

Valeanu, Ioana Laura

**Article**

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# BUSINESS CYCLE SYNCHRONIZATION IN THE EURO AREA

Ioana Laura Văleanu  
Alexandru Ioan Cuza University of Iași, România  
ioanalaura1@yahoo.com

**Abstract:** *Business cycle synchronization represents a condition for the successful implementation of the common monetary policy within the Economic and Monetary Union. There is a tight relation between business cycle synchronization and the economic convergence of the Member States of the Monetary Union. Investigating the specialized literature, this study analyses below the factors which influence the synchronization of the economic fluctuations of the economies in the Euro area. A second objective of this study is represented by the pointing out of the evolution of the synchronization process of the business cycle after the adoption of the euro, in the euro area countries by reference to the empiric evidence. The hypothesis of the study states that the introduction of the unique currency in 1999 resulted into the increase of the synchronization degree of the business cycle.*

**Keywords:** business cycle, synchronization, economic convergence, Monetary Union, euro area  
**JEL Classification:** E32, F36, F44

## INTRODUCTION

The hypothesis that the business cycle of the national economies tend to become more and more synchronized, under the conditions of a continuous increase of the economic integration at the worldwide level (process known under the name of globalization) received considerable attention in the specialized literature. At the regional level, such a synchronization represented a key factor for the successful implementation of a common monetary policy, following the creation of the European Monetary Union. The creators of the European Monetary Union (EMU) saw in the introduction of a unique European currency a potential determining factor of the convergence of the EU economies. According to the Treaty of Maastricht, the objective of the Monetary Union was "to promote throughout the Community a harmonious and balanced development of economic activities (...) a high degree of convergence of economic performance, (...) and economic and social cohesion and solidarity among Member States." Under these conditions, convergence proves to be both a condition and a consequence of the monetary integration.

A starting point in the analysis of business cycle synchronization in the euro area is represented by the theory of the optimum currency area (OCA), which claims that a high synchronization degree between the business cycle of the Member States of the monetary union is a necessary condition for the good functioning thereof.

The conditions for the ascension of a EU Member State to the euro area are both the fulfillment of nominal convergence criteria and the real convergence (structural reform of the economy and economic growth). The fulfillment of the two conditions by the economy of a country assure it the competitiveness and the capacity of eliminating chocks affecting it. Also, the fulfillment of the convergence criteria assure the conditions for the synchronization with the business cycle of the euro area and shall induce a symmetric impact of the common monetary policy. If business cycle of countries participating in a monetary union are not synchronized, a common monetary policy cannot stabilize all economies simultaneously.

Under the conditions of a centralized monetary policy, a state which is in a phase of the business cycle comparatively distinct from those of the other countries of the union, may face expansionist policies materialized by decreasing interest rates or injections of liquidities during boom periods, respectively restrictive policies when in recession. Thus, for assuring the macroeconomic equilibrium, it is preferable that a country whose cycle is not synchronized to the one of the other countries in the union keeps the independence of its monetary policy, having the capacity of modifying the monetary indicators in a manner adequate to the internal economic requirements.

Some studies state that the euro area is an heterogeneous entity and that it is not characterized by a unitary business cycle (Artis, 2003).

The topic of synchronization was often analyzed in terms of causes determining the business cycle of the countries in the euro area to become more and more similar and of factors that determine the similar evolution of the production.

The convergence degree of the business cycle in a monetary union is the result of the influences applied by a series of factors. The specialized literature analyzes the determining factors of business cycle synchronization in Europe: the creation of the European Monetary System, in 1979 (Artis and Zhang, 1997), the development of the international trade (Frankel and Rose, 1998), similarities of sectorial structures of economies (Imbs, 2004) or the existence of common frontiers (Clark and van Wincoop, 2001).

## 1. DETERMINING FACTORS OF BUSINESS CYCLE SYNCHRONIZATION

### 1.1 Commercial Integration

Commerce is considered the factor with the largest capacity of influence on business cycle synchronization (Böwer and Guillemineau, 2006). In spite of these, in theory, it is not clearly delimited whether the intensification of bilateral commerce results into a higher or lower degree of synchronization of the business cycle. On one hand, some empiric studies have demonstrated the causal link between the intensity of commercial exchanges between countries and the correlations of the business cycle.

