

# Measuring the Inflation Rate: Is Housing Different?

By Dean Baker\*

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Center for Economic and Policy Research  
1611 Connecticut Ave. NW  
Suite 400  
Washington, DC 20009

tel: 202-293-5380  
fax: 202-588-1356  
<http://cepr.net>

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# Executive Summary

Analyses of inflation typically focus on the core Consumer Price Index (CPI) or Personal Consumption Expenditure Deflator (PCE), both of which exclude food and energy prices. The reason for excluding food and energy prices is that both are subject to large and erratic fluctuations, which are driven by factors not related to the overall economy. If Federal Reserve Board (Fed) policy targeted an inflation rate that included these factors, it could result in rapid interest hikes to stem inflation, even though the real cause was bad weather driving up food prices or a temporary loss of oil from a major producer — not an overheated economy. In this case, the rate hikes would both have little impact on the actual cause of rising inflation, and would needlessly slow down the economy and keep workers from getting jobs.

This paper argues that the Fed should also consider removing the shelter component from the core inflation indexes it uses in assessing the state of the economy. The reason is that the shelter component is also not moved by the same dynamics as most of the items in the indices. This has not generally mattered in prior years, since inflation in the shelter components has not differed much from the inflation rate in the rest of the core. However, this is no longer true. Over the last four years, a core inflation rate that excludes shelter would be more than 0.5 percentage points lower than the standard core in the CPI and more than 0.3 percentage points lower in the PCE.

This report makes the following specific points:

- The gap between the inflation rate in shelter and the rest of the core indices has been large and growing. It has averaged 1.7 percentage points in the PCE data between January of 2015 and April of 2018. In the CPI, the gap has averaged 1.6 percentage points over this period and grown to 2.2 percentage points over the last year.
- While there have been past periods where the shelter component has diverged from the rest of the non-core indices (although not for as long a period of time), it matters more now because the divergence accounts for a much larger portion of inflation in the core. If the shelter component was excluded, inflation in both core indices would have been under 1.5 percent in the last year — well below the 2.0 percent average rate targeted by the Fed.
- When the shelter component is excluded, there is zero evidence of any acceleration in the inflation rate over the last four years.

- Most economists, including those at the Fed, estimated that the non-accelerating inflation rate of unemployment (NAIRU) was over 5.0 percent, meaning that the inflation rate should start to increase at unemployment rates below this level. The standard argument is that a tighter labor market leads to more rapid wage growth, which then leads to more rapid price growth. The fact that the core inflation rate excluding shelter has not risen at all, even as the unemployment has fallen to 3.8 percent, suggests that even this relatively low unemployment rate is not leading to inflation through conventional mechanisms.
- The current low inflation rate in the non-shelter core means that the Fed is much further from its target of a 2.0 percent average inflation rate than is generally recognized. Part of the basis of 2.0 percent as an inflation target is that it is supposed to allow the Fed room to boost the economy with lower interest rates during a downturn, ideally by having a large negative real interest rate.
- Inflation in the non-shelter core is still below 1.5 percent. It is virtually certain that inflation will decline from this pace when the economy next enters a recession. Even if the Fed were to respond to a recession by again lowering the federal funds rate to zero, the real interest rate in most areas of the economy would be only moderately negative, due to the low inflation rate. If the Fed wants to have the room implied by its 2.0 percent average inflation target, it should want to see inflation in the non-shelter core rise at least somewhat above the 2.0 percent target as a recovery reaches its peak. The current pace is far below this target.
- The rise in core inflation is driven largely by higher housing costs in a handful of metropolitan cities. Setting monetary policy that affects economic conditions nationally in response to conditions in a few major cities is wrongheaded.
- Raising interest rates may have a perverse effect by sapping housing construction in those cities, thereby exacerbating one of the primary current causes of rising inflation. One of the drivers of rising housing costs is lack of supply. If the Fed continues to raise rates, it becomes more costly to develop housing, and that will likely result in diminishing the supply of new housing, further constraining the housing market and resulting in higher housing prices. By failing to consider the unique role of housing in inflation, the Fed is pursuing a path that will actually increase inflation, by their measurements, rather than tamping it down.

