Inflation targeting - Domestic inflation versus CPI inflation

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Introduction

Movements in the exchange rate can have one-off or temporary consequences for inflation through changes in the price of imported consumption goods. For small open economies, such as New Zealand's, a significant portion of total consumption comes from imports. Hence, the exchange rate presents a significant additional channel for inflation to be affected.

How should monetary policy deal with the so-called 'direct' exchange rate pass-through, given that the impact on CPI inflation typically occurs relatively quickly, but the impact of a monetary policy response occurs much more slowly? For example, were the exchange rate to depreciate suddenly today, CPI inflation may rise in the very near-term. If, in response, interest rates were raised, the impact of tighter monetary policy would not be felt until some time after the initial inflationary impulse, by which time that impulse may have dissipated, making the initial monetary policy response unnecessary or undesirable. One suggested approach is for monetary policy to target a measure of 'domestic' inflation that excludes the direct exchange rate effects on inflation.

This paper provides an overview of the economic research on the topic of targeting CPI inflation versus domestic inflation.

Overview

In a small open economy is it better for the central bank to target a measure of domestic inflation (which excludes the direct effects of exchange rate movements on domestic prices) or CPI inflation (which encompasses the price movements of imported goods and services)? Movements in the exchange rate can have short-lived effects on CPI inflation. Domestic inflation, on the other hand, can be thought of as a measure of 'core' or persistent inflationary pressures by excluding the temporary effects of exchange rate movements.

Research at the Bank shows that trying to stabilise CPI inflation may result in higher volatility in output, interest rates and the exchange rate than targeting a measure of domestic inflation. The reason for this is that by targeting CPI inflation, monetary policy often responds to offset the inflationary effects arising from the direct exchange rate pass-through. As a result, monetary policy becomes more responsive to short-term fluctuations in inflation, leading to higher variability in interest rates, the exchange rate and output. Hence, the Bank's research suggested that targeting domestic inflation may achieve better macroeconomic outcomes (lower interest rate, exchange rate and output variability, but higher CPI inflation variability) by 'looking though' the direct exchange rate effects.

In the economics literature, there is no clear consensus on whether it is better for small open economies to target domestic inflation or CPI inflation. Earlier studies tended to suggest that targeting domestic inflation is superior to targeting CPI inflation. More recent studies, on the other hand, have tended to suggest the opposite. One of the main assumptions in these studies is the speed of transmission from movements in the exchange rate into inflation. In the earlier studies, the typical assumption was that the direct pass-through happened very quickly. This meant that exchange rate movements had only temporary effects on inflation.

There is little empirical evidence to support the notion of very quick direct exchange rate pass-through[1] and, as a result, the more recent studies have assumed only gradual adjustment of import prices to exchange rate fluctuations. With this assumption, exchange rate movements tend to have more gradual and persistent effects on inflation. Some studies have also modelled imports as an intermediate good

[1] On the issue of incomplete, or gradual pass-through, Smets and Wouters (2001) cite Campa and Goldberg (2001), *"Exchange rate pass-through into import prices: a macro and micro phenomenon"* mimeo, IESE Business School and Federal Reserve Bank of New York.

used as an input into domestic production. Under this approach, exchange rate movements and import prices can influence inflation indirectly through firms' costs of production. Under these different assumptions, the research suggests that monetary policy should target CPI inflation.

Despite the apparent differing views from the literature, the common element that can be taken from the discussion is that monetary policy should focus on the measure of inflation that matters for the behaviour of individuals and firms. If exchange rate movements have only short-lived effects on inflation, then looking through these effects would be appropriate. If, on the other hand, exchange rate movements result in persistent effects on inflation, then responding to them makes sense. This result is consistent with the Bank's research, which suggests that looking though the direct exchange rate effects may result in better macroeconomic outcomes.

The discussion here can be generalised beyond exchange rate movements to include other factors that may cause short-term fluctuations in inflation, such as movements in oil prices. It has long been considered good practice for monetary policy to look though short-lived fluctuations in the price level, provided that higher inflation in the short-term does not spill over into generalised inflation expectations.

Furthermore, while there is often a clear distinction between domestic inflation and CPI inflation in the academic studies, in practice, it is hard to identify a readily published measure of domestic inflation. One option is to use a GDP deflator, but this has some disadvantages, including that it is not as well known by the public and also has methodological and timeliness difficulties. Similarly, there is no other non-CPI published index which appears to provide a more stable indication of the level of inflation in the economy. Creating a new index of core or domestic inflation does not provide a complete solution as it would be difficult to exclude all possible supply shocks from any automatically calculated measure. The CPI index appears to be the most obvious choice, for the time being at least.

However, the key aspect to the Bank's approach is that it focuses on *medium-term* CPI inflation. The medium term focus provides the Bank with the ability to look through short-term fluctuations in CPI inflation, should it be warranted, and focus instead on responding to underlying or persistent inflationary pressures. To that end, the Bank's interpretation of the 1999 Policy Targets Agreement is entirely consistent with the results from the economic research.

Academic research: How should small open economies deal with exchange rate movements?

For small open economies, the exchange rate presents an additional channel for inflation to be affected. So what does the research have to say about the conduct for monetary policy?

