42 percent compared with the Phillips curve model.[14] Taken together, the results in Tables A1 and A2 offer strong evidence of the divergent behavior and determinants of goods and services inflation, as well as the importance of this difference for understanding and forecasting movements in core inflation.[15]

Conclusion

Core inflation combines price changes in core services and core goods. Yet our results underscore the importance of distinguishing these two components. By using separate models for core services inflation and core goods inflation, we are better able to identify and to measure the impact of

[12] The last value of the inflation rate used for estimation is the four-quarter growth rate from fourth-quarter 2004 to fourth-quarter 2005.

[13] The forecasts from the core goods inflation model and core services inflation model are sometimes referred to as dynamic and static forecasts, respectively.

[14] Compared with the Phillips curve model that includes relative import price inflation, the composite model reduces the MSE by about 66 percent.

[15] In light of the Great Recession, we also examined the models' forecasts for the post-2007 period. An examination of the behavior and accuracy of the forecasts from the composite model and Phillips curve model showed the same features and yielded similar results.

variables in the core inflation process—effects that can be obscured in an examination of core inflation at the aggregate level. Thus, while long-run inflation expectations help to determine core services inflation, short-run inflation expectations influence core goods inflation. In addition, the unemployment gap has a meaningful effect only on price changes in core services, a finding consistent with the view of some commentators that core goods inflation varies with the extent of *global*—not domestic—economic slack. Finally, core goods inflation depends on relative import price inflation, but the same variable shows no link with aggregate core inflation. By constructing composite forecasts that take account of these differing determinants, we can improve upon the inflation forecasts generated from a standard Phillips curve model.

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