Shocks and Divergence Impacts on Regional Integration: The Euro Area Case

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Abstract

This paper's purpose is to evaluate European Area integration strength after economic and political crises occurrence and the clear countries' heterogeneity. We use optimal currency area theory contributions and gather various variables used generally to estimate regional integration in order to understand shocks and divergence real impacts on the area. Results show that shocks accentuate countries' heterogeneity and therefore decrease the Euro area integration.

Keywords: integration, convergence, shocks, Optimal Currency Area, growth, governance, European Area.

1. Introduction

International regional initiatives to promote economic openness strengthen, market regulation and improve information quality are supposed leading to stronger regional economic systems emergence, in which resources allocation is more efficient and without risk. This will ensure sustainable growth for all countries.

However, the global economy has been marked in the last two decades by economic crises recurrence[1] affecting both developed and developing countries. These shocks have, usually, economic and social costs as economic activity drop, bankrupts, unemployment...

Economic blocs' dominance[2] requires a strong macroeconomic policy, within a solid institutional framework, to create better regional economic integration that would allow total liberalization between the co-integrated countries, ensuring risks sharing and benefits maximization.

The interest of this study is at least twice. This research aims to clarify shocks nature and effects on the European Union as an Optimal Currency Area. Also it should enable us to assess the recent economic shocks impact on the European economic integration. In other words we attempt to understand shocks symmetry and risks in an European regional scale in order to evaluate policies to prevent these potential risks.

2. Regional integration and shocks: The contribution of the optimal currency area theory

Mundell (1961) is one of the pioneers of the Optimal Currency Area (OCA) theory. This theory study and analyze costs and benefits of regional integration.

He illustrates his idea as follow. He considers a monetary system with several central banks, each in charge of it national monetary policy. In this context, he takes the example of a shock that results if demand in one country decrease in the benefit of another. Mundell shows that this shock has two consequences: it increases unemployment in the country undergoing the negative demand shock and inflation in the other country. He notes that the monetary policy independence may allow each economy to adjust to this shock. In fact, exchange rate flexibility should absorb such shocks. However, the exchange adjustment is impossible in an integrated area. Mundell concludes that exchange adjustment removal represents a significant cost of such zone creation.

Therefore, the costs of such integration come mostly from countries inability to use an independent monetary policy that allows better adjustment to real and monetary shocks and causes higher adjustment charges.

This example helps to understand better OCA definition. A currency area is called optimal if it has other means to deal with (a)symmetric shocks than exchange adjustment. So, currency area has to substitute exchange adjustment by other mechanisms like production factors movements. In particular, sufficient labor market flexibility in the currency area (both in terms of wages and labor) overcomes the renunciation to the exchange adjustment and prevents shocks.

But before judging whether the area has new adjustment means to abandon exchange adjustment, it is necessary to know if member countries face symmetric or asymmetric shocks. The importance of shock symmetry type in the OCA theory has been revealed. We intend to study the impact of these shocks on an integrated area.

A symmetric shock is an exogenous event with a similar impact on different countries aggregate demand and / or aggregate supply of an integrated area. Changes in oil prices are a symmetric supply shocks; fluctuations in activity in the United States is almost symmetric demand shocks.

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[1] Monetary and banking shocks, stock market crash, etc.

[2] North American Free Trade Agreement (NAFTA), European Union (EU), as major economic and financial poles, and the evolution of regional groups to mega international ensembles like the BRICS (combined economies of Brazil, Russia, India, China and South Africa), TAFTA (Trans - Atlantic Free Trade Area) et APEC (Asia Pacific Economic Cooperation) including America, Japan, Australia and other emerging countries such China, Taiwan, Malaysia and a dozen other countries of the Pacific.

In the absence of coordination of fiscal policies, and the budgetary externalities are positive, each country has an incentive to not stabilize its activity, but to expect that its partners do so. Thus, fiscal policies are insufficiently active. Fiscal policies coordination would internalize this externality and place aggregate deficit of the integrated area to the optimum level by endogenous interest rates response. This type of coordination is also justified in a political economy perspective. Indeed, it could help to create the feeling for people and policy makers in member countries to belong to the same economic and social entity (Boone, 1997).

Thus, economic analysis predicts that in a symmetric shock case, it is efficient to belong to an economically integrated area, which prevents exchange rate movement (instability), avoiding the need of interest rates raise to prevent exchange rates speculative attacks.