# Inflation in the Non-Housing Core

It is standard practice for analyses of inflation to focus on the core rate of inflation, which excludes the food and energy components. The reason is straightforward. Inflation in these sectors is highly volatile and does not follow the same pattern as inflation elsewhere in the economy. For this reason, the core is generally a better predictor of future inflation rates than the overall consumer price index (CPI) or personal consumption expenditure deflator (PCE).

In the last five years, the inflation rate in the shelter components of the price indices has substantially outpaced the inflation rate in the non-shelter core. This has led to a considerable and growing divergence between a core inflation rate that includes shelter and one without shelter. In the last year, the shelter component has added more than half a percentage point to the inflation rate in both the core CPI and core PCE deflator.

The impact of shelter in raising the core inflation rate is unusual in this period. While inflation in the shelter component has somewhat exceeded the rest of the core indices for most of the last four decades, its impact over the last six years has been extraordinary for three reasons.

First, the gap between the inflation rate in the shelter component and the rest of the core has been unusually large, averaging 1.7 percentage points in the PCE data between January of 2015 and May of 2018. In the CPI, the gap has averaged 1.6 percentage points over this period. Furthermore, this gap has been growing, averaging 2.2 percentage points in the CPI over the last year.

The second reason that the higher inflation rate matters more now than in the past is the growing importance of shelter in the consumption basket. This is more of an issue in the CPI than PCE since the weight of shelter in the National Income and Product Accounts personal consumption component has changed little over this period and remains at just under 18.0 percent of the core index.<sup>1</sup> The relative importance of the shelter component went from 35.6 percent in 1987 to 41.4 percent of the core index as of April 2018.<sup>2</sup>

The third reason why this gap in inflation rate matters more now than in prior years is that the inflation rate in the non-shelter core is considerably lower than in past years. To take an extreme case, the gap

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1 There are several reasons for the lower weight of shelter in the PCE, but an important factor is that medical care has a far larger weight in the PCE deflator than the CPI. The latter only includes out-of-pocket payments and individual purchased insurance, the former includes payments made by the government and employer provided health insurance. The shelter index used for the PCE deflator also excludes accommodations, which are included in the CPI.

2 Bureau of Labor Statistics. (1987) and (2018b).

between the inflation rate in the CPI shelter index and the non-shelter core index averaged more than 1.0 percentage point in 1985; however, the inflation rate in the non-shelter core averaged more than 4.5 percent for that year. The shelter component is responsible for a much larger share of the inflation that we have been seeing in the last five years than had been true at prior times.

This paper briefly examines trends in shelter costs and inflation measures that exclude shelter. It notes that if shelter is excluded from the core indices, inflation remains in a range between 1.0 percent and 1.5 percent, well below the Fed's 2.0 percent target. Furthermore, there is no evidence of any acceleration in the inflation rate over the last two years, even as the unemployment rate has fallen well below conventional estimates of the NAIRU.

## The Non-Shelter Core Measure of Inflation

It is reasonable to resist efforts to pull items out of the inflation indices. After all, by cherry picking particular sectors, we can always construct a measure of inflation that is higher or lower than the overall rate, if this is the intention. However, there are good reasons for considering a core measure of inflation that excludes shelter.

First and foremost, it is widely recognized that shelter costs follow a different dynamic than most other components in the CPI. In several major metropolitan areas, house prices have grown increasingly unconnected to construction costs. There is a large and growing literature about the impact of restrictive zoning practices on rents. While construction costs differ little across regions, there are large and growing differences in housing prices due to the restrictive zoning in desirable areas.<sup>3</sup>

Since labor and other construction costs are not driving shelter prices in these areas, the overall state of the economy will have only a very indirect effect on the growth of housing costs through its impact on the demand for housing. In fact, efforts to slow inflation through higher interest rates may have the perverse effect of actually increasing the rate of inflation in the housing sector by reducing the amount of new construction.

