GLOBALIZATION VERSUS SEGREGATION - BUSINESS CYCLES SYNCHRONIZATION IN EUROPE

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Abstract: *Globalization and business cycles are equally elusive economic phenomena; hence they represent a continuous research possibility and a source of possible inquiries due to their complex nature. The aim of the paper is to explain the synchronization of business cycles using the relationship between the growth rate of the GDP and FDI, considered as percentage of the GDP. The results show that there is no unique European business cycle, but two cores between which countries migrate and stress out the importance of the FDI channel in business cycle transmission. The future research directions will employ fuzzy cluster techniques, used on a larger sample.*

Keywords: globalization, business cycles synchronization, FDI, panel data analysis, cluster
JEL Classification: E32, E37, F21, F44

INTRODUCTION

The time for globalization has come. Having obscure origins in the American and French international business literature from the 1960', the concept of globalization is a frequently used word in most languages.

The process of increased integration between countries within the context of the globalized economy has incited the interest in understanding the propagation of business cycle fluctuations across national borders. What is more, the recent synchronized global economic downturn, as a result of the 2008-2009 financial crises in the U.S. and the subsequent sovereign debt problems in the Euro-zone have increased the importance of business cycle synchronization research.

The aim of the paper is to explain the synchronization of business cycles based on the relationship between the growth rate of the GDP and inflows and outflows of foreign direct investments (FDI), considered as percentage of the GDP. These types of investments have replaced trade in the contemporary international literature as a vector of globalization and of cross-country business cycle correlation.

The importance of the research is given by the existence of a bilateral relationship between globalization and business cycles synchronization. Furthermore it can explain the integration of

national economies in regional economic blocs, i.e. the European Union, and also the amount of time needed by each country to synchronize its national business cycle with core cycle of the region.

The study population is represented by all the European states, out of which we have selected a sample of 24 European Union members, 6 neighboring countries, as well as the aggregates for the E.U. and the world, thus totaling 32 sample objects. The latter 8 entities are taken as control variables. The selected time span for analysis is 1992 to 2011.

As regards to the methodology, the study employs panel data analysis, which holds the advantage that it captures both cross-section (country) and period (year) effects. We propose and test an array of fixed versus random effects models in order to choose the most appropriate and statistically significant one. After the LS estimation of the coefficients, we also test the Granger causality, for the chosen model.

The following step towards explaining business cycles synchronization is represented by the hierarchical cluster analysis, useful in detecting the dynamics of the co-movements between the European countries in the proposed time span.

The article concludes by saying there are strong pieces of evidence regarding the existence of business cycles synchronization in Europe. In addition, the synchronization is dependent on the moment of adherence to the European Union.

The article is structured as follows. Section 1 presents theoretical approaches on globalization, business cycles synchronization and foreign direct investments, as well as previous empirical studies on the synchronization of business cycles in the Europe and the world. Section 2 displays the data and the methodology employed in the study, while Section 3 comprises the results provided by the model and their discussion. The last part of the article offers the authors' conclusions.

1. THEORETICAL APPROACH ON GLOBALIZATION, BUSINESS CYCLES SYNCHRONIZATION AND FOREIGN DIRECT INVESTMENTS

1.1 Globalization

Defining globalization as a process raises numerous problems, mainly because there is no concise and universally accepted definition. Specialists from different fields have defined globalization from the perspective of their own activity. For example, an economist will always

associate globalization with the activities performed by multinational companies' outside their native countries, with the purpose of generating profit.

Globalization is a modern term, being used for the first time by Theodore Levitt in 1983, in order to describe the changes which occurred in the contemporary economy, in terms of rapid distribution of production, trade, investments and technology (Levitt, 1983). At first, the concept was used extensively in the economic sense, but in recent years, it has acquired more meanings and dimensions, such as political, social, cultural, military and environmental.

Globalization means different things to different people. What is more, the word globalization is used in two ways, which is a source of some confusion. While sometimes it is used in a positive sense to describe a process of integration into the world economy, other times it is used in a normative sense to prescribe a strategy of development based on rapid integration with the world economy (Nayyar, 2006).

Held and McGrew state that globalization can be perceived as a process or a collection of processes that include the transformation of business transactions and social relations into a spatial organization, expressed by transcontinental or inter-regional flows and networks that incorporate activities, interactions and power (Held, McGrew, Goldblatt, Perraton, 2004).