On the other hand, another approach of the relation commerce – synchronization of the business cycle states that a great opening of commerce stimulates the specialization, due to competitive advantages and economies of scale. Thus, this process seems to lead to a poorer synchronization of the business cycle, because if an idiosyncratic shock affects a certain economic sector of a country it is rather unlikely that it shall affect also the economy of another country for which the respective economic sector has a low importance.

An important role in the determination of the causal relation between the bilateral commerce and the correlations of the business cycle is occupied by the identification of the nature of the commercial flows: intra-industry commerce vs. inter-industry commerce. Thus, in case the intra-industry commerce is prevalent, situation specific to the developed countries, one can notice the growing tendency of business cycle synchronization.

According to Frankel and Rose (1998), the percentage of the intra-industry commerce increased within the bilateral commerce. They provide empiric proofs of the fact that the inter-industry commerce, compared to the intra-industry one, does not play an important role in business cycle synchronization. These authors also sustain the idea that the intensity of commercial exchanges has a positive effect on business cycle synchronization. Akin (2007) shows that the percentage of the intra-industry commerce increased considerably starting with 1970, especially in the developed countries.

On the contrary, in case the inter-industry commerce is prevalent, one can notice a much poorer degree of synchronization of the business cycle. But if the commerce between certain countries is of the intra-industry type, then the removal of the commercial barriers leads to a diffusion of the request shocks.

## 1.2 Monetary Integration

The role of the monetary integration into the determination of the business cycle synchronization is not clearly delimited. Within a monetary union, a monetary policy can lead to a better coordination of the reactions to common shocks, but it can be less efficient in case the countries are affected by idiosyncratic shocks. The reduction of the business cycle synchronization of Member States may be a consequence of giving up controlling the exchange rate.

Artis and Zhang (1999) demonstrated that the ascension to ERM lead to a modification of the similarity of the business cycle. Frankel and Rose (2002) consider that the monetary integration has a considerable effect on the increase of the bilateral commerce between the Member States. Still, other studies reach different conclusions. For instance, de Haan, Inklaar and Sleijpen (2002) analyzed the correlations between the USA economy and the economies of other 18 OECD States but could not provide considerable evidence of the increase of homogeneity of the business cycle throughout time. While the commercial exchanges seem to have a positive effect on economic convergence, stable exchange rates have a negative effect on this process.

Clark and van Wincoop (2001) pointed out that similar monetary policies do not constitute an important determining factor of business cycle synchronization. Analyzing the economies of a sample of OECD countries, during the period 1960-2001, Otto, Voss and Willard (2001) consider the similarities of the economic and institutional structure as determinant factors of the correlations of the economic growth at international level, while the monetary policies have no contribution within these correlations.

## 1.3 Fiscal Policy

Fiscal constraints imposed by the Stability and Growth Pact (SGP) can reduce the risk of asymmetric shocks, but the compliance with the SGP criteria reduces the capacity of answering country-specific shocks by an expansionist fiscal policy. These implications of SGP have different effects on business cycle synchronization. Darvas, Rose and Szapary (2005) demonstrate a positive impact of fiscal policies on the synchronization of the cycle in a group of OECD countries and point out the fact that during the periods with small budgetary deficits the correlations of production are larger. Thus, a better coordination of fiscal policies and a limitation of the budgetary deficits can sustain a stronger synchronization of the business cycle. A study elaborated by Fatas and Mihov (2003) demonstrates that the intensive usage of discretionary fiscal policies leads to the increase of

the volatility of production. In general, the recent literature suggests that the similitudes in the fiscal policies (regarding public expenses and budgetary deficits) have a positive effect on business cycle synchronization. It is still impossible to state clearly whether the application of the Treaty of Maastricht and of SGP had a considerable impact on the correlations of the cyclic fluctuations between countries. According to Böwer and Guillemineau (2006), the importance of fiscal policies for business cycle synchronization decreased after the introduction of SGP.

#### **1.4 Economic Specialization**

The convergence of the business cycle is easier to achieve between countries with similar sectoral structures. If two economies have similar production structures, one should expect that they answer similarly to common shocks. Large differences in sectoral specialization of certain countries negatively influence business cycle synchronization. That is, the more different two economies are, the less correlated their economic fluctuations.

Otto, Voss and Willard (2001) notice that the similar sectoral structures are positively correlated with the fluctuations of production, but in spite of these statistic results show that the sectoral structure does not represent a determining factor with a major importance in business cycle synchronization.

