



# On the benefits of a monetary union: Does it pay to be bigger?☆



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## ABSTRACT

This paper revisits the question of the appropriate domain of a currency area using a New-Keynesian open economy model in which the world is split into two areas, each framed as a continuum of small open regions. We show that the adoption of a common currency like the euro can be beneficial for the members of the monetary union, since the spill-over effects generated by the inflationary policies of the small open economies are likely to outweigh the costs of not tailoring monetary policy to country-specific shocks. We also show that while the enlargement of the monetary union to another group of small open economies can bring about welfare gains for all countries involved, monetary integration of two large economies, such as the euro area and the U.S., will not. These findings can help to rationalize the process of the creation and enlargement of multi-country currency areas like the eurozone.

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## 1. Introduction

*What is the appropriate domain of a currency area? It might seem at first that the question is purely academic since it hardly appears within the realm of political feasibility that national currencies would ever be abandoned in favor of any other arrangement. (...) Certain parts of the world are undergoing processes of economic integration and disintegration, new experiments are being made and a conception of what constitutes an optimum currency area can clarify the meaning of these experiments. Mundell (1961)*

This paper revisits the issue of the appropriate domain of a currency area within a multi-country *New-Keynesian* open economy framework in which the objectives of the policy makers are fully micro-founded — i.e., derived directly from the welfare of the representative household.<sup>1</sup> To our knowledge, we are the first to study *within* this

class of models to what extent the process of formation and enlargement of a monetary union entails beneficial effects for its citizens by comparing the welfare gains of the adoption of a common currency or the extension of the currency area with the costs of renouncing country-specific stabilization policies. According to our main results, there can be welfare gains from sharing a common currency as long as the currency area is formed by a group of small open economies. Similarly, it can be desirable to enlarge the currency area to another group of small open economies. Conversely, integrating the monetary union with another big country cannot bring about sizeable welfare benefits. Our findings suggest that while the adoption and the enlargement of a common currency like the ones experienced in Europe could entail welfare benefits for all the countries involved, there is no reason to try to implement a monetary union between two big economic areas like the eurozone and the U.S.

In our model, the costs of losing monetary autonomy are those identified by *Mundell (1961)* as the main cost of being in a currency area: when countries share the same currency, monetary policy cannot properly stabilize country-specific shocks.<sup>2</sup> Conversely, the source of welfare benefits comes from the internalization of a standard terms-of-trade externality according to which open economy policy makers try to manipulate the terms of trade at other countries' expense. While this

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<sup>1</sup> See *Rotemberg and Woodford (1997)* and *Benigno and Woodford (2005)*.

<sup>2</sup> Notice how by featuring nominal rigidities and labor immobility across countries, the New-Keynesian open economy frameworks are more suited than others to capturing the costs of a monetary union as originally described in *Mundell (1961)*. This is one of the main reasons why we put our contribution within this literature.

cannot be considered the only potential source of welfare benefits ensued from a monetary union – the literature on currency areas<sup>3</sup> emphasizes, for example, the reduction in transaction costs,<sup>4</sup> the cut in hedging costs against exchange rate uncertainty, the increase in price transparency and the consequent increase in trade enhanced by all these factors,<sup>5</sup> the anti-inflationary reputation effects<sup>6</sup> – this type of externality is the natural candidate to rationalize the existence of a currency area within a New-Keynesian framework: a framework which is widely used for monetary policy analysis. Indeed, the terms-of-trade externality arises implicitly in many New-Keynesian open economy models and has been extensively studied in the open macro literature,<sup>7</sup> which, however, tends to underestimate the ensued welfare losses, by usually considering a two country setup.<sup>8</sup>

Differently, we use a multi-country small open economy framework. This modeling choice allows capturing one key feature of the EMU and its enlargement, i.e., the fact that the EMU includes several countries – initially eleven. At the same time, it emphasizes how a group of small open countries tends to generate stronger externalities than a single large open economy. This result is potentially relevant even outside the New-Keynesian literature and independently of the specific externality here considered, since it makes clear that the behavior of the small open or big economy policy makers can generate quite different aggregate effects. Indeed, in our setting the welfare gains of a currency area formed by small open economies are generally larger than those of a monetary union formed by big economies. Intuitively, when economies are small, policy makers take as given what happens in the rest of the world, disregarding completely how their independent policies jointly affect the global economy and the efficient use of the world's resources. By contrast, policy makers of big economies internalize to a large extent the impact of their decisions on the world aggregate outcomes.

The framework of our analysis is a standard New-Keynesian open economy model in which the world is split into two areas, *H* and *F*. In

each area, there is a continuum of small open regions. Each region produces a bundle of differentiated goods. The trade elasticity is allowed to be different from one, to nest the cases in which home and foreign bundles are both substitutes and complements. Results are always shown for different values of this elasticity, since it plays a crucial role in determining the strength and the direction of the terms-of-trade externality.<sup>9</sup>

In this setup, we consider three different policy regimes (*A*, *B* and *C*). Under regime *A*, in area *H* exchange rates are flexible and each small open economy has its own autonomous central bank; by contrast, in area *F* all regions share a common currency and monetary policy is delegated to a single authority (e.g., FED). Under regime *B* there is a single currency in each area and monetary policy is under the control of two independent central banks (e.g., ECB and FED). Finally, under regime *C* there is a common central bank for the world economy. Moreover, in all regimes monetary policies are chosen under commitment and are optimal from the *timeless* perspective.<sup>10</sup>

