

Adopt the euro? The GME approach

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Abstract The objective of this paper is to evaluate the degree of financial integration achieved in the European Union based on covered interest parity and using Generalized Maximum Entropy. EU countries are divided into two groups according to their current situation with respect to the adoption of the euro. Financial integration before the adoption of the euro is analyzed for the countries that adopted the euro in 1999. Similarly, current financial integration is evaluated for non-euro EU countries. Besides the importance of comparing the situation of the non-euro EU countries with the situation of the euro EU countries previous to the euro adoption, which may be useful to evaluate an eventual decision of the non-euro members to adopt the euro, it is interesting to analyze the performance of Generalized Maximum Entropy. Generalized Maximum Entropy has the ability to estimate the parameters of a regression model without imposing any constraints on the probability distribution of errors and it is robust even when we have ill-posed problems. Overall our results suggest that the degree of financial integration on non-euro countries is lower than the degree of financial integration that existed among euro adopting countries before the adoption of the euro.

Keywords Financial integration · Generalized maximum entropy · Timeseries analysis · Ill-posed problems

JEL Classification C15 · C61 · G15

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1 Introduction

The evaluation of financial integration in the European Union (EU) is an important question especially in the event of entry of new countries to the common currency. Adopting the euro, when financial integration is not complete, could result in the increase of disparities between countries. The adoption of the euro by a country leads to the loss of monetary authority for that country and thus it leads to the loss of an instrument to combat possible asymmetric shocks in the country's economy.

With the advance of the integration process, where the introduction of the common currency was an important step, we expect that full financial integration occurs between the different countries, giving them the capacity of similar responses. But countries do not have the same conditions to verify the full financial integration. In the specific case of EU financial markets, the abolishment of capital controls had been done progressively, a process that was completed in 1995. In this scenario, theory indicates that the abolishment of capital controls should conduct to a high level of financial integration in the member states. However, there are other factors which prevent complete financial integration, such as the risk of reinserting controls, the existence of asymmetric information, transaction costs and the existence of legal barriers and different fiscal treatment of returns in the different countries.

The existence of other type of barriers, besides affecting capital mobility, implies that countries do not fully explore the potential benefits of financial integration. In these benefits we can count a better saving allocation that will conduct to better investment returns. With better returns, investors expect better economic performance and the increase of the consumption level. We also expect that financial integration leads to the decrease of borrowing costs (due to more competition), the decrease of intermediation costs (the same motive) and the harmonization of product prices and financial services. In the end, we expect higher market efficiency. But financial integration is presented as an institutional challenge, because the rapid integration of financial markets (noted by the increase in the volume of capital flows between countries) could increase exposition of currencies to risk, facilitating the appearance of global scale crises. In this situation, financial integration was (and it continues to be) a challenge for the euro countries. In addition, it is a challenge also for other EU countries which may decide to adopt the common currency sometime in the future. Since the evidence of financial integration is a good signal to understand if the countries are ready to answer to asymmetric shocks, it is interesting and actual to study the financial integration in non-euro EU countries. The objective of this study is to compare the recent financial integration of these countries with the financial integration, before 1999, of the countries who adopted the euro. This comparison is relevant to evaluate the conditions for a future decision of adopting the euro. There are many types of empirical studies analyzing the financial integration between countries. In this paper we investigate the financial integration in EU countries. One novelty in our paper is the application of the *Generalized Maximum Entropy* (GME from hereon), an econometric methodology which presents advantages over *Ordinary Least Squares* (OLS from hereon), since it is not so restrictive in terms of the main assumptions, estimators are more efficient than OLS ones in small samples and it works good not just with well-posed but also with ill-posed problems. We apply GME to study covered interest parity (CIP from