#### **1.5 Integration of Financial Markets**

Financial markets played an important role in the process of globalization of the last decades, and they also represent a factor of major importance in determining the degree of synchronization of the business cycle. The specialized literature is still rather ambiguous regarding the effect of financial integration on business cycle synchronization.

Kalemli-Ozcan, Sørensen and Yosha (2004) provide empiric proofs regarding the statement that countries with a high degree of financial integration tend to have a very high degree of industrial specialization and less synchronized business cycle.

The specialized literature analyzing the financial crises and the diffusion pattern of the shock in the financial markets indicate a positive effect of the flows of capital on business cycle synchronization.

In their turn Kose, Otrok and Whiteman, (2005) also sustain that financial integration increases international externalities of the macroeconomic fluctuations, leading to more synchronized business cycle.

Baele et al. (2004) identify two measuring types of the degree of financial integration: price-based measures and quantity-based measures.

## 1.6 Structural Indicators

Empiric studies analyzing the determining factors of the correlations of the business cycle include a set of *gravity variables*, used a control variables influencing synchronization. These variables aim at the *natural* similitudes between countries and can consist in: geographic distance, language, frontiers, a country's size in terms of population and economic indicators. Otto, Voss and Willard (2001) use a wider set of *gravity variables* which take into consideration aspects pertaining to the legal system, the quality measuring standards, the degree of openness towards technological innovation. Results of empiric studies showed that a high level of quality standards, a fast technological innovation adaptation rhythm and a common language are important in establishing bilateral correlations.

A study elaborated by Böwer and Guillemineau (2006) verified the robustness of a wide range of explanatory variables for the correlation of the business cycle in different countries of the euro area. Results pointed out a negative relation between the differences in terms of competitiveness between countries and business cycle synchronization. A negative relation is also established between the flexibility of the labor market and the synchronization of economic fluctuations, but these do not have a considerable importance in determining the degree of synchronization of the business cycle. The variable *distance* proves to have a special importance and a positive effect on synchronization.

**Table 1 - Determinants of business cycle synchronization**

Variable	1980-2004	1980-1996	1997-2004
<i>M-variables: traditional determinants of business cycle synchronization</i>			
<b>Ratio of bilateral trade to total trade (BTT)</b>	<b>Robust</b>	<b>Robust</b>	Fragile
<b>Ratio of bilateral trade to GDP (BTY)</b>	<b>Robust</b>	<b>Robust</b>	Fragile
<b>Trade specialisation (TRADEPAT)</b>	Fragile (significant)	Fragile	<b>Robust</b>
<i>Fuels</i>	Fragile	Fragile	Fragile
<i>Machinery and transport equipment</i>	Fragile (significant)	Fragile	<b>Robust</b>
<i>Other manufacturing</i>	Fragile	Fragile	Fragile
<i>Chemicals</i>	Fragile	Fragile	Fragile

<b>Economic specialisation (ECOPAT)</b>	<i>Industry</i>	Fragile <b>Robust</b>	Fragile <b>Quasi-robust</b> (significant)	Fragile Fragile
	<i>Constructions</i>	Fragile	<b>Robust</b>	Fragile
	<i>Wholesale and retail trade</i>	Fragile	Fragile	Fragile
	<i>Financial intermediation</i>	Fragile	<b>Quasi-robust</b> (significant)	Fragile
<b>Bilateral flows og bank assets (LBFA)</b>		Fragile	Fragile	Fragile
<i>Z-variables: policy and structural indicators</i>				
Real short-term interest rate differential (IRSCDIFF)		Fragile	Fragile	<b>Robust</b>
Nominal exchange rate volatility (SD_NERE)		Fragile	Fragile	--
Fiscal deficit differential (DEFDIFF)		<b>Robust</b>	<b>Robust</b>	Fragile (significant)
Price competitiveness differential (NCIDIFF)		<b>Robust</b>	Fragile	Fragile
Stock market differential, cyclical services (CYSERDIFF)		<b>Robust</b>	Fragile	<b>Robust</b>
Trade union membership differential (TUDDIFF)		Fragile	Fragile	Fragile
Geographical distance (GEODIST)		Fragile	Fragile	<b>Robust</b>

Source: *Determinants of business cycle synchronisation across euro area countries*, Uwe Böwer, Catherine Guillemineau, European Central Bank Working Papers, No.587, 2006, p.34.