Thus, if shocks are symmetric, no adjustment mechanisms need to be set up (Georgescu and Popescu, 2014). Therefore, for the countries out of the Euro area (Hungary, Denmark, UK), that have suffered from the symmetric shock of the 2008-2009 financial crisis, the Euro is more attractive and popular.

An asymmetric or specific shock is an event with a macroeconomic impact in only one country of the zone or with different intensity across countries. A change in demand in one specialization area, political or social event, may constitute asymmetric shocks. Indeed, in an asymmetric shock case which is manifested by a demand decrease in a particular country and if fiscal externalities are positive, this country can't stabilize its activity for fear that it will essentially benefit to other countries, which will reduce their budget deficits. On the contrary, if there is fiscal coordination, we can imagine that partner countries accept to not practice a fiscal contraction when the country hit by the negative shock begin pick up its economy (Ramos, Clar and Suriñach, 2003).

However, European monetary policy was unable to respond to various asymmetric shocks that affected some Euro zone countries (Spain, Portugal, Greece, and Ireland). The euro becomes then less attractive in these countries.

The euro is paradoxically more popular in the euro area periphery and less popular inside the area (Koulischer, 2015)

3. Empirical literature review

Monetary union establishment takes as reference the OCA theory. To determine if two or more countries form an optimal currency area, the traditional literature is based on various criteria: production factors mobility (especially labor), prices and wages flexibility (Mundell, 1961), economies liberalization degree (McKinnon, 1963), production structures diversification (Kenen, 1969) and budgetary federalism (Johnson, 1969). However, these criteria are not sufficient to define the optimal currency area strength.

In addition to these criteria, some economists as Krugman (1993), Frankel and Rose (1997, 1998) and Rose and Engel (2000), highlighted the endogenous optimum currency area criteria. Two opposed visions can be illustrated. For Krugman, fixed exchange rate would push countries specialization and would cause asymmetric shocks emergence. Krugman is based on the international trade theories contribution that integration intensifies comparative advantages leading to greater production specialization. This reduces business cycles correlation between union countries which makes them more vulnerable to asymmetric shocks. Conversely, Frankel and Rose believe that economic integration deepening would generate symmetric business cycles emergence so monetary union could be expensive ex ante but become advantageous ex post. Frankel and Rose criticize monetary union-specialization-shock asymmetry relationship based on the gravity model. They show that bilateral trade growth between the EU countries is correlated to business cycles. That's why series of studies on real shocks asymmetry degree of countries' monetary union have been developed.

When we say that a shock has an asymmetric effect, it is necessary to know exactly how to measure this effect. Some approaches measure simply the exchange rates variations; if an event is followed by exchange rates realignment between two currencies, we can consider that there is an asymmetric effect, and that the realignment is an adjustment mechanism. But this approach raises at least two problems. The first is that in real world, exchange rates fluctuate for many reasons and, therefore, it is difficult to detect particular event effects. The second problem is that these effects can be measured between different currency areas. When monetary union is build from different areas, like the case of EMU, the shocks exchange rates effects cannot be meaningful.

The particular shock effects between various currency areas and within a same area can be measured also in terms of inflation rates differential, consumer prices differential, unit labor costs and asset prices. In addition, changes in Gross Domestic Product (GDP) can be measured both between different currency areas and within each of them if national or regional statistics exist.

Unemployment rates statistics, available even in local areas, provide more precise statistical basis. This is why number of recent studies has defined asymmetry by employment differential effects. It is often assumed that there is a fixed relationship between changes in GDP and unemployment rate (Petterson and Amati, 1998).

Empirical studies made to evaluate symmetry and macroeconomic convergence can be divided into two categories. The first category includes studies oriented towards nominal and/or real convergence analysis (Doré

and Masson (2002), Wane (2004), Bamba (2004), Boogardes and Tsangarides (2005), Guillaumont and Tapsoba (2009)). In the second category, studies are particularly dedicated to (a)symmetry dynamic analysis and macroeconomic shocks convergence (Ciccarelli and Rebucci (2006) and Guillaumin (2008)).

