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The divergence between core and headline inflation: Implications for consumers' inflation expectations ☆

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ABSTRACT

We show that US consumer inflation expectations are formed using a variant of adaptive expectations proposed by Mankiw et al. (2004). In particular, expectations behave differently when food and energy prices rise sharply relative to other prices. Using the recently proposed test of Homm and Breitung (2012), we analyze the 1982–2010 period and identify seven periods where the headline price index of personal consumption expenditures (PCEs) move explosively relative to the core PCE. During explosive periods, consumers rely more on past inflation in forming inflation expectations as compared to non-explosive periods. The importance of considering explosive periods in forming inflation expectations is also observed when CPI measures are considered. Finally, we find that during volatile periods inflation expectations are formed similarly as in normal periods. Our results indicate that the explosive behavior of food and energy prices should be taken into consideration when designing policies that aim to anchor inflation expectations.

1. Introduction

Many central bankers focus on measures of core inflation which exclude certain items that face volatile price movements, notably food and energy.[1] Our work is motivated by the recent and important debate over the appropriateness of using core or headline measures of inflation expectations in conducting monetary policy, as discussed by Thornton (2007), Bodenstein et al. (2008), Thornton (2011), and Bullard (2011). This debate has recently been revived as food and energy prices have gone through several periods where they sharply increased relative to the prices of other goods, specifically those used in headline price indices. Fig. 1 highlights this fact by plotting the PCE index deflated by the core PCE index. As we can see, differences between the headline and core price measures have been observed repeatedly over several decades and are not just a transitory phenomenon.

This divergence in price indices may create some difficulty when trying to anchor consumer inflation expectations. Consumers confront individual prices rather than price indices, and might interpret large changes in energy or food items as signals of emerging inflation, changing their expectations about its future path.[2] Bullard (2011) has argued that relative

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[1] The Federal Reserve, for instance, closely monitors the rate of growth of the core personal consumption expenditure (PCE) deflator. Since February 2000 in the Monetary Policy Report to the Congress, the Federal Reserve Board reports the projections of Federal Open Market Committee participants regarding core PCE inflation, rather than headline inflation which include food and energy prices.

[2] Within this spirit, Trehan (2011) argues that households are more sensitive to changes in commodity prices and tend to respond by revising their inflation expectations by more than historical relationships warrant.

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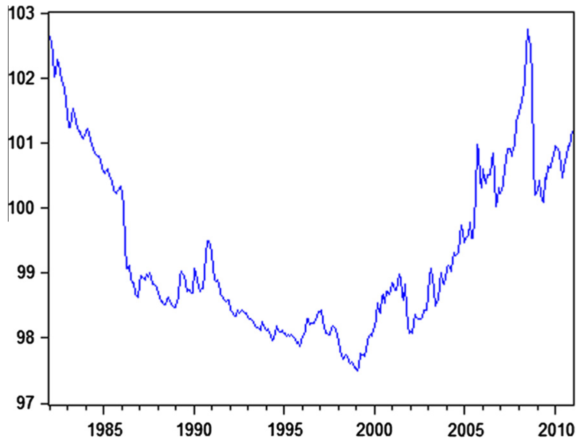

Fig. 1. Headline PCE (deflated by core PCE) from January 1982 to December 2010.

price movements can have an important impact on the public's inflation expectations. Commodities such as oil and food are particularly important in this case. Consumers frequently observe food prices. Moreover, oil prices impact the production and distribution costs of a broad range of different goods and services, affecting many other prices. Thus it is plausible that a sharp or prolonged divergence of food and energy prices from other prices in the economy may pose some challenges when trying to anchor inflation expectations. Bernanke et al. (2007) has argued that when inflation expectations become unanchored the stance of monetary policy may not be as effective.

However, quantifying the divergences between energy and food prices relative to the prices of other goods and how these differences can lead consumers to change their inflation expectations is difficult. In this paper we assess if and how consumer inflation expectations change when food and energy prices deviate sharply or evaporate rapidly from other prices in the economy. In particular, we explore a variant of the inflation expectation framework proposed by Mankiw et al. (2004) by including information regarding sharp deviations between core and headline price measures and rapid evaporation in relative price measures. We define a *sharp deviation* as a period of explosive deviation[3] between core and headline price measures. To identify the periods, where headline PCE has deviated from core PCE in an explosive manner we use the recently proposed CUSUM real-time monitoring strategy of Homm and Breitung (2012).[4] This strategy utilizes only past information and can serve as a real-time warning device. Finally, we refer to *rapid evaporation* as periods that are in the volatile regime classified by the Markov-switching model of Hamilton (1989).

For the period 1982–2010, we find seven episodes where the headline measure of PCE deviates from core PCE in an explosive manner. Hypothesis tests reject the adaptive expectation of Mankiw et al. (2004) framework and suggest that consumers use an alternative specification, where they use macroeconomic information and information regarding -explosive behavior when forming their inflation expectations. The relative importance of past inflation as well as past and current macroeconomic information changes during these explosive periods. Namely, consumers pay more attention to past inflation when observing an explosive deviation between headline and core PCE. This indicates that sharp deviations in relative prices may be important in determining how inflation expectations evolve. In contrast, we are unable to reject the adaptive expectations hypothesis when volatile periods are explicitly considered. This suggests that consumers rely purely on past inflation in forming inflation expectations and do not change once *rapid evaporation* in headline PCE are observed. Our results indicate that the explosive behavior of food and energy prices should be taken into consideration when evaluating policies that rely on consumer inflation expectations, particularly monetary policy.

2. Statistical properties

2.1. Data

The data series for this paper are taken from the Federal Reserve Bank of St. Louis's Federal Reserve Economic Data (FRED) for the period 1982–2010. The PCE headline measure (PCEPI) is seasonally adjusted and at a monthly frequency, and comes from the GDP and components section of FRED. The PCE core measure (PCEPILFE) is also seasonally adjusted and obtained monthly from the same section of FRED, and excludes food and energy. The headline PCE numbers are deflated by core PCE,

[3] Throughout the paper we refer to *explosiveness* as the statistical property of a time series whose characteristic equation has a root inside the unit circle.

[4] Another popular approach for monitoring explosiveness is the recursive right tailed unit root test of Phillips et al. (2011c) and Phillips et al. (2011b).