## 2. EMPIRICAL EVIDENCE OF BUSINESS CYCLE SYNCHRONIZATION IN THE EURO AREA

The optimal implementation of a common economic policy cannot be achieved in the absence of a sufficient synchronization of the economies of Member States. Under these conditions, the considerable interest the topic of the introduction of the unique currency and of the euro effects on the structures of economies and on performance received in the specialized literature of the last decade becomes explicable. Most studies refer to the manner the introduction of the unique currency (positively or negatively) influenced the economic convergence and the synchronization of the economic fluctuations of national economies.

Regarding the behavior and the evolution of the synchronization process of the business cycle within a monetary union, opinions vary, sometimes even contradict each other.

Authors Frankel and Rose (1998), of the study *The Endogeneity of the Optimum Currency Area Criteria*, analyze the effects of the increase of commercial integration, from the moment of the creation of the monetary union, pointing out the fact that the intensification of the bilateral commercial relations lead to a much tighter correlation of the business cycle. Other authors (Corsetti, 2008) sustain that the reduction of the costs of the introduction of the unique currency is achieved by the convergence of the structure of consumption and of expenses.

On the contrary, other opinions Kalemli-Ozcan, Sørensen and Yosha (2004) sustain that the commercial integration leads to the specialization of inter-industry commerce and consequently to the increase of the risk that national economies become affected of specific sectoral shocks.

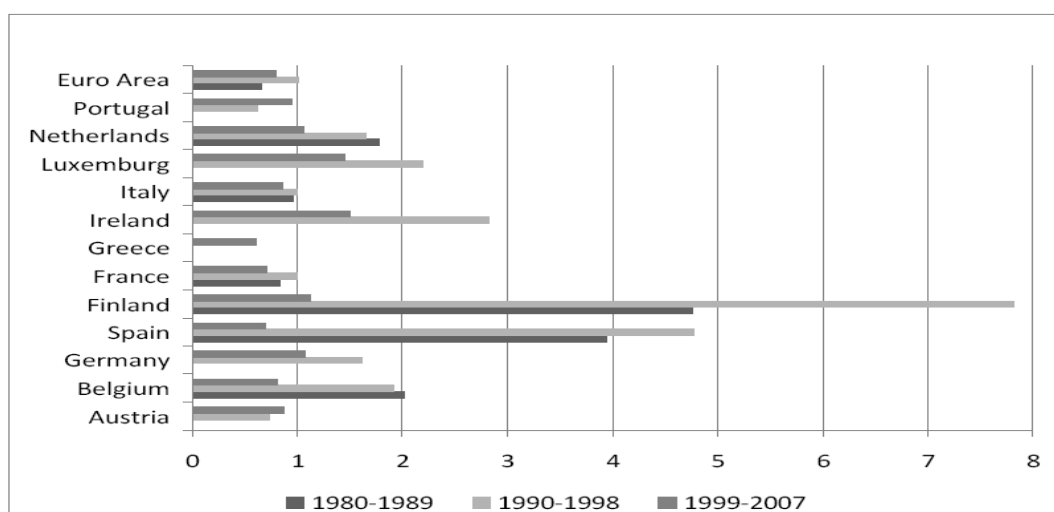


Darvas, Rose and Szapary (2005) concluded that countries with similar budgetary positions have business cycle with a higher degree of correlation. The study *Successes and challenges after 10 years of Economic and Monetary Union*, elaborated by the European Commission concluded that a convergence of the macroeconomic policies imposed by the criteria of the Treaty of Maastricht and by the Stability and Growth Pact led to the reduction of asymmetric economic shocks and an increase of business cycle synchronization of the Member States.

Most frequently used statistic methods for pointing out the facts that influenced the convergence of the business cycle in the euro area are the dispersion of the output gap and the correlation of cyclic fluctuations.

The dispersion of the production differences represent an important instrument of analysis from the perspective of the promoted macroeconomic policies. If all Member States of the euro area are in a similar cyclic position, the standard deviation tends to zero. Under these conditions the common monetary policy produces similar effects on each country. In a study achieved by the European Commission, the results of the measurement of the output gap for the countries in the euro area, during the period 1980-2007, show that the volatility of the production is much more decreased during the period 1999-2007 (period of the euro area), compared to the periods 1980-1989 and 1990-1998. This fact can be noticed both at the general level, and for each country. But this decreasing tendency of the volatility of economic fluctuations cannot be fully and automatically assigned to the introduction of the unique currency. The problem is much more complex under the conditions in which such tendency is part of a worldwide trend. Many authors noticed that the volatility of the business cycle, starting with mid-1990s, acknowledged a decreasing tendency, at the worldwide level. Therefore, many explanations were provided for this phenomenon: the high level of commercial and financial integration, the decrease of the volatility of consumption, the optimization of financial and fiscal management, the good-luck factor materialized in a lower frequency of macroeconomic shocks, the increase of the percentage of services in the structure of national economies etc. It is though difficult to establish the degree of impact on volatility for each of these factors.