Under both regimes *A* and *B*, optimal policies are biased by the desire of the monetary authorities to affect the terms of trade in their favor. This incentive stems from a free riding problem. Through the manipulation of their terms of trade, open economy policy makers try to increase domestic leisure or consumption at other countries' expense. This incentive is common to the policy makers of both large and small open economies. However, the difference in size of these economies shapes their optimal monetary conduct. When the economy is small, its central bank considers its policy decisions and the performance of the country as irrelevant for the behavior of the aggregate economy. As a consequence, from the small open economy's point of view, strategically manipulating the terms of trade has effects exclusively on domestic output, while leaving the rest of the world unaffected. In equilibrium, however, the opposite is true: since the group of small open economies is large, aggregate distortions are substantial. Indeed, the incentive to try to manipulate the terms of trade in their favor jointly with the inability to internalize the effects of their decisions on the world economy pushes small country policy makers to sharply deviate from the Pareto optimum and to shift inefficiently their inflation-output stabilization trade-off. For this reason, small open economy central banks are more prone to adopt highly inflationary policies that generate strong negative externalities. In contrast, when the economy is big, even if they do not internalize the effects of their policies on other countries' welfare, policy makers take into account the impact of their decisions on the world economy equilibrium outcome. They, thus, disagree on how much to produce and consume individually and they try to manipulate their terms of trade by affecting domestic and foreign outputs in opposite directions to allow domestic households to enjoy *relatively* more leisure or consumption. Nevertheless, they take into account the feedback effects of their policies stemming from the other area and they recognize the importance of using the resources available in the world economy efficiently. This is why large economy central banks tend to adopt monetary policies which are much less inflationary than those of the small open economy policy makers.

The differences in the conduct of monetary policies explain the differences in outcomes across policy regimes. Under regime *B*, policy makers of areas *H* and *F* are exactly symmetric. Both of them generate negative spillovers between areas. Hence, being under regime *C* instead of *B* eliminates these externalities. However, independently of the trade-elasticity value, this welfare benefit is always outweighed by the costs due to the impossibility of properly stabilizing area-specific shocks. This result suggests that adopting a common currency for two large economies like the U.S. and the eurozone is not desirable. Conversely, under regime *A*, while the common central bank in area *F* generates aggregate externalities only between areas, monetary policy

<sup>3</sup> For a recent review of this literature, see Santos Silva and Tenreyro (2010).

<sup>4</sup> Alesina and Barro (2002) incorporate transaction costs – in the form of trade costs – into a model and show that the desirability of currency unions increases as the world number of countries rises and the average country size falls. Yet, in their analysis, the objectives of the policy makers are *ad hoc*.

<sup>5</sup> There is a vast empirical literature investigating the effects on trade between countries of adopting a common currency. See, for instance, Rose and van Wincoop (2001) and Santos Silva and Tenreyro (2010).

<sup>6</sup> Note that the sources of gains deriving from the adoption of a monetary union are mostly microeconomic and thus difficult to embed into a standard open economy model, as a welfare analysis would require. Apart from the internalization of policy externalities here considered, the other main source of macroeconomic benefits identified by the literature is the possible improvement in the ability of the central bank to commit to anti-inflationary policies. However, the credibility of the monetary authorities can be equally enhanced in other ways – for example by reinforcing central banks' independence and their mandate to pursue price stability – which do not imply renouncing to an important policy instrument for macroeconomic stabilization.

<sup>7</sup> See e.g., Corsetti and Pesenti (2001), Corsetti and Pesenti (2005), Pappa (2004), Benigno and Benigno (2003), Benigno and Benigno (2006), Benigno and Benigno (2008) and De Paoli (2009a).

<sup>8</sup> As Corsetti et al. (2010) underlined on page 915, the empirical relevance of the terms-of-trade externality as a motive shaping optimal monetary policies in open economies is an open issue. They also mention how, in the past, the debate on this issue has been influenced to some extent by the corresponding debate – and the possible skepticism – in the trade literature on the optimal tariff argument (an argument going back to Johnson (1953), but more recently put forward by, for instance, Grossman and Helpman (1995) and Bagwell and Staiger (1999), who use it to motivate the need for trade agreements). Interestingly, recently there have been several empirical studies in the trade literature (e.g., Broda et al., 2008; Bagwell and Staiger, 2011) finding strong support for the idea that countries try to improve the terms of trade in their favor, since, for instance, open economy policy makers systematically set higher tariffs in those sectors where they have more market power. Note, however, that within the WTO using trade policies strategically is difficult and therefore countries may try to use other policy instruments to affect their terms of trade. For example, Epifani and Gancia (2009) explain the relationship between government size and openness in the light of the incentive of non-cooperative fiscal authorities to improve the terms of trade, grounding their results on robust empirical evidence. In conclusion, this new evidence corroborates the empirical relevance of the terms-of-trade externality as a motive driving open economy policy maker decisions.

<sup>9</sup> For a discussion see Tille (2001), Obstfeld and Rogoff (2002), Benigno and Benigno (2003), Pappa (2004) and Corsetti et al. (2010).

<sup>10</sup> See Woodford (2003), Benigno and Woodford (2005) and Benigno and Woodford (2012).

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