Reputed author Jagdish Bhagwati defines economic globalization as being the process of integration for the national economies within the international economy through trade, foreign direct investments, short-term capital flows, labor flows and technologic flows (Bhagwati, 2004).

For Robert Gilpin the term "globalization" refers to the increasing linkage of national economies through trade, financial flows and foreign direct investments (FDI) done by multinational firms (Gilpin, 2004).

The International Monetary Fund defines economic globalization as being a historical process, the result of innovations and technological progress. This refers to ongoing growth of the integration of the worlds 'economies, especially thanks to the commercial and financial flows. The term can also refer to work force and know-how migration across the national borders. What is more, there are broader *cultural, political and environmental dimensions* regarding the phenomenon of globalization (IMF Staff, 2000).

An almost identical perspective can be found at sociologists Anthony Giddens and John Tomlinson, who consider globalization as being a multidimensional phenomenon with implications at an economic, political, cultural and technological level, implications that need to be analyzed in terms of simultaneity (Tomlinson, 1999). Giddens goes even further and states that globalization is

a reality, not a continuation of older trends and it does not only refer to economic interdependence but to a transformation of the time and space that we live in (Giddens, 2001).

Some authors state that there is a general consensus regarding the historical background of globalization, meaning that there are two main waves of development, stretching over three distinct periods of time. Starting from the definition provided by Bairoch and Kozul-Wright (1996) and Baldwin and Martin (1999), the first wave of globalization is defined as the period before World War I (1870-1914). The bloc economy period (1915-1959) covers the interwar period, which involves the Great Depression, World War II and the subsequent recovery period. The second wave of globalization represents the period after 1960 (as cited in Artis and Okubo, 2009).

1.2 Business cycles synchronization

Jean Charles Léonard de Sismondi (1819) was the first to put into question the problem of economic dynamics, contradicting the description of economic behavior using the concept of static equilibrium.

Further contributions to the theory of economic cycles were done by Juglar (1862) by use of statistical methods. What is more, his works are very important because he made the first classification of economic cycle's phases, namely: prosperity, crisis and liquidity (recovery). Today, the medium economic cycle, spanning 7 to 12 years bears the name Juglar, in his honor.

At the middle of the 20th century Burns and Mitchell offer a definition for business cycles which became known as the classical one. According to them the business cycles represent a type of fluctuation which can be found in the aggregated activity of nations that organize their endeavors in businesses: a cycle consists of a simultaneous expansion of several activity branches, followed by their general recession, which followed by a new expansion phase, corresponding to a new cycle. These fluctuations cover a period of time from 1 to 12 years, without the possibility of division in subunits that have a similar behavior (Burns and Mitchell, 1946).

A classification of the business cycles, based on duration, can be found in Schumpeter's work, *A History of Economic Analysis*. The author, who supports the theory of capital over-accumulation, analyses the economy through the economic cycle perspective and portrays it as Phoenix, destroyed by innovation, that will be reborn to be more efficient, precisely because of innovation (Schumpeter, 1939).

As regards to the modern approach of business cycles, the work *Frontiers of business cycle research* (Cooley, 1995) is noteworthy because it brings together a number of opinions that oppose

Burns and Mitchell's classical perspective centered around the idea of interdependence between the economic growth and economic fluctuations, regarding the business cycle as phenomenon generated by economic shocks, technology etc.

The literature on business cycles acknowledges two types of cycles: the "classical" cycle, as defined by Burns and Mitchell (1946), which involves an absolute decline in economic activity from the peak and an absolute rise in activity from the trough. Clearly such cycles do not exist in growth economies and they are relatively rare for world economies over the last centuries. The other type is based on deviations or growths (occasionally described as growth rates), where the underlying idea is that the business cycle can be identified as a cycle relative to a trend (Artis and Okubo, 2009).

1.3 Foreign direct investments

The foreign direct investments can be defined as a long-term investment relationship between a resident entity (a person or a firm) and a foreign entity. Usually it implies that the investor exerts a significant managerial influence in the firm in which he has invested. Hence the idea that FDI are not the privilege of multinational corporations, because it can be done by a person or a firm that has started the internationalization process.