There are two important differences in the perspective on inflation given by the standard core inflation rate and a core measure that excludes the shelter component. First, there is basically zero evidence of

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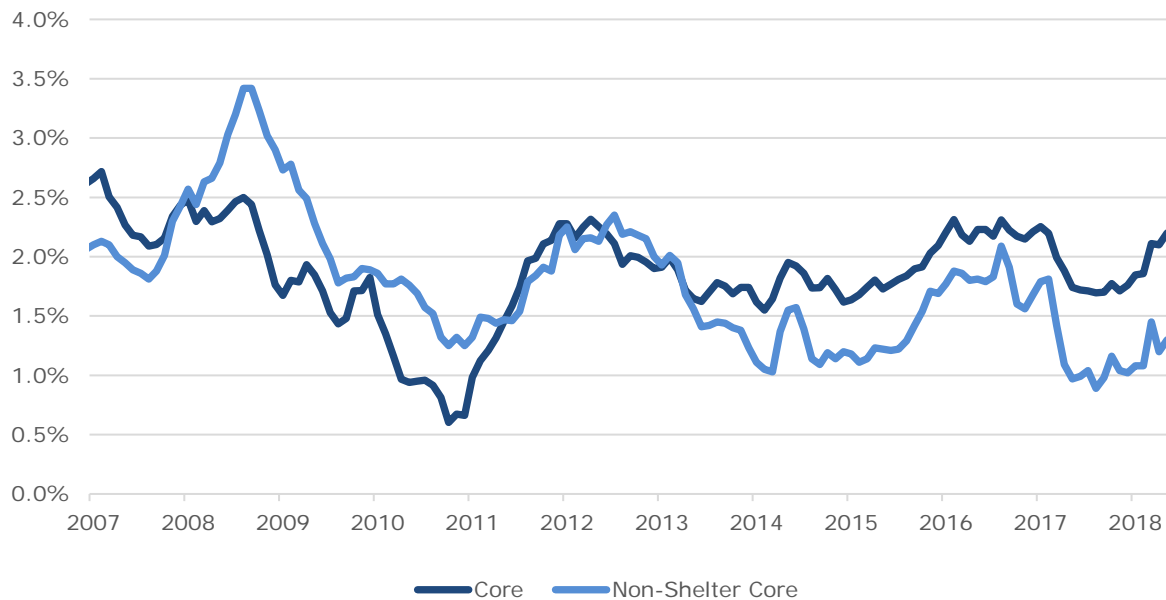
3 Romem (2017).

acceleration over the last four years in the non-shelter core and second, the inflation rate in the latter remains well below the Fed's 2.0 percent target.

**Figure 1** shows the inflation rate in the non-shelter core in the CPI since 2007 compared with the core CPI.

**FIGURE 1**

**Inflation Prior 12 Month: Core CPI and Non-Shelter Core**



Source and notes: Bureau of Labor Statistics (2018a).

As can be seen, the non-shelter core shows no upward trend whatsoever over the last four years, even as the unemployment rate has declined well below most estimates of the NAIRU. In April of 2014, the year-over-year inflation in the non-shelter core was 1.4 percent. This rate increased modestly over the next two years, peaking at 2.1 percent in August of 2016. Since then, it has edged downward. In the 12 months ending in May of 2018, the inflation rate in the non-shelter core was just 1.3 percent. While there was a limited case for acceleration in this measure from 2014 to 2016, it clearly has not been accelerating over the last 20 months as the inflation rate has edged downward.

The second point, that inflation in the non-shelter core is well below the Fed's 2.0 percent target, is directly apparent. The 1.3 percent rate over the last 12 months is near the lowest rate of inflation by this measure in the recovery. If the Fed considers 2.0 percent inflation a desirable target for governing monetary policy, it is falling well short for most sectors of the economy.

This is not just an issue of scorekeeping. If the Fed would like to see a 2.0 percent inflation rate in order to allow for lower real interest rates, it is not accomplishing this purpose. In a recession, it is desirable to have a negative real interest rate in order to provide more incentive for investment. The real interest is the difference between the nominal interest rate and the inflation rate. When the inflation rate exceeds the interest rate, it increases the profitability of investment because it means the items that businesses will be selling in the future (e.g. cars, haircuts, airfares) will be rising more rapidly relative to the interest rate that businesses have to pay to finance investment. This gives them more incentive to invest.