Our research

The Bank has published research on this issue (Conway, Drew, Hunt and Scott (1999)). The conclusion was that *"…targeting a measure of domestic inflation, which does not include the direct effects of exchange rate movements on the price of imported goods, results in lower variability in real output, nominal interest rates, the exchange rate and domestic price inflation."* When the central bank targets CPI inflation, it attempts to offset the direct effects of exchange rate movements, which are largely temporary in nature.[2] When the exchange rate depreciates, the direct pass-through causes CPI inflation to rise over the very short-term. In response, monetary policy raises interest rates, which causes the exchange rate to appreciate, and a fall in CPI inflation. Monetary policy then has to contend with the indirect exchange rate impact via the exchange rate's effect on net exports and the output gap. In contrast, when the central bank targets domestic inflation, it largely ignores the direct exchange rate impact on the CPI and instead focuses on the indirect effect via the output gap. With monetary policy being less reactive, variability in output, interest rates and the exchange rate are lower.

[2] In our stochastic simulation experiments, shocks to the exchange rate, while they do exhibit some serial correlation, are temporary in nature as the exchange rate reverts back to its equilibrium.

The international economic literature

There is no clear consensus in the economics literature on which inflation measure is superior for the purpose of measuring domestic inflation. Studies by Gali and Monacelli (1999) and Clarida, Gali and Gertler (2001) suggest optimal monetary policy should focus on domestic inflation. On the other hand, more recent studies by Adolfson (2001), McCallum and Nelson (2001), and Smets and Wouters (2001) all discuss optimal monetary policy in terms of CPI inflation. So can we reconcile these apparent differences and draw any common element in the discussion?

New open economy macroeconomics

This section outlines the analytical framework behind the new open economy macroeconomics field. Lane (2001) provides a more thorough outline in his survey paper.[3]

The issue of domestic inflation versus CPI inflation is analysed using the work horse model in new open economy macroeconomics. The framework was introduced by Maurice Obstfeld and Kenneth Rogoff in 1995.[4] Some salient features of these models are:

- they are small dynamic general equilibrium models with well specified micro-foundations;
- they include nominal rigidities (such as downwardly rigid nominal wages) and market imperfections (such as monopolistic competition).

In contrast to perfect competition (where firms are price takers), monopolistic power gives rise to firm-specific pricing decisions which aim to set prices as a mark-up over marginal costs – hence costs will affect inflation. Nominal rigidities, such as wage stickiness or staggered price setting, mean that the aggregate price level adjusts smoothly and gradually over time. In contrast, without such rigidities, prices would instantaneously 'jump' to their new equilibrium level following shocks. Under staggered price setting, where only a fraction of firms can change their prices in each period, firms take into account expectations of future costs in setting their prices today because they realise the price they set will remain effective for a given number of periods before they get the opportunity to reset them in the future.

The presence of nominal rigidities gives rise to potential inefficiencies in the market clearing solution. The objective of the central bank is to 'neutralise' these inefficiencies and achieve the equilibrium that is associated with fully flexible prices. This requires monetary policy to target the measure of inflation that stabilises firms' marginal costs, such that there is no incentive for firms to change prices even if they have the opportunity to do so. By achieving this objective, the central bank minimises the 'distortions' that can arise due to resource misallocation (eg too much consumption of foreign goods, insufficient production of domestic goods, resulting in unsustainable external debt positions).

The choice of targeting domestic inflation or CPI inflation comes down to which measure of inflation affects firms' marginal costs. In studies where there is full and immediate direct exchange rate pass-through, domestic inflation is preferred. Assuming full and immediate direct pass-through means that the law of one price (in effect, purchasing power parity) holds. When this assumption is relaxed and/or the model includes an additional assumption of imports being used as direct inputs into domestic production, the result is that monetary policy should target CPI inflation. Gradual import price adjustment means that exchange rate movements have persistent inflationary effects, which should not be ignored. Using imports as part of domestic production means that import prices enter directly into firms' production costs and affect their pricing decisions accordingly. In contrast, when exchange rate movements do not have persistent inflationary effects or do not affect firms' costs directly, monetary policy considers the impact of exchange rate movements insofar as it affects aggregate demand (via net exports/terms of trade).

Another way to view the issue of domestic versus CPI inflation is that monetary policy should be directed to 'neutralise' the inefficiencies in the economy caused by nominal rigidities. To the extent that wages are sticky, but there is full and immediate exchange rate pass-through, the only source of inefficiency is in the domestic market prices, in which case

[3] In fact, for those that are interested in this area of research, a great resource is the following website: http://www.geocities.com/brian_m_doyle/open.html

[4] "Exchange Rate Dynamics Redux" *Journal of Political Economy*, 103, 624-660.

targeting domestic inflation is optimal. But when import prices are also sticky, there are inefficiencies in markets for both domestic and foreign goods so monetary policy should target prices in both markets – hence, targeting CPI inflation becomes optimal.

Reconciliation of views

Despite the contrasting conclusions, there is a common element that can be drawn from the discussion. No matter what assumptions are made regarding the degree or speed of direct exchange rate pass-through, or whether imports are used in domestic production, it is important that monetary policy focuses on measures of inflation that have greatest relevance for the behaviour of economic agents. If exchange rate movements have only short-lived effects on inflation, then it may be appropriate to focus on a measure of inflation that abstracts from direct exchange rate pass-through. If exchange rate movements have persistent effects on inflation, then responding to CPI inflation makes sense. The key is to distinguish between exchange rate movements or other price shocks that are merely transient, and those that may pose a threat to persistent inflation, and to focus the monetary policy response on the latter.

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