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Transmission of the debt crisis: From EU15 to USA or vice versa? A GVAR approach



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ABSTRACT

In this paper, we estimate a GVAR model in order to study the transmission of shocks between the EU15 and the USA economies, respectively, on a quarterly basis in the 2000 (Q1)–2011 (Q4) time span. Our work is based on the global variables of trade and credit which act as the transmission channels, whereas EU15 is being treated as a single economy. Our main finding is that a shock in the US Debt has significant and persistent results on the EU15 and US economies. In general, the EU15 economy seems to be more vulnerable to the various shocks while US Debt is found to affect significantly in the short run its EU15 counterpart.

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1. Introduction

Over the last period, the so-called debt crisis is a hot topic that has been in the research agenda of several economists around the world such as [Greenlaw, Hamilton, Hooper, and Mishkin \(2013\)](#) who

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argue that countries with high debt loads are vulnerable to an adverse feedback loop. In fact, over the years, heavy indebtedness is a crucial policy issue since debt fluctuations constitute a significant component of total macroeconomic volatility, while changes in the fiscal balance are closely monitored in policy circles.

In the meantime, there is no doubt that several developments over the past two decades have drawn attention to global business cycle linkages among major economic regions. As [Schneider and Fenz \(2011, p. 2\)](#) have argued: “research interest focuses on the co-movement of fluctuations in the Euro area and the US.” In this work, we focus on the transmission of debt shocks from the US to the EU15 economy and vice versa. As we know, the so-called European debt crisis has made it practically impossible for some countries in the Euro area to repay their debts. So, could the EU15 Debt crisis threaten the US economy, or vice versa? Such questions have received renewed interest lately, and one important research question would be to study the conditions of the unwinding of such conditions.

The VAR approach,¹ and especially the Global VAR (GVAR) model, provide nowadays a useful framework for assessing the transmission of shocks.² The GVAR framework was introduced by [Pesaran, Schuermann, and Weiner \(2004\)](#) and developed through several high quality theoretical contributions such as [Pesaran and Ron Smith \(2006\)](#), [Dées, di Mauro, Pesaran, and Smith \(2007\)](#), [Chudik and Fratzscher \(2011\)](#), [Chudik and Pesaran \(2011\)](#) as well as empirical ones such as [Dées, di Mauro, Pesaran, and Smith \(2005\)](#), [Dées, Holly et al. \(2007\)](#), [Pesaran, Schuermann, Treutler, and Weiner \(2006\)](#), [Pesaran, Smith, and Smith \(2007\)](#) and [Bussière, Chudik, and Sestieri \(2012\)](#).

The GVAR model is suitable for assessing relationships between economic entities while its methodology provides a general, yet practical, global modeling framework for the quantitative analysis of the relative importance of different shocks and channels of transmission mechanisms as opposed to the traditional VAR approach. In fact, it comprises a compact econometric model of the world economy which is specifically designed to explicitly model the economic and financial interdependencies at both the national and international level.

More specifically, the GVAR combines individual country/regional vector error-correction models, where the domestic variables are related to corresponding foreign variables that are constructed exclusively to match the international trade, financial or other, desired patterns of the economic entities under consideration. Then the individual country models are linked through a consistent econometric approach so that the GVAR model is solved for the world as a whole in contrast to traditional VAR methodology which is solved for a specific economic entity. Therefore, it can then be used to investigate the degree of interdependencies via impulse response analysis.

The GVAR framework is structured upon observables, which typically include macroeconomic aggregates and financial variables, with the country-specific foreign variables serving as a proxy for common unobserved factors. It is, thus, capable of providing estimates of the impact of a US Debt shock not only on US output, but also on output growth in EU15.³ It is exactly this characteristic that constitutes an important input in the so-called “decoupling” of these two regions of the world.

In this work, we build the empirical application of our approach on the USA and EU15 economies that produced together a little less than 50% of the world’s economic output in 2012 ([CIA, 2013](#)). Also, our work estimates the link between output and debt fluctuations in the USA and the EU15, based on the global variables of trade and, especially, credit which act as the transmission channels. In fact, the related literature suggests that there are numerous channels through which the transmissions of shocks could take place, such as common observed global shocks, global unobserved factors, or

¹ See, for instance, the recent work of [Valcarcel and Wohar \(2013\)](#) who examined the changes in oil price inflation for the US economy using a Time Varying Structural VAR model in a Bayesian set up.

² The so-called factor augmented vector autoregressions (FAVAR) are often viewed as an alternative approach to GVAR (see e.g. [Bernanke, Boivin, & Eliasziw, 2005](#); [Korobilis, 2013](#)). However, the number of estimated factors used in FAVAR is different for different countries and it is not clear how they relate to each other globally ([Dées, Holly, Pesaran, & Smith, 2007](#)). In fact, [Kapetanios, Pesaran, Hashem, and Yamagata \(2011\)](#) argue that GVAR estimators perform better than the corresponding ones based on principal components. Also, for a Dynamic Structural VAR approach in the US economy see [Valcarcel \(2012\)](#).

³ The GVAR model presented in this paper is estimated with the EU15 being treated as a single economy, a choice which, according to [Dées et al. \(2005, p. 5\)](#) is “economically justified and allows us to consider the impact of external shocks on the euro area as a whole without the danger of being subject to possible inconsistencies that could arise if the different economies in the euro area were modeled separately”.

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