As was universally recognized, hitting the zero lower bound in the Great Recession was a serious impediment to the Fed's ability to boost the economy. This has led many economists, including some at the Fed, to suggest raising the 2.0 percent inflation target. If the economy goes into the next recession with inflation in the non-shelter core well under 2.0 percent, it will have little ability to counteract the downturn with conventional monetary policy.

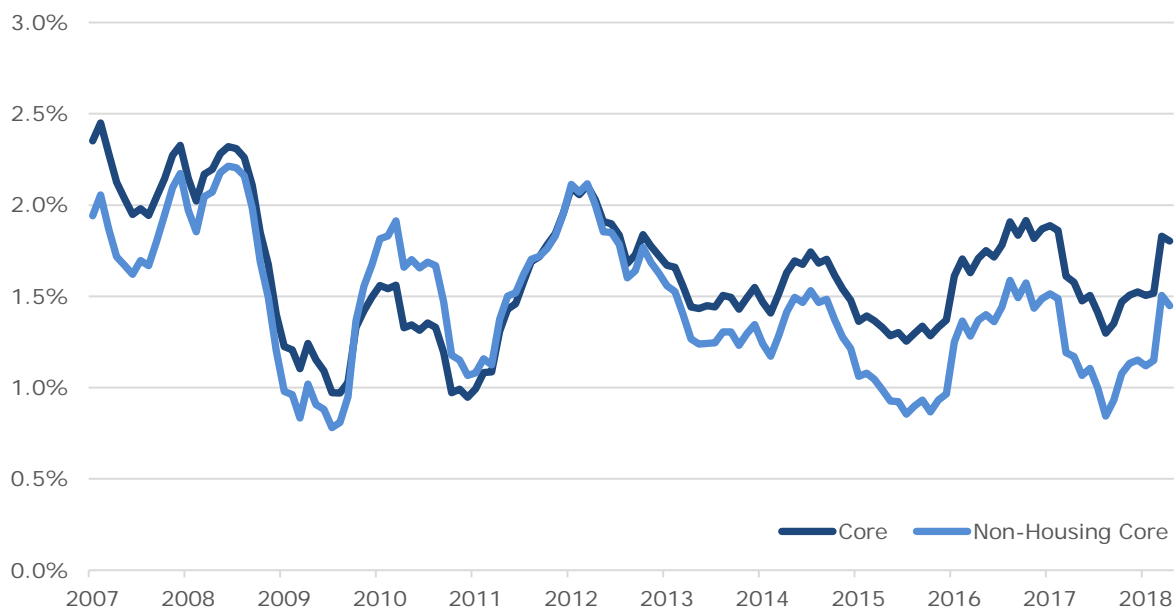
With a 10-year Treasury bill rate near 3.0 percent, the real rate from this reference point is close to 2.0 percent for the non-core sectors of the economy, excluding shelter. Using the federal funds rate as a reference point, the real interest rate would be 0.6 percent. While the Fed may consider this acceptable given current economic conditions, inflation in the non-shelter core is sure to fall when the next recession hits. If it falls from its current level, then it is likely to be very close to zero after a downturn. This is apt to render traditional monetary policy useless, as the real interest rate will still be near zero even if the federal funds rate goes to zero.

There is a similar, although not identical, consequence if the PCE deflator is used as the basis for measurement. As noted above, the shelter components have a smaller weight in the PCE than in the CPI. As a result, the difference between the inflation rate shown in the core PCE deflator and the inflation rate in a core PCE that excludes the shelter components is somewhat less than with the CPI. In recent months, it has been close to 0.4 percentage points, as opposed to the 0.7 percentage point gap seen in the CPI. Nonetheless, the basic story is the same.

**Figure 2** shows the inflation rate over the prior 12 months for the core PCE deflator and a core PCE deflator that excludes shelter.



**FIGURE 2**  
**Core Inflation and Core Excluding Housing (Prior 12 Months)**



Source and notes: Bureau of Economic Analysis (2018).

