Core inflation and monetary policy: a two-sector DSGE approach

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Abstract

There is a wide consensus among macroeconomists that the aim of monetary policy is to ensure price stability. An increasing number of central banks, including National Bank of Poland (NBP), have adopted direct inflation targeting as their monetary policy strategy. There is a number of questions that need to be addressed while setting the inflation target, including its level, the width of the tolerance band, target horizon, and finally, which prices need to be taken into account. The last question, i.e. the choice of the price index suitable for the monetary policy is the main motivation of the thesis.

The general price level in an economy is most commonly measured by a consumer price index (CPI), often referred to as the headline inflation. Its wide coverage, objective manner of calculation and the advantage of being familiar to the public are the reasons for central banks to choose the CPI as the target measure. However, from the theoretical point of view, the CPI may not be the most suitable target inflation measure, since its basket includes prices that are influenced by seasonal factors, supply shocks and administrative decisions. Such prices cannot be controlled by the central bank and are often excluded from the core inflation measures. Many central banks look at measures of core inflation as an indicator of underlying inflationary pressure in the economy. NBP (1998) in its official strategy states that „the core inflation is a more accurate measure of structural changes in the economy’s price levels. A comparison of CPI and core inflation indexes enables to define the limits of central bank influence on inflationary processes taking place in the economy.”

Another factor influencing the usefulness of a given inflation measure for the purpose of monetary policy implementation is the degree of price stickiness. A number of previous analyses of individual prices have found the differences in the level of price stickiness across the production sectors (Bils and Klenow, 2004; Dhyne et al., 2006). In general, energy and food prices are reported to change much more frequently than those of other goods and services. In
addition, there are also significant differences in inflation persistence across different types of consumer goods (Bilke, 2005; Lünnemann and Mathä, 2004; Hertel and Leszczyńska, 2013).

The aim of the thesis is to use a dynamic stochastic general equilibrium model (DSGE) to explain the differences in price stickiness and inflation persistence and to incorporate both types of heterogeneity within a general equilibrium model. This type of model allows for an analysis of the macroeconomic consequences of heterogeneity in price stickiness and the role of different inflation measures in monetary policy.

The research questions that we aim to answer are the following:
1. Is the price stickiness heterogeneous across sectors of the Polish economy?
2. Which price index does NBP respond to?

These questions are answered using a two sector DSGE model which is constructed in the thesis. The model is designed using the mechanisms described by Aoki (2001), Benigno (2004) and Benigno and López-Salido (2006), who built a model of the economy under a single monetary authority while still allowing for sectoral heterogeneity in price setting. The model also describes a small open economy, here following Gali and Monacelli (2005) and Clarida et al. (2001). The model assumes a generic agent who is both the consumer and supplier of working hours for the purposes of production. The agent consumes a bundle of home and foreign goods but supplies labor to only one of the firms, which produces a single differentiated good in one of two sectors: A and B. Sector A represents the production of food and energy. The prices of these two components of the consumption basket have been reported to be the least sticky (Dhyne et al., 2006; for a similar study for Poland see Macias and Makarski, 2013). Sector B consists of firms that produce services and goods other than food and energy. According to the analyses of individual prices, the prices of these products (especially services) are much more persistent than those of sector A. Because the production from sector B fully covers the basket of core inflation price index (the inflation net of food and energy), the model can be used to assess the role of core inflation in monetary policy.

The model is then applied to Polish data using a Bayesian estimation. In a model comparison exercise, the Bayes factor is used to show the empirical advantages of a model that uses heterogeneous price-setting mechanisms in sectors A and B compared with a model that uses common price-setting rules across sectors. Additionally, different monetary policy scenarios are considered and compared using Bayes factor as well. Finally, an impulse response function analysis is used to draw monetary policy conclusions.
References:


