Is the survival of the euro area at risk? An economic analysis of exit and contagion possibilities☆

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ABSTRACT

Our paper analyzes the possibility that the most fragile countries of a monetary union decide to exit when hit by negative external shocks, and can thus also induce the exit of more robust member states (contagion). The paper reaches two main results: (i) the depreciation of the common currency lowers the exit as well as the contagion probabilities; (ii) the non-price competitiveness factors, here stylized in terms of output gap elasticities to the exchange rate, also play a crucial role since higher elasticities of the weakest countries make their exit from the monetary union more likely, and if these same elasticities for the other member states are low enough contagion will never hapepen; The paper also shows that the previous results are deeply affected by the initial assumptions and a number of exogenous variables and structural parameters.

1. Introduction

The dramatic episodes of the Greek crisis (end of June – beginning of July 2015) led some of the main European countries and inter-governmental institutions to explicitly discuss the exit of a member state from the European Economic and Monetary Union (EMU) as a possible way out of an institutional *impasse*. In the euro area's short life, it was the first time that this possibility was formally put on the table.[1] A persistent significant probability that a fragile member state leaves the monetary union would transform the EMU into a reversible fixed exchange rate *régime*. In fact, the euro area remains at risk due to the lack of convergence between the performances of the EMU's 'core' countries and a few fragile countries (mainly, Greece and Italy). In Germany, there is a growing consensus that Italy's economic fundamentals are becoming incompatible with the EMU's rules. On the other hand, Italy is the third most important EMU's economy by size. Hence, despite the progress made by Greece during the last two years, it remains crucial to analyze (i) the conditions that would make it convenient for a member state in trouble to leave the euro area, and

(ii) the possible impact of this exit on the behavior of other member states.

Our paper is unable to fully address questions (i) and (ii). The exit process of a given country from a monetary union cannot be reduced to an "in/out" alternative, since it depends on a number of medium-long term variables such as the sustainability of its public debt and related financial charges, the balance of its capital flows in the area, the weaknesses and interdependencies of its banking sector, its price and non-price competitiveness in international markets, and its expectations about the area's future policy. Moreover, the costs of transitioning from the current *régime* (inside the monetary union) to the new one (outside the monetary union) matters a lot for the actual choices of the country potentially leaving and its possible followers; and the main features of this transition are deeply influenced by the legal and institutional settings of the monetary area and by the structural, economic, and social organization of each of the member states (cf. Boltho and Carlin, 2013). Therefore, to assess the convenience of an exit from the euro area and its possible impact on the strategies adopted by other member states, it would be necessary to combine a

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[1] The *Treaty for the Functioning of the European Union* (TFEU) does not conceive of at possible exit from the EMU but just from the EU (cf. Athanassiou, 2009). However, as emphasized by law scholars (see for instance: Tosato, 2015, sec. 10), the Lisbon Treaty does not expressly prohibit a temporary and separate withdrawal from the euro. Moreover, such a prohibition cannot be based on "an inseparable bond between the monetary union and the Union as a whole" as some EU member states do not adopt the euro (at least currently). Hence, it is possible to conceive the exit from the EMU of a given country as a temporary interruption of its participation to the euro area but not of its membership to the EU. Hofmeister (2011) discusses this and other exit options from the euro at length, even if he remains skeptical on their possible implementation.

large number of institutional, organizational, financial, and productive components. This is beyond the scope of our model.

Our paper is based on a simplified framework. It focuses on a one-shot game between two stylized economic systems in a monetary union: a member state affected by economic fragilities and lack of competitiveness, and another more robust and competitive member state. This simple setting, which is based on Canofari et al. (2015), can be conceived as a stylized representation of part of the euro area. The first country (country *A*) can approximate a representative of a set of the most fragile countries (for instance: Greece) with a significant probability of exiting from the monetary union if affected by strong negative shocks; the second country (country *B*) can approximate either Germany and its satellites (i.e., the 'core' member states in the euro area) or, even better, an intermediate country (typically France), which is exposed to direct contagion due to the possible exit of country *A*. We adopt the latter view.

Our paper aims to assess the effects of the euro's appreciation/depreciation and other non-price competitiveness factors on the probability that 'peripheral' country *A* leaves the EMU when hit by a negative and specific demand shock. We also analyze the role played by the euro's depreciation and non-price factors on the contagion probability from country *A* to country *B*.[2] Since the two countries' decisions are taken in a one-shot game, they are determined in a point-of-time and hence relate - by definition - to the short-term.[3] However, these decisions can also depend on long-term exogenous expectations.

The dependence of the exit probability of country *A* on the euro's appreciation/depreciation is determined by its output gap elasticity to its real effective exchange rate—the higher this elasticity, the more likely the country's exit from the euro. However, changes in the euro's relative value cannot be the only variable affecting the exit probability of peripheral member state *A*. Competitiveness indicators, such as the relative dynamics of labor unit costs and of technical and organizational innovations, matter a lot (see Corsetti, 2015); and the same applies to relative improvements in the institutional setting. Since our theoretical model cannot endogenize either the labor market or institutional and organizational variables, we interpret the elasticity of country *A* as a proxy for the impact of the euro's appreciation/depreciation with respect to a set of other variables given exogenously. This assumption makes it possible to show that the probability of contagion is affected by the trade balance elasticity of country *B* to its effective exchange rate relative to the corresponding elasticity of the peripheral country *A*. In particular, if the elasticity of country *B* is low enough, contagion never occurs.

