Journal of Macroeconomics 49 (2016) 99–118

Contents lists available at ScienceDirect

Journal of Macroeconomics

journal homepage: www.elsevier.com/locate/jmacro

Monetary union with sticky prices and direct spillover channels☆

Benjamin Schäfer

Universität Siegen, Unteres Schloß 3, 57072 Siegen, Germany

ARTICLE INFO

Article history:
Received 24 February 2016
Revised 1 June 2016
Accepted 6 June 2016
Available online 8 June 2016

JEL Classification:
F45
E3
E5

Keywords:
Monetary Unions
EMU
Sticky-price models
Real spillovers
Monetary policy analysis

ABSTRACT

This paper derives a sticky-price, forward-looking model of a monetary union (MU) of two countries, with trade across countries and immobile labour. Contrasting to the existing literature, the resulting laws-of-motion do not resort to spillovers via aggregate, union-wide magnitudes but instead feature direct impact of the output gap of the respective other country, and indirect impact of price dynamics via the the consumer price indices (CPIs). Further, the paper analyses the equilibrium dynamics of a variant of the model under various exogenous shocks, most prominently, idiosyncratic shocks to cover diverging developments of the different regions of an MU. A numerical analysis of the parameter calibration for saddlepath-stable behaviour is provided. I find i.a. that idiosyncratic shocks result in heavily oscillating behaviour due to unsynchronised spillovers and reactions of the central bank.

> "Same-same. But different. But still same."
>
> *James Franco as Dave Skylark in "The Interview" (2014)*

1. Introduction

Until now, theoretical treatments of the macroeconomics of monetary unions (MUs) remain by and large variants of international economics models, where one or several small open economies are influenced by aggregate magnitudes. Then cross-country spillovers are modelled by asymmetric shocks to one country, which influences then the outcomes in the other countries via the shock's effect on the aggregate magnitudes. This approach is sensible from a modelling point of view, by simplifying the formal presentation and also from an economic point of view, since of course any asymmetric shock influences the other countries via its effect on the aggregates but these spillovers are of an indirect nature.

However, the huge amount of interaction *inside* the MU, from firms' cross-border supply chains to the increased availability of foreign goods from other member countries suggest that the cross-country spillovers are only insufficiently modelled by asymmetric shocks and their influence on union-wide aggregates. Instead, I find it more appropriate to see how the countries themselves influence each other directly and how (asymmetric) shocks run through these direct channels. Hence,

☆ I owe thanks for fruitful discussions to Christian Endres, Sven Faller, Tobias Gruhle, Carsten Hefeker, Ulrike Neyer, Lars Siemers, Jan Welsch, the participants of the 2015 M3 MAGKS Money Meeting in Marburg and the participants of the 2016 CEUS Workshop at WHU in Vallendar. Further, I thank two anonymous referees for insightful comments. All remaining errors are mine.

E-mail address: benjamin.schaefer@uni-siegen.de, economics@benjaminschaefer.de

http://dx.doi.org/10.1016/j.jmacro.2016.06.003
0164-0704/

the basic difference in the line of thought of the present paper as compared to the literature is one of perspective: Not at all is an MU an economic entity of its own that influences its members; instead, the countries themselves are the MU, influencing each other due to the large extent of economic interlocking and trade.

The presence of a common monetary policy (CMP) conducted by a supranational common central bank (CCB) does not mean that this set of interlocked economies, all of a sudden transform into a nation-like entity, thus justifying the study of aggregate developments. A common currency merely acts as a device to coordinate monetary policies.[1] by replacing the (un)coordinated, national policies by a CMP.

