



What measure of inflation should a developing country central bank target?



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ARTICLE INFO

Article history:

Received 4 December 2012

Received in revised form

17 June 2015

Accepted 19 June 2015

Available online 2 July 2015

Keywords:

Inflation targeting

Monetary policy framework

Core inflation

Headline inflation

Financial frictions

ABSTRACT

In closed or open economy models with complete markets, targeting core inflation enables monetary policy to maximize welfare by replicating the flexible price equilibrium. We analyze this result in the context of developing economies, where a large proportion of households are credit constrained and the share of food expenditures in total consumption expenditures is high. We develop an open economy model with incomplete financial markets to show that headline inflation targeting improves welfare outcomes. We also compute the optimal price index, which includes a positive weight on food prices but, unlike headline inflation, assigns zero weight to import prices.

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1. Introduction

Most central banks view low and stable inflation as a primary, if not dominant, objective of monetary policy. In the existing literature, the choice of price index to target has been guided by the idea that inflation is a monetary phenomenon. Core inflation (excluding food, energy, and other volatile components from headline CPI) has been viewed as the most appropriate measure of inflation since fluctuations in food and energy prices represent supply shocks and are non-monetary in nature (Wynne, 2008). Moreover, since these shocks are transitory, highly volatile, and do not reflect changes in the underlying rate of inflation, they should not be a part of the targeted price index (Mishkin, 2007, 2008).

Previous authors have used models with price and/or wage stickiness to show that targeting core inflation maximizes welfare. Existing models have looked at complete market settings where price stickiness is the only distortion (besides monopoly power). Infrequent price adjustments cause mark-ups to fluctuate and also distort relative prices. In order to restore the flexible price equilibrium, central banks should try to minimize these fluctuations by targeting sticky prices (Goodfriend and King, 1997, 2001).

Using a New Keynesian model, Aoki (2001) demonstrates that targeting inflation in the sticky price sector leads to macroeconomic stability and welfare maximization. Targeting core inflation is equivalent to stabilizing the aggregate output gap as output and inflation move in the same direction under complete markets. Benigno (2004) argues that in a common currency area the central bank should target an index that gives higher weight to inflation in regions with a higher degree of

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nominal rigidity, effectively ignoring exchange rate and commodity price fluctuations. In a more general multi-sector setting, [Mankiw and Reis \(2003\)](#) show that, in order to improve the stability of economic activity, the targeted “stability” price index should put more weight on sectors that have sluggish price adjustment, are more procyclical, and have a smaller weight in the consumer price index.

The results from the prior literature generally rely on the assumption that markets are complete (allowing households to fully insure against idiosyncratic risks). The central bank then only needs to tackle the distortions created by price stickiness. However, in developing economies, a substantial fraction of agents are unable to smooth their consumption in a manner consistent with the permanent income hypothesis. Moreover, developing economies have other structural differences from advanced economies, including the relatively high share of food in household consumption expenditures.

In this paper, we provide an analytical framework for determining the optimal price index for developing economy central banks to target. The paper makes three main contributions. First, it generalizes the results of [Aoki \(2001\)](#) and [Benigno \(2004\)](#) by developing a model that encompasses their frameworks. Second, it shows that incomplete financial markets and other characteristics of developing economies substantially alter the key results. Third, it derives optimal price indexes and compare them with feasible rules such as headline inflation targeting that also improve welfare relative to core inflation targeting but are easier for central banks to communicate and implement.

Our model has three sectors to make it more representative of the structures of developing economies. First, the food (or informal) sector, which comprises a large fraction of the economy and where prices are flexible. Workers in this sector live hand-to-mouth, i.e., they have no access to credit markets and simply consume their current labor income. Second, the sticky price (or formal) sector that is subject to productivity and mark-up shocks, and where workers do have access to credit markets. Third, a sector that is open to foreign trade and where prices are flexible but also highly volatile. This sector, which proxies for the commodity-producing sector, faces large external shocks.

Financial frictions that result in consumers being credit constrained have not received much attention in models of inflation targeting. When markets are not complete and agents differ in their ability to smooth consumption, their welfare depends on the nature of idiosyncratic shocks. Thus, this model also allows us to analyze the welfare distribution under alternative inflation targeting rules. Under incomplete markets, household income, which is influenced by the nature of shocks and the price elasticity of the demand for goods, matters for consumption choices. For instance, a negative productivity shock to a good with a low price elasticity of demand could increase the income of net sellers of that good and raise the expenditure of net buyers of that good.

Our model incorporates other important features relevant to developing economies. In these countries, expenditure on food constitutes 40–50 percent of household expenditures, compared to 10–15 percent in advanced economies. Low price and income elasticities of food expenditures as well as low income levels make the welfare of agents in developing economies more sensitive to fluctuations in food prices. These features imply that agents factor in food price inflation while bargaining over wages, thus affecting broader inflation expectations ([Walsh, 2011](#)). Thus, in developing economies even inflation expectation targeting central banks must take into account food price inflation.

Our key result is that in the presence of financial frictions targeting headline CPI inflation improves aggregate welfare relative to targeting core inflation (i.e., inflation in the sticky price sector). Lack of access to financial markets makes the demand of credit-constrained consumers insensitive to interest rates. These consumers' demand depends only on real wages, establishing a link between aggregate demand and real wages. Thus, the relative price of the good produced in the flexible price sector not only affects aggregate supply but, through its effects on real wages, also influences aggregate demand.

Our model allows us to compute optimal price indexes that maximize welfare. The optimal price index also includes a positive weight on food prices but, unlike headline inflation, generally assigns zero weight to import prices. This is because agents in that sector have access to financial markets and, unlike in the case of food, the price elasticity of the demand for goods produced in this sector is high.

These results differ from those of the prior literature based on complete markets settings. For instance, in [Aoki's \(2001\)](#) model, relative prices of the flexible price sector only appear as a shift parameter of inflation in the sticky price sector. Under incomplete markets, by contrast, the central bank has to respond to price fluctuations in the flexible price sector in order to manage aggregate demand. Financial frictions break the comovement of inflation and output, implying that stabilizing core inflation no longer stabilizes the output gap. Thus, in the presence of financial frictions, targeting a broader measure of inflation improves welfare.

In related work, [Catão and Chang \(2010\)](#) show that, for a small open economy that is a net buyer of food, the high volatility of world food prices causes headline CPI inflation targeting to dominate core CPI inflation targeting. Adding this feature would strengthen our results but make our model less general since few developing economies import a large share of their food consumption. [Frankel \(2008\)](#) argues that a small commodity-exporting economy should target the export price index in order to accommodate terms of trade shocks. Our results suggest that ignoring sectors with nominal rigidities and targeting this set of flexible prices, which has a small weight in the domestic CPI, would reduce welfare.

The paper is organized as follows. The next section contains some empirical facts to further motivate the structure of the model and its relevance to developing economies. [Section 3](#) outlines the main features of the model and contrasts them with the prior literature. [Section 4](#) presents the main results and [Section 5](#) contains various sensitivity experiments to check the robustness of the baseline results and also presents some extensions of the basic model. [Section 6](#) concludes the paper.

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