In the first category, several empirical approaches analyze economies convergence. The literature provides different methods to take into account various convergence patterns, and analyze such process dynamics. Panel analyzes can test sample global convergence to the same level, or to different steady situations by introducing fixed effects (Canova and Marcet, 1995). They also test samples stability and properties (Gaulier, Hurlin and Jean Pierre, 1999). Cointegration analysis considers convergence as a long term process (Bernard et Durlauf, 1996). It distinguishes converged series, those that converge and those that diverge. Convergence can also be tested by analyzing the evolution of time-series distribution (Quah, 1995). This method can detect convergence clubs. These studies offer a variety of approaches that can be complementary and depend on data type availability and convergence concept choice.

In the second category, Uhlig (2003) study outlines some issues regarding the interaction of independent fiscal authorities and one central bank in the European monetary union. It points out the possibilities of coordination failures, causing potentially excessive deficits, free riding problems and European fiscal or banking crises. Some other studies are based on structural balance calculation that may take into account international environment impact to prove economic convergence absence due to trade terms deterioration and adverse economic cycle movements. Houssa (2008) study belongs to this studies category. He estimates a dynamic factor model to develop negative correlation between low supply shocks and demand shocks symmetry. His results show that supply shocks transmission at national level is usually asymmetric, reflecting the presence of structural heterogeneity among countries.

Our empirical analysis that follows will refer to the first category studies.

4. Empirical approach:
To evaluate empirically the shocks impact on countries integration, we must first identify and choose our model variables in order to formulate a direct and simplified model to estimate such phenomenon.

4.1. Empirical methodology
In the following, we will measure integration by countries yields convergence because it represents its first consequence.

We will test investment yields convergence degree between various European markets (Abiad, Leigh and Mody, 2009). European yields spreads are inspired mainly by the unit price law (UPL) contribution and its correlate the interest rate parity (IRP). To check the unit price law i.e. that the markets are perfectly integrated; we must observe the prices in considered zone and demonstrate the European yields equalization (Kallel and Zoghlami, 2015).

With EY_{it} European yields expressed in % for country i (i = 1......,I) in the year t (t = 1......,T) (International Monetary Fund, 2014). We define the following variable:

$$X_{it}^{EY} = \left| \ EY_{it} - EY_{.t} \ \right|$$

It corresponds to the absolute spread between the country i yield and the average yield for the whole zone in year t. With:

$$EY_{.t} = \frac{1}{I} \sum_{i=1}^{I} \ EY_{it}$$

We define also the following variables:

$$X_{.t}^{EY} = \frac{1}{I} \sum_{i=1}^{I} \ X_{it}^{EY}$$

This variable corresponds to the yields absolute spread average of the integrated area for a given year (inter individual average). This variable constitutes our global integration measure. Indeed, if countries are perfectly integrated, the yields should converge between countries in which case the absolute spread average tends towards zero. Variables used in this measurement are based on financial investment incomes to investment position (or stock) ratio (Cardebat and Teïletche, 2000).

Also, economic objectives have motivated European construction beginnings. Indeed, it was supposed to promote European countries economic performances. Thus, single market creation in January 1993, and the Euro since January 1999, had been presented as useful measures against unemployment through their positive impacts on economic growth and production increase. These decisions have indeed deepened European economic integration degree, which means that they have reinforced economic links importance between member States. So European economic integration degree is not only a condition for growth in Europe, but it

depends on necessarily.

However, the shocks that have ravaged the area since its creation show that Maastricht Treaty convergence criteria mentioned in the stability and growth pact have not succeed to establish a political integration with the economic and monetary integration. Therefore appears the need for Euro zone specific governance emergence and coherent institutional architecture between the countries members (Arthuis, 2012). In fact, the institutional development was often considered as a necessary condition to ensure regional integration policies success. Indeed, there is a package of instruments to measure country institutional level governance. The largely allowed idea is that countries must reinforce their governance structures when they are engaged in an economic integration process. Institutional systems weakness seems to be a handicap for reliable monetary policy establishment and successful integration (Zoghlami, 2016).

European countries growth is calculated by the annual percentage growth rate of Gross Domestic Product (GDP) at market prices based on constant local currency. They are based on constant 2005 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (World Bank Indicators, 2015).

Governance indicator is defined as "the set of practices and institutions through which authority is exercised in a country ". It is measured by the World Bank by six aggregate indicators summarized in Worldwide Governance Indicators (WGI). (Kaufmann, Kraay and Mastruzzi, 2010).

Finally, and consistent with our problematic, we will introduce the shocks effect to assess their impact on the area integration. Indeed, even if the single currency is doing well, the Euro zone often undergoes various shock types marked by the economic activity decline and deep internal problems. So we will define a dummy variable, which takes (0) or (1) values to indicate countries stability periods (0) and countries shocks periods (1). We determined these periods from European countries central banks publications.

