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Flattening of the New Keynesian Phillips curve: Evidence for an emerging, small open economy☆

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ABSTRACT

The flattening of the Phillips curve is a vigorously investigated phenomenon in many advanced economies. Still little evidence has been presented for emerging, small open economies facing persistently low inflation. In this paper I address this issue through rigorous estimation of a substantial number of stylized, open-economy hybrid new Keynesian Phillips curves for Poland. I find robust evidence of the flattening of the Phillips curve and the rising impact of external factors for both headline and core inflation. I conclude that during excessive disinflation in Poland the flattening of the Phillips curve can be partly explained by the underutilization of labour, whereas the stronger impact of global factors on core inflation suggests strengthening indirect effects. The changes in the estimated parameters indicate that the macroeconomic cost of bringing inflation back to the desired target has increased. Further identification of the reasons behind the flattening of the Phillips curve in an emerging, small open economy should provide useful insights for monetary policy.

1. Introduction

In recent years a steep disinflation could be observed in many economies raising the question of the determinants of recent unexpectedly low and persistent inflation (European Central Bank, 2017). In the environment of plummeting commodity prices, the protracted period of anemic recovery in highly developed economies as well as the struggling emerging markets, several factors could justify this phenomenon across countries. The discussion on the drivers of muted inflation, in particular on the relationship between the price dynamics and the adjustments in domestic real activity, focuses on the advanced economies (e.g. Blanchard et al., 2015). At the current juncture little evidence has been presented for emerging, small open economies facing persistently low inflation and heavily depending on the evolution of external factors. The principal aim and the main contribution of this paper is to fill this gap in the literature by investigating empirically the changes of the hybrid new Keynesian Phillips during this excessive disinflation period for an emerging, small open economy. For this purpose I employ the Polish data.

Following the ongoing debate in the literature concerning the substantial specification uncertainty of the Phillips curve (Mavroeidis et al., 2014), I estimate a battery of stylized open-economy hybrid new Keynesian Phillips curves (henceforth hybrid NKPC) in two samples. In order to account for the considerable uncertainty regarding the modelling of the hybrid NKPC I use two vintage datasets, alternative variable definitions and different estimation methods. In the course of the analysis I compare the GMM estimates in the two samples and evaluate the statistical significance of the changes of the hybrid NKPC reduced-form parameters between samples. As an alternative to a fixed-coefficient approach, I estimate a time-varying stochastic volatility version of the curve and study the behaviour of its parameters throughout time. Moreover, in the paper I shed light on the determinants of the protracted period of low inflation in Poland by performing a counterfactual analysis that assesses whether the recent disinflation period can be explained by adjustments in domestic real activity. Basing on this exercise I infer which hybrid NKPC specification resembles most closely the inflation developments during the excessive disinflation period. However, I underline that a more structural analysis should be conducted to better understand the reasons behind these changes and precisely disentangle the influence of global and domestic as well as supply and demand shocks on inflation in Poland. This remains beyond the scope of this paper and is a topic for future research.

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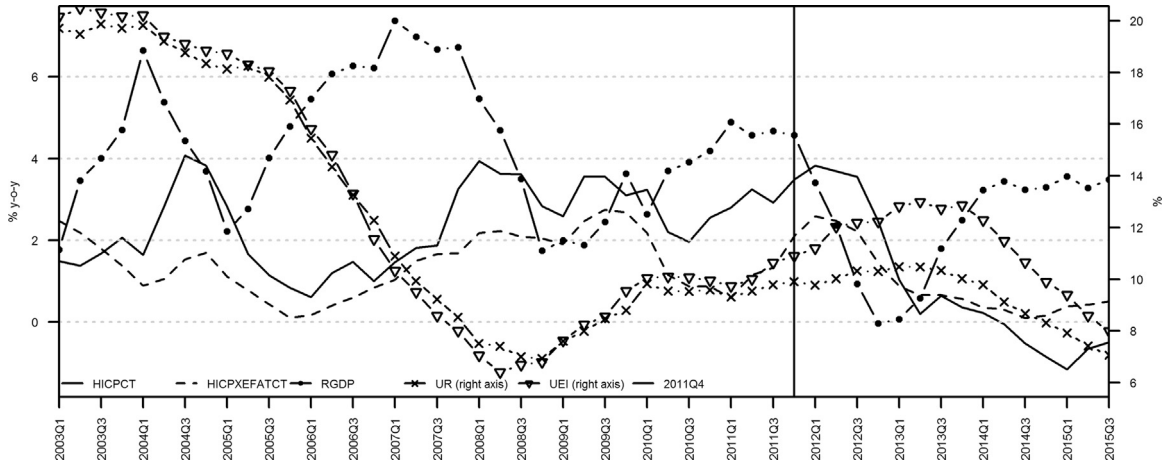

Fig. 1. Annual headline and core inflation rate in Poland and real activity developments, Note: HICPCT – HICP inflation (constant taxes), HICPXEFATCT – HICP inflation excluding energy, food, alcohol and tobacco (constant taxes), RGDP – annual growth rate of the real gross domestic product, UR – seasonally adjusted unemployment rate, UEI - seasonally adjusted underemployment index. Source: Eurostat, Narodowy Bank Polski, Wyszyński (2016), own calculations.

