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Monetary policy credibility: A Phillips curve view

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ABSTRACT

The paper investigates the presence of monetary policy credibility in eight countries by filtering the residuals from an "augmented" Phillips curve. Two of the eight countries (US and New Zealand) exhibit robust credibility effects across samples. Two countries (South Africa and the UK) exhibit credibility effects in the sample involving the 1990s, but these effects disappear in the sample beginning in 2000. The rest of the countries do not exhibit monetary policy credibility. Given that seven of the eight countries have adopted an explicit inflation-targeting framework, we conclude that there is very weak evidence that this framework enhances monetary policy credibility. These results are however sensitive to how inflation and the output gap are measured.

1. Introduction

This paper uses a Phillips-curve based method to investigate the extent of central bank credibility in eight countries. Since Kydland and Prescott (1977), credibility has been viewed as an important ingredient in the conduct of monetary policy. According to Blinder, Ehrmann, Fratzscher, De Haan, and Jansen (2008) credibility helps with making disinflation less costly. Credibility also helps the central bank gain public support for its actions. This view is shared by, for example, Bertola and Caballero (1992), Bertola and Svensson (1993) and Demertzis, Marcellino, and Viegi (2008). However, empirical analyses suggest that central banks are not perfectly credible. This may be due to the fact that, as Lohman (1992) argues, in order to optimize monetary policy commitment and retain credibility, central banks must be allowed to exercise flexible policy responses to unforeseen contingencies.

The most relevant place where the theory of credibility is applied is the Phillips curve. Blinder (2000) notes that the so-called credibility hypothesis says that perfectly credible pre-announcements of disinflation will reduce inflation expectations abruptly. Therefore if the central bank is credible relatively low unemployment is required to bring about a drastic fall in the inflation rate. By implication, slight increases in the interest rate must deliver drastic declines in inflation through a downward revision of inflation expectations, thereby shifting the Phillips curve downwards. Ultimately therefore, the test for credibility must involve a test of the extent to which inflation expectations are negatively related to changes in the short-term interest rate.

There are at least two ways in which inflation expectations are extracted. One way relies on surveys as in Berk (1999), Aron and Muellbauer (2007), Ang, Bekaert, and Wei (2007), Arnold and Lemmen (2008) and Henzel (2008), and the other extracts inflation expectations from the bond rate. In the latter case, by combining the Fisher relation and the expectations theory of the term structure, it can be shown that the bond rate contains information about future inflation. Goodfriend (1993) and Mehra (1996) for example, argue that the term structure is useful in predicting movements of future inflation rates for some periods for the US.

In this paper, we investigate the extent to which monetary policy is credible in eight countries: South Korea, South Africa, Mexico, New Zealand, Australia, Canada, the United States and the United Kingdom. The contribution of this paper is that it uses the Phillips curve to extract inflation expectations. The hypothesis that this paper seeks to prove is that, if monetary policy is credible, there will be a negative relationship between inflation expectations and the nominal interest rate, as pointed out by Blinder (2000).

The paper is structured as follows: Section 2 derives the model that extracts inflation expectations from the Phillips curve, and uses the nominal interest rate to test for the presence or absence of monetary policy credibility. Section

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3 provides empirical results of the tests and Section 4 concludes.

2. Monetary policy and inflation expectations

The objective of this paper is to construct a measure of inflation expectations and to use this measure to test for the presence of monetary policy credibility. Our method begins by specifying an all-encompassing empirical expectations-augmented Phillips curve, which includes a measure of demand pressure, import price inflation, the labour share, money supply, fuel and food price inflation. Our Phillips curve formulation is a modified version of the one found in Blinder (2000) in that it adds other determinants of inflation over and above inflation expectations and demand pressure. The Phillips curve takes the following form:

$$\pi_t = \pi_t^e + \beta x_{t-1} + \vartheta \Delta q_{t-1} + \gamma z_{t-1} + \varphi m_{t-1} + \theta \widetilde{\pi}_{t-1}^{fuel} + \psi \widetilde{\pi}_{t-1}^{food} + \varepsilon_t, \quad (1)$$

where π_t is the actual inflation rate, π_t^e is the expected inflation rate, x_t represents demand pressure measured by the output gap, q_t is the log of the price of imports denominated in domestic currency, z_t is the labour share which represents cost push from the labour market, m_t is the deviation of money supply from trend, $\widetilde{\pi}_t^{fuel}$ and $\widetilde{\pi}_t^{food}$ are real fuel price and food price inflation respectively and ε_t represents a disturbance term that is serially uncorrelated. We assume, as noted by Rudebusch (2005), that there are inertial lagged responses of inflation to its determinants due to the prevalence of contracts and menu-costs. The above specification requires some explanation.

The New Keynesian literature, e.g. Gali, Gertler, and López-Salido (2001), Gali, Gertler, and López-Salido (2005), Woodford (2001), Lindé (2005), Sbordone (2005) among others, uses either marginal cost or the output gap but not both. Our justification for including both these variables can be found in Gordon (1998), Bardsen, Jansen, and Nymoen (2004), Asada, Chen, Chiarella, and Flaschel (2006) and Fair (2008). These authors interprete the labour share as a cost-push variable over and above standard measures of excess demand such as the unemployment or output gap. We also include excess money supply as suggested by Ando, Brayton, and Kennickell (1992) and Mohanty and Klau (2004) to capture its impact on the inflation rate. The role of the monetary aggregate in the Phillips curve is discussed by Nelson (2003), Gerlach and Svensson (2003), Ireland (2004) and Woodford (2006). Lastly, real fuel and food price inflation are specified as supply-side shock variables in the triangle model of inflation by Gordon (1998).