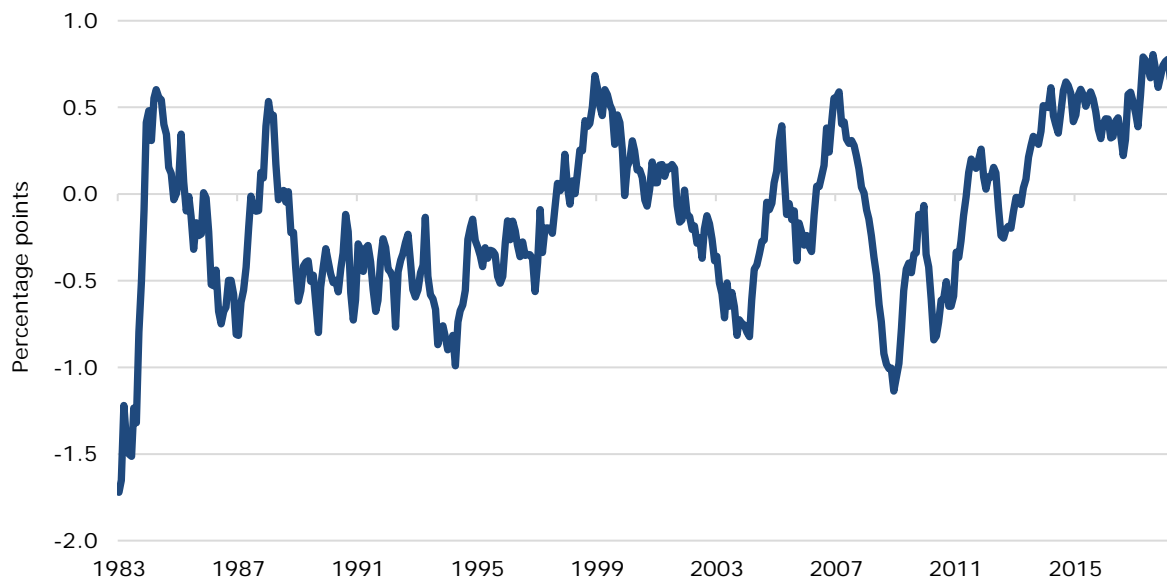
As can be seen again, there is no story of accelerating inflation in the core index that excludes shelter over the last four years. The year-over-year inflation rate in the non-housing core index in April of 2014 was 1.5 percent. It then fell to less than 0.9 percent in the summer of 2015 before rising back to a peak of 1.6 percent in the summer of 2016. This measure of inflation fell again to less than 0.9 percent in the summer of 2017. Since then, it has inched upward, standing at 1.4 percent as of April 2018. This is not a story of inflation accelerating as the labor market has moved towards and below standard estimates of the NAIRU.

While the rate of inflation shown in the non-shelter core PCE deflator is somewhat closer to the Fed's 2.0 percent target than with the CPI, it is important to remember that the target is an average. This means that just before a recession, the inflation rate should be somewhat above 2.0 percent since a recession will almost certainly lower the inflation rate. For this reason, to be consistent with its target, the Fed should be looking for a somewhat higher rate of inflation by this measure before it begins tightening too aggressively.

# The Development of the Gap between the Core Inflation Index and the Non-Shelter Core

The development of a large gap between the core measures of inflation and a core that excludes shelter is a relatively new phenomenon. In general, the rate of inflation in shelter costs has not sharply diverged from the other components of the core indices. **Figure 3** shows the gap between the rate of inflation shown in the prior 12 months in the core CPI and the rate of inflation in a core that excludes housing in the 35 years since the CPI began using its rental equivalence measure for owner-occupied housing.

**FIGURE 3**  
Core Inflation Minus Core Inflation Excluding Housing



Source and notes: Bureau of Labor Statistics (2018a).

As can be seen, while there are past periods in which the rate of inflation in the overall core has exceeded the rate of inflation in the core excluding shelter, this has not been a consistent pattern. There also have been substantial periods in which the opposite was the case. Furthermore, in none of the prior periods has this divergence been so large and long-lasting.<sup>4</sup>

<sup>4</sup> There have been some changes in methodology that have not been applied retroactively to the shelter index in the CPI which could affect this picture somewhat. Prior to 1989, BLS did not factor in depreciation in its measure of rent. This meant that the reported rent understated the rate of rental inflation shown by the current methodology by roughly 0.3 percentage points annually (Bureau of Labor Statistics 1988). On the other side, an incorrect aggregation formula caused the owners' equivalent rent index to overstate the inflation rate using current methodology by roughly 0.5 percentage points annually, until it was changed in January of 1995 (Bureau of Labor Statistics 1995).

