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Monetary regime change and business cycles ☆

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ABSTRACT

This paper proposes a method to structurally estimate a model with a regime shift and evaluates the importance of acknowledging the break in the estimation. We estimate a DSGE model on Swedish data taking into account the regime change in 1993, from exchange rate targeting to inflation targeting. Ignoring the break leads to spurious estimates. Accounting for the break suggests that monetary policy reacted strongly to exchange rate movements in the first regime, and mostly to inflation in the second. The sources of business cycles and their transmission mechanism are significantly affected by the exchange rate regime.

1. Introduction

After the breakdown of the Bretton-Woods system, several countries searched for a new nominal anchor for their monetary policy. Many small open economies initially opted for some form of managed exchange-rate regimes but, over time, most proved to be incapable of resisting the pressures of international capital markets. As those regimes proved to be ineffective, central banks around the world searched for a new framework to conduct monetary policy. Inflation targeting eventually became the new regime of choice, initially adopted by New Zealand and quickly followed by others, such as Canada, United Kingdom and Sweden.

From a methodological point of view, dealing with regime breaks is not a trivial task. In this paper, we propose a simple method to estimate a model over a period of time containing a regime shift. We then evaluate to which degree it is important to explicitly acknowledge the break in the estimation procedure. In our analysis, we focus on those cases where

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the timing of the shift is known by the econometrician. Thus, we are not engaging in an exercise in which we are searching for the structural break.

We apply our method to Sweden, a good example of a small open economy that went through such a monetary policy regime change. Sweden adopted an exchange rate target zone in 1977, setting a central parity for the Swedish krona against a basket of currencies, and only allowing small deviations from that parity. After the dramatic and unsuccessful attempt to defend the currency at the end of 1992, the Swedish authorities decided to abandon that exchange rate regime. Shortly thereafter, in January 1993, Sveriges Riksbank (the central bank of Sweden) announced the adoption of an inflation targeting regime.[1]

We start by estimating a DSGE open economy model assuming that all the parameters are constant in the two sub-periods, except for the monetary policy related ones.[2] This allows us to estimate two separate policy rules, one for each regime, i.e., the target zone (TZ) period and the inflation targeting (IT) period. We then compare the propagation of shocks in the two periods through impulse response analysis, and analyze whether the regime change implies a different decomposition of business cycle volatility. Our results suggest that the influence of different shocks is regime dependent to a substantial degree. We also find that monetary policy reacted strongly to exchange rate movements during the target zone regime while it focused mainly on inflation stabilization during the inflation targeting period. The difference between the two regimes is sharper in response to shocks that originate abroad—foreign shocks hit the economy harder during the TZ period than during the IT period because the exchange rate's role as a shock absorber was more restricted. We thus conclude that it is important to account for the regime change in the estimated DSGE in order to properly capture the information in the data.

We then investigate the extent to which ignoring the regime change can lead to spurious results. Therefore we re-estimate the model ignoring the policy break and compare the results to our benchmark estimation. We find that in this case we risk capturing business cycle properties that are averaged across the two periods. This misspecification will affect not only the parameters of the policy rule but also the posterior distribution of the parameters associated with structural economic relations unrelated to the policy regime. This means that we estimate a policy characterization that is not correct for either period and further contaminates the estimation of the policy-independent parameters. In particular, the misspecification affects the parameters associated with the demand side of the economy and, therefore, the whole internal propagation mechanism of the model.

In order to shed further light on the implications of the two monetary regimes on the business cycles of a small open economy, we also conduct a counterfactual experiment. We evaluate how the inflation targeting monetary policy rule would have performed in response to the shock innovations from the target zone historical sample. In this exercise we find that Sweden would have had significantly higher levels of output, hours worked and consumption, at the expense of a more depreciated currency (in both nominal and real terms), higher inflation and more macroeconomic volatility.

The model considered is close to Kollmann (2001), and to describe monetary policy during the Target zone period we follow Svensson (1994) and assume a linear managed float without an explicit band as an approximation to a non-linear exchange rate band model.

Structural estimation of small open economy models has been the subject of extensive research in the recent past.[3] Unlike the previous literature, this paper considers the effects of monetary regime change on the dynamics of a small open economy. In this way, the paper contributes to the literature on time-varying DSGE models, e.g., Fernández-Villaverde and Rubio-Ramírez (2007) and Justiniano and Primiceri (2008). However, in contrast to those papers, we model a specific change of monetary policy regimes at a given well known date, rather than allowing specific parameters to change over time in a random fashion. In a way, we follow Lubik and Schorfheide (2004) who estimate a model with regime breaks dividing the data in two samples. Unlike Lubik and Schorfheide (2004) we assume that only certain parameters can change with the regime and estimate the two regimes jointly. This allows us to establish a "computational bridge" between sub-samples to avoid losing information on parameters that are unrelated to the regime change. Belaygorod and Dueker (2009) also assume constant "deep parameters" across regimes to improve the precision of the estimates of the differences across regimes. However, they use a change-point approach to allow the data to provide estimates of the regime change dates. Differently from them, in our case the econometrician does not draw any inference about the timing of the switch. In a way Belaygorod and Dueker (2009) is a more general approach than ours because it allows for uncertainty about the date of the regime change. In the particular case of an explicit change in monetary policy regime that was clearly announced this is less crucial. With an announcement the only piece of uncertainty for the econometrician is whether the monetary authority may have started implementing the new regime before it was announced or, instead may have delayed applying

[1] After the Bretton Woods collapse in 1973, Sweden participated in the so-called "snake" exchange rate mechanism. In 1977, the Riksbank announced a unilateral target zone to a currency basket constructed using trading weights. In May 1991, the ECU became the official target. Lindbeck et al. (1994), Lindberg et al. (1993), Lindberg and Soderlind (1994) and the official web page of Sveriges Riksbank are good references for a more detailed description of the exchange rate regimes adopted in Sweden in the last century.

[2] As explained at some length in the model section, besides the parameters in the Taylor rule we also allow the risk premium shock in the UIP condition to be regime-dependent.

[3] See Smets and Wouters (2003), Adolfson et al. (2007), Justiniano and Preston (2010a), Justiniano and Preston (2010b), and Lubik and Schorfheide (2007), among many others.