In the following we try to use a model which gathers these various aspects of European economic integration. We will present our model and proceed to its application for the European case. This labor will give us an idea about several shocks impacts on European integration.

4.2. Model specification and tests

The European integration study should logically lead us to test the following model:

$$X_t = \alpha_{it} + \beta_1 (GDP)_{it} + \beta_2 (WGI)_{it} + \beta_3 (SH)_{it} + \varepsilon_t \qquad (i = 1.... I, t = 1.... T)$$

With (X_{it}) the zone absolute yield spread. It is defined within our study framework as being the most direct and homogeneous regional integration measurement; it represents our endogenous variable. More countries integers the observed area, these returns spread compared to the areas average (X_t) tend to zero. We consider a model without constant to verify this hypothesis.

$(GDP)_{it}$ refers to country's gross domestic product,

$(WGI)_{it}$ represents country's governance indicator,

$(SH)_{it}$ is a shocks dummy variable.

ε_t is the error term

We consider 12 countries training the principal European economic and financial partners. The study covers the period 2001-2013. The countries are: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

a. Descriptive tests

Our empirical Study will start with some descriptive tests of the model variables. At first, this study shows some descriptive statistics, then, normality and variables correlation.

	X	GDP	GOV	
Descriptive statistics				
Mean	0.856393	1.311152	0.447601	
Median	1.093217	1.409035	0.356571	
Maximum	6.637760	1.986121	2.068169	
Minimum	-8.863888	0.361811	0.006127	
Std. Dev.	2.858885	0.412448	0.376639	
Normality Test				
Skewness	-0.785272	-0.563829	1.252687	
Kurtosis	4.020081	2.357681	4.756553	
Jarque-Bera	22.79661	10.94721	60.85544	
Probability	0.000011	0.004196	0.000000	
Correlation matrics	X	GDP	GOV	SH
X	1.00000			
GDP	0.21109	1.00000		
GOV	0.05552	0.28469	1.00000	
SH	-0.21679	-0.57812	-0.19274	1.00000

Table1. Variables descriptive tests

Descriptive tests in Table 1 give us an idea about the study variables properties. The normality test shows that the model variables follow a normal distribution. The correlation matrix indicates no significant correlation between the model variables.

b. Unit root and cointegration tests

In order to avoid false regression, it is necessary to ensure the variables stationarity and the absence of cointegration relation between them.

The panel stationarity study is requested in the case of a large sample size. In our analysis we will use the generally recommended tests, ie Levin, Lin and Chu (2002) and Im, Pesaran and Shin (2003) tests which null hypothesis assumes the presence of unit root and thus the non stationarity of the variable. However, while the first test permits the presence of specific individual effects and heterogeneity between individuals, the latter allows also the possibility of heterogeneity of the unit root in the panel.

Tests results are:

	Levin, Lin and Chu		Im, Pesaran and Shin	
	Model without trend	Model with trend	Model without trend	Model with trend
	Statistic values	*P-values*	*Statistic values*	*P-values*	*Statistic values*	*P-values*	*Statistic values*	*P-values*
X	2.43247	0.04882	3.24116	0.74289
	0.0075	0.5195	0.0006	0.2288
GDP	4.55504	6.46628	2.39126	2.97113
	0.0000	0.0000	0.0084	0.0015
GOV	2.21508	1.64865	2.07011	0.41779
	0.0134	0.0496	0.0192	0.0620

Table2. Level unit root test

This table shows that the null hypothesis of Level unit root presence could be rejected for all the variables. So they are level stationary.

In the next stage we will check, referring to the works of Pedroni (1997, 1999, and 2004), if a linear combination of these variables can be characterized by a stationary process. We tried to check the existence of a long-term stable relationship for our function.

Pedroni developed seven cointegration tests for panel data, four for the "within" model (when the considered panel is homogeneous) and three for the "between" (for heterogeneous panel). The first, called cointegration statistics pool is based on the combination of autoregressive coefficients between the different members for unit root tests on the estimated residuals. The second, called average group cointegration statistic is based on estimators that represent estimated individual coefficients average for each country.

Of the seven tests, we use the Phillips-Perron (PP) and ADF tests.