There was a short period of divergence that began at the end of 1983, but by early 1985 the overall core measure actually exceeded the non-shelter core. There was a very short period in the late 1980s when the core index exceeded the non-shelter core, but this was followed by almost a decade in which the non-shelter core index showed a higher rate of inflation. The most persistent gap previously occurred in the years from late 1997 to late 2001, although there was only a brief period in 1999 when the gap was anywhere close to its current size. For most of this four-year period the difference between the two indices was less than half as large as it has been for the last five years.

This point is important since it implies that the pattern of shelter costs with respect to the overall inflation rate in recent years is not consistent with past patterns. In prior decades, it would have made little difference if the Fed had looked to a core measure of inflation that excluded shelter or the core measure that it actually uses. In general, the difference between the inflation rates of the two indices was inconsequential. That is not presently the case.

## **Implications of the Gap between the Core Inflation Rate and the Non-Shelter Core**

The most important implication of the large gap between the core inflation and a core that excludes shelter is that there is no evidence of accelerating inflation in the non-shelter core and the rate remains well below the Fed's 2.0 percent target. This suggests that the Fed needs be much less concerned about inflation rising to levels it views as unacceptable.

Furthermore, as was noted earlier, insofar as inflationary pressures stem from shelter costs, higher interest rates are not likely to be an effective remedy. While higher rates can eventually exert downward pressure on shelter costs by reducing demand, their most important immediate effect is likely to be a reduction in the construction of new housing units. The resulting reduction in supply would be expected to lead to higher housing costs. Given the very limited inflation outside of the shelter sector, higher interest rates could actually boost, rather than dampen, inflation.

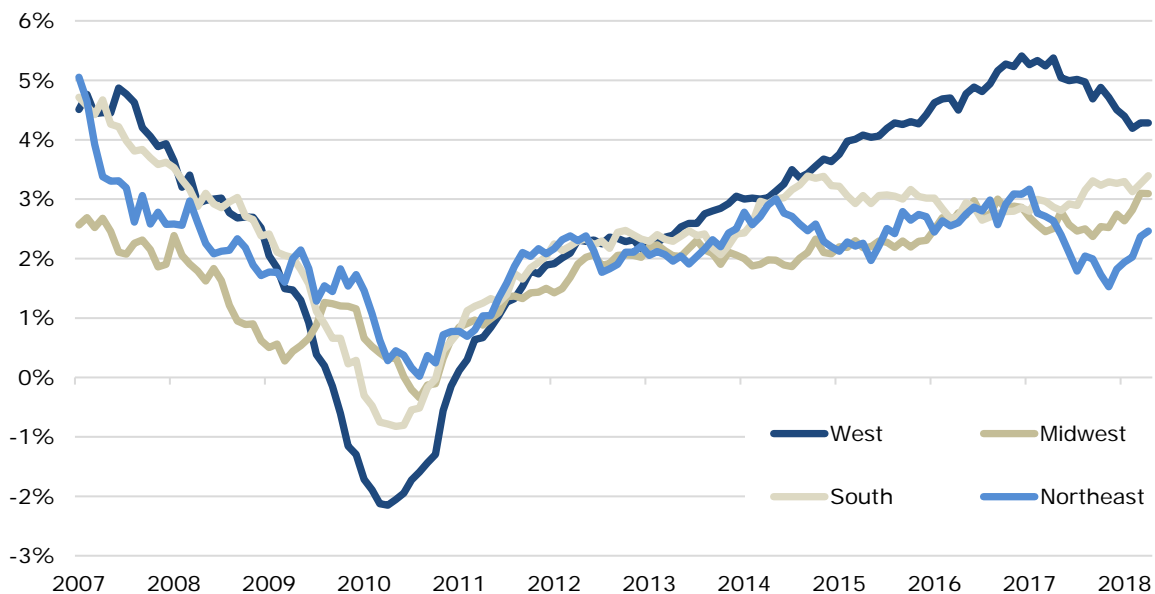
The fact that inflation in the non-shelter core index is substantially lower than the core index means that real interest faced by businesses in most sectors of the economy is actually higher than is generally recognized. With a gap that is now near 0.7 percentage points as measured by the CPI, most sectors of the economy are seeing a real interest rate that is considerably higher than the core inflation rate