However, it is well known[2] that such CMPs cannot accommodate all members of an MU equally well and the short-run trade-off between unemployment and inflation extends across countries. While this is true even for identical economies, if a single country of the MU is hit by asymmetric shocks, the literature[3] has stressed that countries have all kinds of heterogeneities and idiosyncrasies. Since members of an MU are not only connected via a CMP but also via trade and commerce, idiosyncratic events in one country likely have *direct* repercussions on the economies of its fellow members. Moreover, global events that affect all members of an MU in the same way or affect the institutions of the MU, may have very different direct and indirect effects on the single countries, depending on their relative economic exposure to each other, in terms of size, trade volume, rigidity of prices, wages and labour markets or preferences for imports or for leisure over consumption. CMP reacting to such events affects the economies in different ways, perhaps not only in magnitude but also in direction. These different real developments in turn should have different direct repercussions on the other members – a mechanism largely absent from the literature. All these heterogeneities, be it due to asymmetric shocks or structural differences, make again the case against studying an MU's aggregates, but instead the countries themselves, as profound movements in the single countries might cancel out in the aggregate.

In the spirit of this perspective, the present paper offers a treatment of the macroeconomics of the members of an MU and, in turn, of the MU as a whole, without losing the view on its constituents: the single, different countries. To this end, I derive a sticky price, forward-looking model of a two-country-MU, following the presentation and notation of the baseline model by Galí (2008) and incorporates features also used by i.a. Benigno (2004), Lombardo (2006), and Beetsma and Jensen (2005). However the result differs from most of the existing contributions by introducing hitherto unexplored, micro-founded, direct spillover channels, via the output gaps.

The paper is structured as follows: The next section goes over the relevant literature and explains where the present paper fits in. In the third section I state the assumptions and structure of the economies and derive the central laws-of-motion. There will be structurally symmetric aggregate supply and aggregate demand curves for each of the two countries as well as an interest rate rule to describe the CMP of the CCB and hence close the model. Next, I analyse the policy parameters space that yields saddlepath stable behaviour and present simulations of the model's equilibrium dynamics when the MU is hit by a global monetary shock and by idiosyncratic shocks to local productivity and inflation, respectively. I find that common shocks are easily absorbed by the MU, while idiosyncratic shocks, due to the direct spillovers, lead to heavily oscillating behaviour, making stabilisation by the CCB much harder, a result that obviously has policy implications The last section concludes.

2. Literature overview

The inquiry into the nature of the macroeconomic dynamics of an MU has produced a vast number of contributions. Most of the contributions are variants of international economics models, focussing on member countries whose behaviour is influenced by union-wide aggregate magnitudes, essentially using the rationale of the single member country being like a small open economy and the MU acting like the "rest of the world".

The present paper abandons this prevailing approach by modelling direct and explicit spillover channels, without resorting to union-wide aggregate magnitudes, This allows to track more easily the source and cause for a certain movement, as there is no "black box" of an MU lumping all developments together and as such shrouding the ways the single economies influence each other. Of course, movements in one country do influence the aggregate magnitudes, so the results of previous analyses remain by all means relevant for policy analysis; the present paper however adds more detail in how exactly a single member country influences its fellows, by shedding more light on the heterogeneities in the spillover channels. To this end, I model the spillovers directly via the main variables of the model, i.e. inflation rates and output gaps.

The structure of the model follows the baseline sticky-price, forward-looking macroeconomic model as laid out by i.a. Galí (2008), Walsh (2010), and Woodford (2003), thus modelling an MU "from scratch". Technically and notationally, the model is most closely related to the baseline model by Galí (2008). However, it also incorporates elements that are similarly found in contributions by i.a. Benigno (2004), and Beetsma and Jensen (2005), and Lombardo (2006). Further, since Bayoumi and Eichengreen (1992), Belke et al. (2013), Basse (2014), and Giannone et al. (2010) and others have shown that there are

[1] See e.g. Cooper and Kempf (2003); Alesina et al. (2002)

[2] As early as Mundell (1961). See also Lane (2000); Debrun et al. (2005). Colourfully, Aksoy et al. (2002) use the term "frustration" for regionally suboptimal outcomes of a CMP.

[3] To name but a few, Benigno (2004) offers a theoretical treatment and Lee (2009) an empirical one. See further section 2 for a more detailed view on the literature.