The FDI flows are composed from the paid up share capital and the reserves of an investor that has at least 10 % of a firm's share capital, the credits between the investor and the company in which he has invested and the reinvested profit (National Bank of Romania, 2011).

Apart from the above mentioned sources, the multinational corporations' foreign subsidiaries can receive financing through sums obtained directly from the domestic capital market of the host country, or by resorting to external financing (loans, bonds etc.), different from the intra-firm source of financing. These sums increase the subsidiary's productive capacity and influence the local market, without being acknowledged as FDI, but as capital expenditures. There may be situations when the sums obtained from other sources can exceed the FDI value (Voinea, 2007).

FDI is also considered to encompass other broader, heterogeneous non-equity forms of co-operation that involve the supply of tangible and intangible assets by a foreign enterprise to a domestic. Those broader collaborative associations include most types of quasi-investment arrangements, such as licensing, leasing, and franchising; start-up and international production sharing arrangements; joint ventures with limited foreign equity participation; and broader co-operation (de Mello, 1999).

Frenke, Funke and Stadtmann (2004) argue that FDI has long been recognized as a major source of technology and know-how for developing countries. Indeed, it is the FDI's ability to transfer not only production know-how but also managerial skills that distinguishes it from all other forms of investment, including portfolio capital and aid. FDI can accelerate growth by generating employment in the host countries, fulfilling saving gaps, large investment demands, sharing knowledge and management skills through backward and forward linkages in the host countries (as cited in Agrawal and Khan, 2011).

Though, FDI is seen as a vital factor in inducing growth rate, however, Bezuidenhout (2009) states that it will only lead to growth if its inflows are properly managed. The degree up to which FDI can be exploited for economic development depends on conduciveness of economic climate. In the absence of such a climate FDI may be counterproductive; it may thwart rather than promote growth (as cited in Agrawal and Khan, 2011).

1.4 How does globalization affect business cycle synchronization?

The researches regarding the two waves of globalization (Bairoch and Kozul-Wright, 1996; Baldwin and Martin, 1999; Williamson, 2002) point out that the openness degree of trade and finance are the main determinants of the two waves. The openness degrees for both trade and finance are perceived as positive indicators of business cycle transmission between economies.

Related to the issue of international business cycle transmission and synchronization, Baldwin and Martin (1999) suggested many different international economic features in capital and trade flows, such as:

a) Capital flows have a substantially different nature with enormous short-term flows in the second globalization wave, driven by the advancement of information technology.

b) Foreign direct investment (FDI) has substantially different features: FDI among developed countries in manufacturing as well as service sectors are outstanding in the second globalization wave.

c) Trade flows have different features: intra-industry trade promoted by scale economies and product differentiation is active in the current globalization.

Can it be said that business cycle synchronization is an effect of globalization and more intense international economic linkages?

Business cycles are seen by Schumpeter (1939) as the effect of innovation and technological improvements. In this regard, globalization can account for business cycle transmission, because

multinationals are vectors of technology and know-how transfer, leading to closer economic linkages between the home country and the destination country of the FDI.

A very important aspect is that the economic theory does not provide definitive guidance concerning the impact of increased trade and financial linkages on the degree of business cycle synchronization (Prasad, Wei and Kose, 2003).

A standard method of globalization is that of trade openness, defined as the share of import and export values in GDPs (Dreher, Gaston and Martens, 2008). International trade linkages generate both demand and supply-side spillovers across countries. For example, on the demand side, an investment or consumption boom in one country can generate increased demand for imports, boosting economies abroad. Through these types of spillover effects, stronger international trade linkages can result in more highly correlated business cycles across countries.

Financial linkages could result in a higher degree of business cycle synchronization by generating large demand side effects. For instance, if consumers from different countries have a significant fraction of their investments in a particular stock market, then a decline in that stock market could induce a simultaneous decline in the demand for consumption and investment goods in these countries.

International financial linkages could stimulate specialization of production through the reallocation of capital in a manner consistent with countries' comparative advantage in the production of different goods. Such specialization of production, which could result in more exposure to industry- or country-specific shocks, would typically be expected to be accompanied by the use of international financial markets to diversify consumption risk (Kose, Otrov and Prasad, 2003).