Our model could offer a more comprehensive analysis of the workings of the euro area, if it encompassed strategic interactions between three agents: a country *E* representing the EMU's core member states (i.e., Germany and its satellites), in addition to countries *A* and *B*. However, it is well known that referencing a strategic interaction with more than two heterogeneous players severely increases the complexity of the analytical setting (cf. Papadimitriou, 2007; Chen et al., 2009). Hence, in the following analysis, we will assume that Germany and other 'core' EMU member states do not react to measures implemented by countries *A* and *B*. The assumption implies that EMU country *E* plays an even less apparent role than the one played by the extra-EMU world (any currency appreciation/

depreciation relative to the euro is taken as a benchmark and, by definition, the euro cannot appreciate/depreciate toward itself).

This simplification is compatible with a well-known result (see Eichengreen and Sachs, 1986), which has been recently refined (see Benigno and Romei, 2014; Fornaro, 2015; Cook and Devereux, 2016)—a unilateral devaluation by a country (such as *A*) can have weak or even counter-intuitive effects on other countries (such as *E* and the extra-EMU world), especially if the zero lower bound is binding. On the other hand, our simplified model cannot incorporate two other effects of unilateral devaluations which are encompassed in the literature just quoted: the role of expectations, and the possible micro-founded spillovers which are crucial to design the optimal policy responses (see Corsetti et al., 2000; Corsetti and Pesenti, 2005).

It remains that our model analyzes the strategic interaction between some types of EMU countries by means of a one-shot game: a fragile country, hit by a specific shock which negatively affects its price and non-price competition, can choose to abandon the monetary union; and an intermediate country, not directly hit by any shock, can suffer from contagion. We consider the role of both the currency's depreciation and output gap elasticities in determining possible Nash equilibria. Hence, our paper is based on Canofari et al. (2015) and mainly refers to the literature on the EMU crisis due to exchange rates effects.[4] To be more specific, it belongs to the so-called "second generation models," which started with the contribution by Obstfeld (1986) and later included the role played by economic fundamentals (see Jeanne, 1997). However, we do not follow a recent evolution of these models aimed at stressing the role of credibility, expectations, and policy trade-off to analyze possible self-fulfilling speculative attacks (see Obstfeld, 1994, 1997; De Grauwe and Ji, 2013). We are instead influenced by the models that analyze strategic interactions between countries to explain the collapse of the European exchange rate mechanism (see Buiter et al., 1996; Di Bartolomeo et al., 2006).

The remaining parts of this paper are organized as follows. In Section 2, we define the general framework. Section 3 illustrates the structure of the game and the different in/out *régimes* involved when the peripheral country is hit by an exogenous shock. In the fourth section, we analyze the role played by the currency's depreciation (appreciation) in offering disincentives (incentives) to peripheral country *A* to leave the monetary union and, hence, in stabilizing (destabilizing) the area. Then, we assume the exit case for country *A* and consider the probability of a contagion effect from this exit for country *B*. In particular, Section 5 specifies the peculiar role played by currency depreciation, and Section 6 examines the impact of output gap elasticities. The last section offers some conclusions and proposes avenues for further research.

2. The general model

The basic structure of our model largely reproduces that of Canofari et al. (2015). We consider a monetary union characterized by two countries, *A* and *B*, which strategically interact. In a given point-of-time country *A* may decide to leave the union due to a specific and negative demand shock, and country *B* can decide to follow the same path due to contagion. The other EMU countries are denoted by *E*, whereas the rest of the world outside the EMU is denoted by *W*. Some of the analytical refinements of this basic structure, introduced in the current paper, are quite important since they make the model more general. They can be synthetized in the following five points. First: the common currency exchange rate with respect to the rest of the world

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[2] Our definition of contagion is based on the possibility that country A's exit also implies the exit of country B. We concentrate on the exchange rate and other non-price tools without considering policy interventions. However, let us recall that the effectiveness of monetary policy in stabilizing demand shocks has been called into question in the literature (e.g., Chortareas and Mavrodimitrakis, 2016).

[3] Given this framework, our paper cannot address questions such as: does the participation to a monetary union positively or negatively affect the potential growth of a given country? According to Dreyer and Schmid (2016), whereas the participation to the European Union improves the member states' economic growth, the participation to the euro-area does not have further effects but during the financial crises (where the effects become negative).

[4] We are also indebted to other papers analyzing the Greek crisis by means of theoretical tools. Referring to the literature on exchange rate crises, let us quote Arghyrou and Tsoukalas (2011) who argue that the Greek case can be interpreted as the result of a deterioration of Greece's macroeconomic fundamentals between 2001 and 2009. In this view, without a structural convergence, Greece participation to the EMU will be inconsistent in the long term (see also German Council of Economic Experts, 2015).