For the euro area the effect of the introduction of the unique currency on the evolution of the volatility of the business cycle was also considered. The specialized literature analyzes both positive effects (regarding the management of macroeconomic policies) and negative effects (a poorer coordination of national monetary and fiscal policy, increase of the specialization degree) of the introduction of the unique currency.

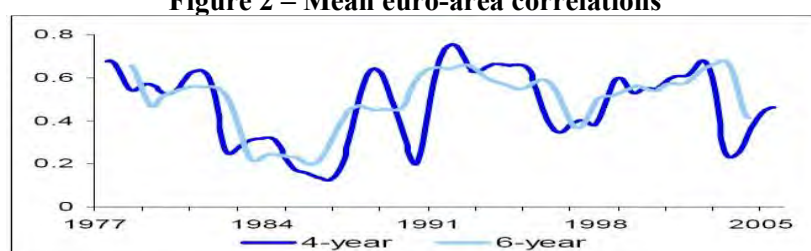


Source: European Commission, Final Report *Study on economic integration and business cycle synchronization*.

Empiric studies show that starting with 1980 and until 1986, correlations of the business cycle in the euro area are very weak. This level of the correlations can be understood by referring to the specificity of the macroeconomic policies and to the different economic or other type of events which influenced national economies. Causes of the low degree of correlation of the business cycle during the period 1980-1986 can be found in the EMS instability, materialized by a high number of adjustments of the exchange rate, in the asymmetric effects of the shocks of the oil price.

Starting with 1988 one can notice a continuous increasing tendency of the correlation of the business cycle. This tendency coincides with a period of stability and credibility of EMS. But the unsynchronization of the business cycle noticed during the period 1990-1993 can be assigned to the reunification of Germany and to the ERM Crisis. Before the disturbances on the exchange market of 1992-1993, the Exchange Rate Mechanism of the European Monetary System seemed to be a success of the intra-European monetary arrangements, capable of assuring an operational framework that would lead to a complete monetary union of the Community members. But at the end of 1992 major disturbances of the system occurred, and EMS had to face the most severe crisis in its history.

**Figure 2 – Mean euro-area correlations**



Source: European Commission, Final Report *Successes and challenges after 10 years of Economic and Monetary Union*, 2008.

Another considerable decrease of the correlation of the business cycle in the euro area is identified in 1997 and it coincides to the crisis of the Asian markets. It seems that this crisis asymmetrically affected the economies of the countries in the euro area.

During the period that followed, one can notice an increase of the degree of synchronization of the business cycle, until 2003, when a sudden fall of the correlations occurs. The increase of the correlations starting with the end of 1990s could be determined by the financial and commercial integration consequent to the Internal Market Programme or by the optimization of the coordination of macroeconomic policies in the euro area.

## CONCLUSIONS

Commerce is considered one of the most important factors determining business cycle synchronization, but it may have both positive and negative effects: the intra-industry commerce leads to business cycle synchronization while the inter-industry commerce, by the effect of specialization, encourages economic asymmetries between countries.

Business cycle synchronization of the euro area countries is a primordial condition in the successful implementation of the common monetary policies. In the absence of synchronization, a common monetary policy would produce differentiated effects on national economies and would increase the economic differences between the Member States of the Union.

According to empirical data, business cycle synchronization in the euro area countries seems to have considerably increased during the period 1986-1995, as an effect of the implementation of the Internal Market Programme and of the financial and commercial integration. Together with the start of the third period of EMU in 1999, business cycle synchronization continued to acknowledge a positive evolution, but in a slower pace. It generally proves to be difficult or even impossible to clearly delimit the effects of the introduction of the unique currency on business cycle synchronization, but most of the empirical studies provide evidence denying the hypothesis that the unique currency would determine economic asymmetries between countries, by the effect of the commercial specialization.

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