As regards to the business cycle literature, Heathcote and Perri (2002), Kose, Prasad and Terrones (2003), Baxter and Kouparitsas (2004) and Inklaar et al. (2008) have studied how increased trade and/or financial integration has led to international business cycle synchronization in the post-war period. They indicate that globalization promotes international economic linkages and heightened business cycle correlations (as cited in Artis and Okubo, 2009).

1.5 Previous empirical studies

The studies and research papers that have investigated the issue of business cycle synchronization have reached quite different concluding ideas. These differences can be linked to

the approaches used, either qualitative or quantitative, the variables employed in the model and the methodology applied to determine business cycles and alternative ways to assess synchronization.

Regarding the data, the two most important variables used are quarterly data on GDP and monthly data on industrial production (IP).

In this regard, the number of studies which focus on the study of GDP, GDP deflator and even GNP is overwhelming. Without being exhaustive, we mention those of Fidrmuc and Korhonen (2010), Krolzig (2010), Darvas and Szapary (2004), Artis (2003), Li and Liu (2004), Otto et al. (2001).

However, the conceptual reasoning behind using IP is less convincing although its motivation dates back to Burns and Mitchell's influential work (1946) and is found in various modern studies such as Camacho and Perez-Quiros (2006).

Apart from the industrial production, other monthly series used in the study of the business cycles synchronization refer to trade (Fidrmuc and Ikeda, 2012), trade openness (Artis and Okubo, 2009; Hsu, Wu and Yau, 2010).

Business cycles synchronization is often analyzed via bilateral influences of the above-mentioned variables. In this scope, both the chosen measure of economic growth and the independent variables are used to compute bilateral influence indexes, subject to further analysis, like in the works of Frankel and Rose (1998), Hsu, Wu and Yau (2010), Otto et al. (2001) and Li and Liu (2004).

Another possible approach for analyzing business cycles synchronization is the panel data analysis, which holds the main advantage that it explores simultaneously the cross-section and period effects of the independent variable on the studied one. For this type of research the studies done by Otto et al. (2001), are noteworthy who emphasize the shock-transmission mechanism between countries. Panel data also facilitates the comparison between countries or groups of countries, like in the studies of Li and Liu (2004), Hsu, Wu and Yau (2010), or the influential work of Frankel and Rose (1998).

Furthermore, in order to obtain a classification of the studied entities, cluster analysis is employed. Artis (2003) makes use of this technique in order to prove there is no European business cycle but a global cycle with a European core, an approach further developed in Artis and Okubo (2009), dealing with globalization and business cycle transmission. Camacho and Quiros-Perez (2006) also promote the idea that there is a link between "old" members of the EU but there is no attractor country.

During the last decades numerous papers focused on the role of foreign direct investment in positively influencing economic growth. De Mello (1997) shows two main channels through which FDI may cause economic growth: the adoption of new technologies in the production process through technological spillovers and the stimulated knowledge transfers, both in terms of labour training and skill acquisition and by introducing alternative management practices and better organizational arrangements. This vision is sustained by a survey done by OECD (2002) that underpins these observations and documents that 11 out of 14 studies have found FDI to contribute positively to income growth and factor productivity. However, the development level of the country tends to influence this relationship as it appears that developing countries have to reach a certain level of development, in education and/or infrastructure, before they are able to capture potential benefits associated with FDI

The pre-requisite conditions for identifying a positive impact of FDI on economic growth are studied by Blomström et al. (1994), who implied that FDI has a positive growth-effect when a country is sufficiently rich in terms of per capita income, Balasubramanyam et al. (1996), who emphasized the role of trade openness and by Borenztein et al. (1998), who concluded that FDI raises growth, but only in countries where the labour force has achieved a certain level of education. However, when Carkovic and Levine (2002) estimate the effects of FDI on growth after controlling for the potential biases induced by endogeneity, country-specific effects, and the omission of initial income as a regressor, they find, using this changed specification that the results of these four papers break down. Carkovic and Levine conclude that FDI has no impact on long run growth.

Another strand of the literature has focused on the causal relationships between FDI and growth using as a main tool the Granger causality test between the two time series by employing different samples and estimation techniques. Zhang (2001) looks at 11 countries and tests for long run causality based on an error correction model, which indicate a strong Granger-causal relationship between FDI and GDP-growth, while De Mello (1999) stressed the causation from FDI to growth in 32 countries of which 17 are non-OECD by providing evidence from panel data estimations. A similar approach can be found in Nair-Reichert and Weinhold (2001) who test causality for cross country panels, using data from 1971 to 1995 for 24 countries; they find that FDI on average has a significant impact on growth, although the relationship is highly heterogeneous across countries.