The specific way in which inflation expectations are formed is a subject of considerable debate. Two ways of specifying π_t^e flow from the work of New Keynesian economists. One way uses $E_t(\pi_{t+1}|\Omega_t)$, which denotes an expectation at time t of inflation at time $t+1$, based on the information set Ω_t. Another way is to formulate a hybrid specification which assumes that a fraction λ of agents are backward-looking while the other fraction $(1-\lambda)$ is forward-looking. This leads to $\pi_t^e = \lambda\pi_{t-1} + (1-\lambda)E_t(\pi_{t+1}|\Omega_t)$. In GMM estimations of New Keynesian Phillips Curves, the information set is made up of the instrumental variables such as lags of inflation, interest rate, output gap or unit labour cost and commodity prices. However Fair (2008) argues that the use of these lags is not theoretically appropriate. He says: "To use these lags, one has to argue that the equation is part of a larger model in which the lags appear, but this is not very satisfying".

Mavroeidis (2005) further argues that the parameters of the New Keynesian Phillips Curve are weakly identified. He argues that full information methods, rather than single-equation GMM estimations, may be preferable because they are more robust to mis-specification problems. Using the Generalized Empirical Likelihood estimation, Martins and Gabriel (2009) also find weak identification, which casts serious doubts about the validity of the New Keynesian Phillips Curve. The same result is obtained by Bardsen et al. (2004), on the basis of the first-stage regression F-test. Similarly Rudd and Whelan (2005) show that (a) the instruments that are usually used in the GMM estimations of the New Keynesian Phillips Curve imply that the parameters of the second-stage regression will be downward-biased and (b) the reduced-form expression of the second-stage regression features only lagged inflation.

At an empirical level, Bardsen et al. (2004) find that the all-encompassing model that features both labour share and the output gap, and higher lags of inflation, makes the forward-looking component of the hybrid Phillips curve insignificant. Yet, this specification of the Phillips curve passes standard tests of mis-specification in contrast to the NKPC. Boug, Cappelen, and Swensen (2010) also find that the NKPC as formulated by Gali and Gertler (1999) is firmly rejected by the data for both the US and Euro-area. Fair (2008) also shows that the FIML estimation of the NKPC delivers an insignificant forward-looking component. Gordon (2011) and Fair (2008) find that the NKPC fails to outperform traditional specifications. Gordon (2011) in particular argues that the NKPC may be relevant in high inflation episodes whilst the traditional specification with only lagged inflation may be relevant in stable and moderate inflation environments.

However Kozicki and Tinsley (2003), Ireland (2007) and Cogley and Sbordone (2008) find that the observed persistence of inflation may be accounted for by the time-variation of underlying inflation rather than lagged inflation. In this case we may specify π_t^e as $\pi_t^e = \lambda\pi_t^* + (1-\lambda)E_t(\pi_{t+1}|\Omega_t)$, where π_t^* is the time-varying component of trend-inflation. This specification does not feature the backward-looking component because empirically, Cogley and Sbordone (2008) find that the backward-looking component becomes insignificant when time-variation of trend-inflation is taken into account.

Cognisant of this on-going debate, our paper argues that if inflation expectations have a forward-looking element, then such an element must be influenced by the prevailing stance of monetary policy provided there is some level of credibility, as pointed out by Blinder (2000). Therefore the basic assumption that we make is that inflation expectations are time-varying. Note that we can write Eq. (1) as follows:

$$\pi_t = \beta x_{t-1} + \vartheta \Delta q_{t-1} + \gamma z_{t-1} + \varphi m_{t-1} + \theta \widetilde{\pi}_{t-1}^{fuel} + \psi \widetilde{\pi}_{t-1}^{food} + \upsilon_t, \quad (2)$$

where $\upsilon_t = \pi_t^e + \varepsilon_t$. Inflation expectations in the Phillips curve are contained in the term υ_t. We postulate that if monetary policy is credible, then inflation expectations contained in υ_t respond to changes in the short term nominal interest rate. Note that the disturbance term ε_t does not respond to changes in the nominal interest rate. The reason for this is that $E(\pi_t^e \varepsilon_t) = 0$. If both expected inflation and the disturbance term were affected by the nominal interest rate, there would be some correlation between the two arising from the movement in the nominal interest rate.

We expect that υ_t will exhibit some persistence. This persistence can be grounded in the two explanations found in the literature. Firstly, υ_t may be persistent because past inflation may affect current inflation through a combination of expectations formation and overlapping wage and price contracts as noted by Fuhrer and Moore (1995) and Gordon (1998). Secondly, υ_t may be persistent because of the time-variation of trend inflation as noted by Kozicki and Tinsley (2003), Ireland (2007) and Cogley and Sbordone (2008). Our specification does not favour any of