implies. With the price of goods and services in most areas rising at a rate of just over 1.0 percent annually, the nominal interest rates in the market translate into higher real interest rates than is generally recognized.

A second point that follows from the large divergence between shelter costs and the overall CPI is that there are large differences in the inflation rate experienced in different areas of the country. While metropolitan areas with relatively plentiful housing, like Philadelphia and St. Louis, are seeing inflation rates well under 2.0 percent, cities with tight housing markets, like Los Angeles and Portland are seeing inflation rates close to 4.0 percent. This means that wage growth following the national average would imply respectable real wage gains in many areas, while it would not be keeping pace with inflation in the areas with very strong housing markets.

This is captured by the regional differences in housing inflation as shown in **Figure 4**.

**FIGURE 4**  
Consumer Price Index Inflation in Shelter, by Region



Source and notes: Bureau of Labor Statistics (2018a).

Shelter costs have outpaced the core CPI in every region, but the gap is far more pronounced in the West. The year-over-year inflation rate in shelter in the West had been over 5.0 percent in 2017, although it has recently fallen back to 4.3 percent. The inflation rate for shelter in the South has hovered near 3.0 percent for most of the last four years. There has been some pickup in the inflation rate for shelter in Midwest, rising from just under 2.0 percent in 2014 to slightly over 3.0 percent in

April of 2018. By contrast, inflation in shelter has slowed slightly in the Northeast, from a peak of 3.2 percent at the start of 2017 to 2.4 percent in the April data.

A third point is that the relatively rapid rise in shelter prices is creating a growing split between current homeowners and renters. For those who already own a home, a rise in the index for owners' equivalent rent implies a higher opportunity cost for living in a home they own. This means they are effectively foregoing more income by living in their homes rather than renting it out. This is a cost, but they have an offsetting asset in the form of a more highly valued house.<sup>5</sup>

For this reason, it is difficult to see how a person who owns the home she lives in can be harmed by an increase in owners' equivalent rent. For these people, the rate of inflation they see is the CPI excluding the shelter component, since they will have no need to be paying for their shelter beyond the payments needed to pay off a mortgage and maintain their house.

By contrast, a non-homeowner will be seeing something like the inflation rate shown by the CPI. As rent increases faster than the overall CPI, it will be necessary for these households to commit a larger share of their income to rent. The current gap of 0.7 percentage points between the core inflation rate in the CPI and the non-shelter rate corresponds to the difference in the underlying inflation rate seen by renters and homeowners. (The overall rate reflects the actual inflation they are seeing, but the assumption is that the deviations between energy and food prices and core do not persist.)

## Conclusion

Over the last five years, there has been a large and persistent difference between the standard core measures of the inflation rate and measures that exclude shelter. This is due to the fact that shelter costs have risen substantially more rapidly than the overall CPI over this period. The rapid pace of increase in shelter costs is not due to rising construction costs, but rather due to restrictive zoning practices in a limited number of highly desirable metropolitan areas that have limited the supply of housing.

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5 The relationship between movements in sales price and rents is not one-to-one, but they generally go in the same direction. An exception was during the housing bubble in the last decade. While sales prices hugely outpaced the overall rate of inflation, there was little change in real rents.

If shelter costs are removed from core measures of inflation there is zero evidence of any acceleration in the inflation rate during this period. Furthermore, inflation remains well below the Fed's targeted rate of 2.0 percent. Since this figure is an average, this measure suggests that the Fed should be prepared to allow the labor market to get considerably tighter with the expectation that more rapidly rising wages will eventually lead to inflation rates that are consistent with its target.

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