Recent puzzling behaviour of inflation is a subject of heated discussion and scrutiny also in emerging, small open economies, such as Poland. Excessive disinflation, similar to that observed in most European countries – most notably in the euro area (Constâncio, 2015) – started in 2012Q1 (Fig. 1). After reaching 4.4% in 2011Q4, headline inflation experienced an abrupt fall. It was followed by an unprecedented long period of deflation, during which the annual inflation rate descended to as low as −1.5% in 2015Q1, a historically low level. Although the protracted period of deflation in Poland coincides with plummeting global commodity prices, anaemic economic growth in the advanced economies and the struggling emerging markets, the current Polish inflation rate may seem baffling when looking through the lens of the developments in domestic real activity (Fig. 1). Throughout the global financial crisis and the European sovereign debt crisis that followed, economic growth in Poland remained robust, experiencing only a short-lived slowdown at the turn of 2012. Moreover, after a period of stability, labour market conditions continued to systematically improve. Surprisingly enough, the disinflation process has prevailed. This development is not exclusive to headline inflation as core inflation has declined as well and currently evolves slightly above its historically lowest levels. This indicates that the responsiveness of inflation to the adjustments in domestic real activity has decreased, leading to the flattening of the Phillips curve.

The identification of the determinants shaping the recent disinflation and the protracted presence of low inflation is crucial to the monetary policy conduct. The flattening of the Phillips curve can limit the effectiveness of monetary policy action. Consequently, as this phenomenon unravels, larger fluctuations of output are needed to impact inflation. However, a flat Phillips curve implies also that keeping inflation stable should be easier once it reaches its preferred level. Hence, by having at its disposal the estimated semistructural parameters of the open-economy hybrid new Keynesian Phillips curve, the monetary authority can assess to what extent current inflation is responding to domestic developments and to what extent it is governed by global factors. These parameters contain valuable information for the central bank about the effectiveness and relative cost of adjusting inflation towards the desired inflation target.

Several conclusions are warranted in the paper. The results indicate that a statistically significant relationship between inflation and adjustments in domestic real activity still persists in the Polish economy. However, during the recent disinflation period the estimate of the slope coefficient of the hybrid NKPC has on average considerably decreased across specifications. This suggests that the phenomenon of Phillips curve flattening is not exclusive to the advanced economies but is present also in emerging, small open economies. Moreover, while the slope flattens partly due to the underutilization of labour, the impact of the external factors has recently strengthened. This claim is robust for both headline and core inflation, different estimation techniques and sets of instruments. Hence, in the presence of historically low inflation, the conjunction of the flattening of the Phillips curve and the rising influence of global factors limits the ability of the Polish central bank to adjust inflation quickly and without generating significant costs in terms of output fluctuations or financial stability. On the other hand, once an inflationary output gap establishes, its influence on inflation should be smaller. Thirdly, the counterfactual analysis indicates that cyclical factors do not fully explain the gradual lowering of the Polish inflation rate. However, in the environment of robust domestic economic growth and constant improvements in the labour market, the flattening of the Phillips curve may highlight the inadequacy of the pressure exerted on prices by the demand side. Fourthly, in order to model Polish inflation with the a open-economy, hybrid new Keynesian Phillips curve, specifications with the unemployment gap, the import price deflator and survey inflation expectations should be considered in the first place as they tend to have superior explanatory ability in the low inflation environment compared to other specifications.

The outline of the paper is as follows. Section 2 briefly reviews the comprehensive literature on the Phillips curve and the modelling issues. The data and the methodology used in this analysis are presented in Section 3. The main results are discussed in Section 4. Section 5 concludes.

2. Literature review

The literature on the trade-off between inflation and real economic activity is voluminous. Although economists broadly agree that inflation can be curbed at a cost of lower aggregate demand, at least in the short-run, the exact specification of the curve has been a subject of heated debate since the seminal work by Phillips (1958) who introduced the concept for UK's wage inflation and unemployment. Samuelson and Solow (1960) have provided a subsequent extension by gauging the relationship between the U.S. unemployment and price inflation. Along with the development of the economic theory, myriad of Phillips curve specifications have been studied with the emphasis laid upon the nature of the inflation–aggregate demand relationship and its inference for the monetary policy conduct. This abundance of research, caused by the nontrivial choice regarding the variable proxies, estimation methods or theoretical assumptions imposed on the model, has been recently reviewed comprehensively by Mavroeidis et al. (2014) and Abbas et al. (2016).