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Output gains from accelerating core inflation

Sandeep Mazumder

Department of Economics, Wake Forest University, Box 7505 - Winston Salem, NC 27109, United States

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ABSTRACT

Previous research finds that the analysis of sacrifice ratios–namely, identifying disinflation episodes, calculating the sacrifice ratio, and looking at its determinants–changes substantially when one moves from headline to core inflation. This paper examines whether similar findings are obtained when examining benefice ratios, and we find arguably even greater differences. Specifically, we see that headline inflation identifies far more inflationary episodes since the 1990s than core inflation does. Furthermore, Jordan's (1997) argument that the speed of inflation is a negative and significant determinant of benefice ratios does not hold when we move from headline to core inflation, both within the U.S. and also across the OECD. We also find strong evidence that the initial level of GDP at the onset of an inflationary episode matters. In particular, output gains from accelerating inflation appear only to be beneficial for OECD countries that start with a low level of GDP. Conversely, countries that start with a high level of GDP should not pursue additional output gains from allowing a rise in inflation.

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1. Introduction

For many years macroeconomists have dedicated a significant amount of time to measuring the sacrifice ratio, which measures the amount of real GDP that is foregone in order to reduce trend inflation by one percentage point. The seminal work of Ball (1994) first proposed an episodic way in which to identify disinflation episodes and thereafter to compute the sacrifice ratio. Ball's paper spawned an entire literature that estimates the sacrifice ratio and then seeks to examine the determinants of the sacrifice ratio. While many potential determinants of the sacrifice ratio have been touted, overwhelmingly the literature finds the most robust determinant to be the speed of disinflation, where faster "cold-turkey" disinflations are less costly.

Recent work by Mazumder (2014) questions whether the measure of prices that is used to both identify disinflation episodes and measure the sacrifice ratio matters. To answer this question, Mazumder switches from the consumer price index (CPI)–which is used in almost all of the papers in the literature–to a measure of core inflation, namely the CPI less food and energy prices (XFE). Arguably this is an important change to make given the weight that is assigned by both academic macroeconomists and monetary policymakers to core inflation. By making this one simple change, Mazumder finds several large differences emerge, such as in the timing of disinflation episodes. But most notably, the argument in favor of cold-turkey disinflation disappears. In this paper we consider what happens if one uses core inflation to identify inflationary episodes instead of disinflationary ones. This involves computing the benefice ratio–the amount of real GDP that is gained by allowing a rise in trend inflation by one percentage point.

E-mail address: mazumds@wfu.edu

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This is a particularly relevant topic to investigate given the low inflation environments we have observed across almost all advanced economies in the several years following the Great Recession, not to mention that central bankers all over the world often favor using core inflation when assessing the current rate of inflation. For example, in his semiannual report to Congress, Bernanke (2007) stated that "because monetary policy works with a lag, however, policymakers must focus on the economic outlook. Food and energy prices tend to be quite volatile, so that, looking forward, core inflation (which excludes food and energy prices) may be a better gauge than overall inflation of underlying inflation trends". Likewise, the European Central Bank (ECB) President highlighted the importance of core inflation as it pertains to the ECB achieving their inflation objective: "The ECB's objective is headline inflation... But core inflation has to be taken into account because it is more closely linked to medium-term inflation trends" (Draghi, 2015).

Arguably even greater differences emerge with the benefice ratio when switching from headline to core inflation than what Mazumder (2014) finds. In particular, Jordan's (1997) argument that the speed of inflation is a negative and significant determinant of benefice ratios does not hold when using alternative U.S. measures of core inflation. Furthermore, we examine what happens when switching from CPI to XFE prices for the OECD and find the speed of inflation–in particular, the length of the inflationary episode–is significant with headline inflation, but not when we switch to core inflation. We also examine whether the level of GDP that a country begins with is important, and find strong evidence of its statistical significance. Specifically, the output gains from accelerating inflation appear to be only beneficial if a country begins with a low level of GDP. Therefore countries that start with a high level of GDP should seek to avoid pursuing additional output gains from allowing some inflation.

The rest of the paper is organized as follows: Section 2 briefly discusses some of the major papers in the sacrifice and benefice ratio literature, while Section 3 examines U.S. benefice ratios that are based on alternative measures of core inflation. Section 4 investigates OECD benefice ratios, and we conclude in Section 5.

2. Background

2.1. Measurement of sacrifice ratios

The seminal work of Ball (1994) was the first to identify disinflation episodes and measure the sacrifice ratio in an episodic manner. The first step in the Ball method is to define trend inflation as a centered 9-quarter moving average of actual CPI inflation. Inflation peaks and troughs are then identified, where a peak is a quarter where trend inflation is higher than the previous and following 4 quarters.[1] Similarly, an inflation trough is one where trend inflation is lower in a given quarter, compared to the previous and subsequent 4 quarters. We then identify a disinflation episode as one that begins with an inflation peak and ends at a trough, with the additional condition that inflation has fallen by at least 2%.[2] Thereafter Ball assumes that output starts at trend at the inflation peak, and then return to trend 4 quarters after the end of an episode, which allows for some persistent effects on output. Ball finally assumes that trend output grows log-linearly from the peak to 4 quarters after the trough. The sacrifice ratio is then the sum of deviations between the fitted line for trend output and the log of actual output, divided by the change in trend inflation over the course of the episode.

Since the work of Ball (1994), two new techniques have emerged in the literature with regards to measuring the sacrifice ratio. Essentially both argue that the way trend output is computed by Ball does not adequately capture the path of potential output. First, Zhang (2005) allows for greater persistent effects on output by calculating the HP filter of log real GDP for the entire sample period and then computing the growth rate of the HP filter. Then, Zhang assumes potential output grows at the growth rate of the HP filter from the inflation peak to 4 quarters after the inflation trough. Zhang's method tends to raise estimates of the sacrifice ratio, since it captures greater losses in potential output than that which is captured by the Ball technique. Second, Hofstetter (2008) implements the same methodology as Zhang (2005), but instead argues that output losses due to disinflation policy have already begun at the inflation peak. To account for this, Hofstetter assumes that output is at trend 4 quarters before the inflation peak, and then grows according to the growth rate of the HP filter until the end of the episode. This technique generally leads to sacrifice ratios that are even slightly larger than that of Zhang's technique, since it incorporates output losses that have already begun prior to the disinflationary episode. Both the Zhang and Hofstetter methods are important modifications to the Ball technique, whereby they specifically allow for greater persistent effects on output. In other words, the disinflationary impact on GDP is not only felt during the episode itself, and to truly measure the amount of potential output that is lost, we need to project the growth rate of output that existed prior to the onset of disinflation.

[1] Note that Ball only considers cases where trend inflation stays at less than 20% since 1960.

[2] For this paper we follow Mazumder (2014) by changing this threshold to 1.5%, since core inflation typically displays much less volatility than headline inflation. It turns out that all inflationary episodes in the U.S. involve a change in trend inflation of 2% or more, so this is a non-binding change. Later on, when we examine OECD data, the 1.5% threshold enables us to expand our sample size, which we apply equally to headline and core inflation so that we are fairly comparing both series.

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