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Would it have paid to be in the eurozone?

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ABSTRACT

Giving up an independent monetary policy and a flexible exchange rate are the key aspects of joining a monetary union. In this paper we analyse how joining the euro area would have affected the Polish business cycle during the recent financial crisis. To this end we construct a small open economy DSGE model and estimate it for Poland and the euro area. Then we run a counterfactual simulation, assuming Poland's euro area accession in 1q2007. The results are striking — volatilities of GDP and inflation increase substantially. In particular, had Poland adopted the euro, GDP growth would have oscillated between −6% and +9% (−9% to +11% under more extreme assumptions) instead of between 1% and 7%. We conclude that during the analysed period independent monetary policy and, in particular, the flexible exchange rate played an important stabilizing role for the Polish economy.

1. Introduction

It has been long recognized that joining a monetary union entails costs and benefits. In particular, a key source of both is related to giving up independent monetary policy and a flexible exchange rate. On the one hand, independent monetary policy and a flexible exchange rate provide a shield against asymmetric shocks. On the other, the latter can also be a source of shocks whereas fixing the exchange rate eliminates exchange rate risk for the economy. Overall, it is ex ante not clear whether for a particular country, joining a monetary union would provide more or less macroeconomic stability.[1] This is particularly true in the case of emerging markets joining monetary unions created by developed economies. In emerging markets exchange rate volatility is usually relatively high and the economic structure differs from that of advanced economies making the country prone to asymmetric shocks.

In this paper we ask how joining the euro area would have affected the business cycle in the Polish economy in the period surrounding the financial crisis. Clearly, we are not the first to ask about the consequences of giving up independent monetary policy. Numerous studies analysed the consequences of joining the euro area for most of current members of the European Union.[2] However, the bulk of research was done from the ex ante perspective. This means that in one way or another, these studies extrapolated past experience regarding the economic structure and/or shocks hitting the economy to predict the future under EMU. However, economic developments often surprise, as the recent financial crisis clearly shows. Taking this into account, an ex post study can yield new, valuable information on the counterfactual performance of an economy in the euro area.

Here, the existing literature is much poorer. Amisano et al. (2009) use a time varying VAR model to assess the impact of the EMU accession by Italy. In particular they conduct a counterfactual scenario, assuming that in the period 1999–2008 Italy stayed outside of the euro area. Their finding is, inter alia a higher counterfactual GDP level, though of comparable variability.[3] Another related study is Pesaran et al. (2007), who use a global VAR model to compute the potential consequences of the UK's hypothetical euro area accession. They find that the UK's entry to the euro area in 1999 would probably have reduced GDP in the short term and raised it in the longer term. However, the effects are found to be small (reported deviation of the GDP path from baseline does not exceed 1%) and welfare implications ambiguous. In an another study for the UK Mazumder and Pahl (2013), estimate a Phillips curve and construct counterfactual series with the UK in the eurozone, to find that unemployment would have been higher and GDP lower. Aspachs-Bracons and Rabanal (2011) run a counterfactual simulation and show that the boom–bust cycle in Spain would not have differed had Spain not joined the euro area. Söderström (2010) employs an open economy DSGE model to analyse the consequences for Sweden, should it have joined the euro in 1999. According to the results the economic consequences of giving up monetary independence would have been minor. All in all, the existing studies do not report substantial effects of having (or not) joined the euro. The only exception is Lama

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[1] Mundell (1961) and McKinnon (1963) are the seminal positions on optimum currency areas. See also De Grauwe (2003) for a detailed exposition of this problem.

[2] Calmfors et al. (1997), Csajbók and Csermely (2002), HM Treasury (2003), NBP (2004, 2009) just to mention a few.

[3] The latter conclusion comes from eyeballing the provided figures, since the authors do not report standard deviations.

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and Rabanal (2012), who analyse the welfare consequences of the UK's potential euro area accession. In most simulations the welfare consequences are minor, however under the assumption of financial turbulence they do become significant. In contrast to our paper the financial shocks are, however assumed, and not taken from the estimated model.

Our study adds to the current literature in two ways. First, in contrast to the previous studies our analysis is for an emerging market economy that is supposed to join the euro. Emerging markets usually face relatively volatile exchange rates. Moreover their economic structure differs from that of more advanced union members, which makes them prone to asymmetric shocks. These issues can potentially be crucial in determining business cycle effects of joining a common currency area. Second, we concentrate on the period of extreme economic turbulence related to the global financial crisis. This period seems of particular interest since the destabilizing force of the crisis proved strong enough to put the survival of the euro area into question and caused unprecedented exchange rate fluctuations in emerging markets, Poland included. At the same time the ECB's monetary policy became constrained by the zero lower bound on interest rates. These factors could potentially be responsible for sharp differences between being and not being a member of the euro area. However, in our view, dealing with this special period requires taking explicitly into account the role of disturbances caused by the financial sector. In contrast to the existing literature we control for these factors.

Our tool is a DSGE model estimated on the Polish and the euro area data. The model apart from standard frictions present in new Keynesian models also contains financial frictions in the form of collateral constraints *a la* Kiyotaki and Moore (1997) and Iacoviello (2005) as well as stochastic interest rate spreads Gerali et al. (2010). Given that the period under analysis contains the financial crisis, this allows us to account for financial shocks and therefore the crisis does not blur our conclusions.