		Statistic	Prob.
PP Statistic	*Pool*	-1.539038	0.0619
	Group	-2.955466	0.0016
ADF Statistic	*Pool*	-2.270490	0.0116
	Group	-3.297271	0.0005

Table3. Pedroni cointegration test

The tests reject the null hypothesis of no cointegration relationship between the variables. Thus, we see that there is a long-term relationship between European integration and other variables. So we can estimate the different relationships

c. Individual effects test: Hausman test (1978)

Hausman test consists to verify if the individual effects are fixed or random. The results show less than 5% probability (0.004) which leads us to reject the hypothesis of random individual effects existence. Thus, we hold in follows that our model individual effects are fixed.

4.3. Estimation and interpretations

Our model final specification is:

$$X_t = \beta_1 (GDP)_{it} + \beta_2 (WGI)_{it} + \beta_3 (SH)_{it} + \varepsilon_t \qquad (i = 1.... I, t = 1.... T)$$

The empirical validation gives us the following estimators:

$$X_t = 0.049234 (GDP)_{it} + 1.190808 (WGI)_{it} - 0.246650 (SH)_{it}$$
$$(0.0123)* \qquad (0.0007)* \qquad (0.0507)*$$

Estimation results show, on one hand, significant positive relationships between European countries yields convergence degree and both gross domestic product and governance indicators; on the other hand a significant negative relationship between these yields convergence and our shocks variable.it proves that, countries' economic performances and governance level, influences positively European integration; but, as expected, several shocks has bad impact on such integration.

Results analysis reveals that, despite of economic growth positive impact on European countries integration, this impact is weak (0.049234).This finding is due to economic activity fluctuation and deep internal imbalances. Significant gaps remain in the area (labor costs, unemployment rate and labor rate) and differences in competitiveness between Euro zone countries limit Economic and Monetary Union adjustment capacity.

Also, results prove that governance quality reinforces the zone integration and its impact is very strong (1.190808) on countries regulation. In fact economic and fiscal coordination and solidarity, when economic and financial crisis occur, determine integration process success.

The negative relation between shocks and European zone integration (- 0.246650) reveals that crises reduce economic integration between the zone partners. indeed, economic and financial shocks turn into convergence crisis in an integrated area.

Deep analysis of the Euro area members shows clearly two countries groups. Northern Europe including: Germany, Austria, Belgium, Luxembourg, Finland, Netherlands) and southern Europe including: France, Italy, Spain, Portugal, Greece, Ireland. We find that European economies remained particularly divergent, and the ambition to reach real integration after nominal integration did not work.

Therefore, in addition to growth rates heterogeneity, we note also productive structures divergence. In 2012, exports to GDP ratio was 57% in Austria, 52% in Germany against 33% in Spain and 27% in France and Greece. This export capacity differential illustrates European economies cost competitiveness heterogeneity. Indeed, export development has been possible thanks to wage moderation in the North, while labor costs rose in the South. Between 2000 and 2013, they rose 30% in Germany, against 43% in France and 50% in Italy.

European countries heterogeneity requires better Euro Area governance. This explains the importance of its coefficient in our estimation. To this end it is necessary to surpass two problems: policies disintegration and countries non adapted specialization. For the first we distinguish a weak budgetary positions and macroeconomic situations coordination between Euro States served by an incoherent institutional architecture. For the second, European Union has not become an optimal currency area. Labor mobility within the euro area remained weak, and transfers between countries remained insufficient to offset productive specialization. The Euro Area has been careless in applying Maastricht Treaty rules which it was equipped. European governance has an important responsibility.

Crises negative effect on European integration requires an effective countries' macroeconomic coordination and requires specific governance.

The results conclude that symmetric or asymmetric shocks impact is important and affect negatively region integration process. This impact is bigger because the member countries suffer from political and structural economic differences.

5. Conclusion

This paper provide theoretical and empirical framework for studying shocks and divergence impacts on regional integration. The proposed analysis shows Euro zone convergence problems alimented by recurrent region crises.

The Euro zone countries real convergence has not performed as hoped. The current crisis impact is certainly due to factors related to monetary union establishment that seem causing greater heterogeneity. The EU is unable to support real convergence and productivity structures homogeneity in member countries. But it can prevent divergence by reducing shocks effects and giving European countries more economic policy flexibility.

European governance appears as a major issue in European Union reform, both in politic, economic and social matters. Governance seems to be the central point in the quest of harmonized European integration ensuring risks sharing and benefits maximizing.

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