Having estimated the model and identified the structural shocks, we run counterfactual simulations that assume that Poland joined the euro area in 2007, i.e. the earliest possible moment. The analysed period (1q2007–4q2011) seems of particular interest, since it covers several strong economic shocks, related in particular to the financial crisis and eurozone default crisis. Our main finding is that being part of the euro area in the analysed period would have substantially increased the volatility of the Polish economy. In particular, GDP would have featured a strong boom after the accession, followed by a recession during the financial crisis. The behaviour of inflation would have shown a similar pattern, though with considerably lower magnitude of accession effects. All in all, we conclude that during the analysed period independent monetary policy and, in particular, the flexible exchange rate played an important stabilizing role for the Polish economy.

We also would like to stress that we do not pretend to investigate all the aspects of the accession to monetary union. In our framework adopting the euro means giving up independent monetary policy and fixing the exchange rate. We realize that joining the eurozone is more than that, but we believe that for analysing the cyclical behaviour of the Polish economy during the recent financial crisis, these are two most important factors.

The rest of the paper is structured as follows. Section 2 presents the model and Section 3 its calibration and estimation. Results of the counterfactual simulations are presented in Section 4 and Section 5 concludes.

2. The model

Our model is built in the tradition of Iacoviello (2005) and shares many features with Brzoza-Brzezina and Makarski (2011). In our economy patient and impatient households consume consumption goods and housing as well as provide labour input. Entrepreneurs consume consumption goods and produce wholesale goods using capital and labour. Those wholesale goods are branded by distributors and sold to final good producers who aggregate them into one final good. Next, final goods are sold to households as consumption goods and capital and housing producers who produce, respectively, capital and housing. Our economy also features a banking sector which intermediates borrowing and lending, a government which collects taxes to finance government expenditures and a monetary authority which conducts monetary policy.

2.1. Households, labour market and entrepreneurs

The economy is populated by impatient households, patient households, and entrepreneurs of measures γ_I, γ_P, and γ_E, respectively, where $\gamma_I + \gamma_P + \gamma_E = 1$.

2.1.1. Patient households

Patient households discount future with the discount factor β_P, calibrated so that they save in equilibrium. The representative patient household maximizes the following utility

$$E_0 \sum_{t=0}^{\infty} \beta_P^t \left[\varepsilon_{u,t} \frac{\left(c_{P,t}(\iota) - \xi c_{P,t-1}\right)^{1-\sigma_c}}{1-\sigma_c} + \frac{\chi_{P,t}(\iota)^{1-\sigma_\chi}}{1-\sigma_\chi} - \frac{n_{P,t}(\iota)^{1+\sigma_n}}{1+\sigma_n} \right] \tag{1}$$

which depends on consumption[4] $c_{P,t}$, housing $\chi_{P,t}$, labour supply $n_{P,t}$ and features external habit formation in consumption, $\xi \in (0, 1)$. Moreover, households' consumption is subject to an intertemporal preference shock following an $AR(1)$ process $\varepsilon_{u,t}$.[5] Patient households can deposit their savings at differentiated savings banks $D_{P,t}(\iota, i_s)$, $i_s \in [0, 1]$ and savings are aggregated as follows

$$D_{P,t}(\iota) = \left[\int_0^1 D_{P,t}(\iota, i_s)^{\frac{1}{\mu_s}} di_s \right]^{\mu_s} \tag{2}$$

where μ_D determines the elasticity of substitution among deposit varieties. We define the average savings rate as $R_{s,t}$

$$R_{s,t} = \left[\int_0^1 R_{s,t}(i_s)^{\frac{1}{1-\mu_s}} di_s \right]^{1-\mu_s} \tag{3}$$

where $R_{s,t}(i_s)$ denotes the interest rate on deposits in bank i_s. Patient household own all the firms and banks in this economy, receive a stream of dividends $\Pi_{P,t}$ and pay lump sum taxes $T(\iota)$ (for simplicity we assume that only patient households pay taxes). They are restricted by the following budget constraint

$$\begin{aligned} P_t c_{P,t}(\iota) + P_{\chi,t}\left(\chi_{P,t}(\iota) - \left(1-\delta_\chi\right)\chi_{P,t-1}(\iota)\right) \\ + \int_0^1 D_{P,t}(\iota, i_s) di_s \le W_t n_{P,t}(\iota) + R_{s,t-1} D_{P,t-1}(\iota) - T(\iota) + \Pi_{P,t} \end{aligned} \tag{4}$$

where P_t, $P_{\chi,t}$ and W_t denote respectively the price of consumption goods, price of housing and the nominal wage and δ_χ denotes the housing depreciation rate. Solving the household's problem we get the following demand for deposits from bank i_s

$$D_t(i_s) = \left(\frac{R_{s,t}(i_s)}{R_{s,t}} \right)^{\frac{\mu_s}{\mu_s - 1}} D_t. \tag{5}$$

[4] Note that a variable with subscript P denotes the patient household variable, while the variables denoted with I and E denote its counterparts for respectively, impatient households and entrepreneurs.

[5] For notational convenience we use the following convention: if the shock is denoted with a given subscript, for example $u - \varepsilon_{u,t}$, then we use this subscript to denote its persistence parameter $-\rho_u$ as well as standard deviation of i.i.d. innovations $-\varsigma_u$.