There is also a sample of studies which state the existence of a bi-directional causality between FDI and growth like those of Choe (2003), Basu et al. (2003) and Mahmoud Al-Iriani and Fatima Al-Shami (2007) (as cited in Moudatsou and Kyrkilis, 2009).

The literature proves the occurrence of a statistically significant relationship between FDI and growth; although this relationship is highly heterogeneous across countries, the studies generally agree that FDI, on average, has an impact on growth in the Granger causal sense.

In this regard, it follows that using FDI as a vector of business cycles' synchronization is not an unnatural approach.

A few sectoral studies like that of Buch and Lipponer (2005) which focuses on Germany, respectively that of Kleinert and Martin (2012) concerning France show that the phenomenon of synchronization starts at a micro-economic level, has its roots in the existence of foreign affiliates of multinational companies, expands to reach a macro-economic level by the occurrence of strong connections between the FDI and economic growth, boosting business cycle co-movement and finally settles as the outcome known as globalization.

2. STATISTICAL APPROACH

2.1 Data and variables

The business cycle is a widely debated economic phenomenon, with an elusive nature. The academic community has yet to come to a unanimously accepted definition, let alone a single way of quantification. In this regard, previous studies have used a range of variables to account for economic activity. Furthermore, the synchronization of the business cycle along regions/continents is a sensitive issue, a relatively new one, which can be treated as a secondary product of globalization.

Thereof the main difficulty in the analysis is that there is no direct method of observation. The business cycles and their presumptuous synchronization can only be quantified indirectly by various growth and development indexes.

On the other hand, due to the dynamic nature of this economic fluctuation, a static approach is almost ineffective, having little relevance and thus, it is advisable to choose a panel data analysis, in order to capture the true nature of this occurrence. Also, this way of study is suitable to measure both the cross-section and period influences, thus having a complete picture of the simultaneous influences.

This study focuses on the synchronization of business cycles through foreign direct investments (FDI). These types of investments are a vector of globalization and of cross-country business cycle correlation as noted by Hsu, Wu and Yau (2011, p. 3).

The most common variables used to measure the economic output as an indicator of the business cycle phase are variations on the aggregate indicator GDP found in numerous studies ((Artis and Okubo, 2009), (Artis, 2003), (Eickmeier, 2007), (Stock and Watson, 2010), (Li and Liu, 2005) and (Hudea and Stancu, 2012)). Other papers ((Camacho, Perez-Quiros and Saiz, 2006), (Hsu, Wu and Yau, 2011)) use industrial production or sectoral data (Burns and Mitchel, 1946), (Buch and Lipponer, 2005) in order to identify the simultaneous economic fluctuations that lead to the business cycle.

In this paper, for the measurement of economic output as a quantification of the business cycle phase, we use an annual growth rate of the GDP for each country/region. The motivation of this approach is twofold.

Firstly, the GDP is an aggregate indicator which encapsulates the activity in every sector, smoothing out specific shocks.

Secondly, using a growth rate is equivalent to a differentiation of the original GDP series, thus increasing the probability of producing a stationary series, a necessary condition in panel data analysis. The growth rate also provides a way to employ a cross-country comparison, which would necessitate deeper statistical analysis if the nominal value of the GDP was used. Nominal value GDP has one more down-side, namely that it is usually non-stationary and needs filtering as Hodrick and Prescott (1997), Canova (1998) and Baxter and King (1999) prove in their papers.

The other variable under study, the foreign direct investments, is chosen because, as previously mentioned by Li and Liu (2005): "FDI is an important facet of globalization", thus leading to business cycle synchronization. We have chosen to express both the inflows and the outflows of FDI as percentages of GDP, in order to have a comparable measure across countries and also across time.

In brief, the model includes the following variables, as defined by the World Bank methodology:

- $\%GDP_{i,t}$- the annual percentual growth of the GDP in country/region *i* at time *t;*
- $FDI_{i,t}^{in}$ -Foreign direct investment, net inflows (% of GDP);
- $FDI_{i,t}^{out}$ -Foreign direct investment, net outflows (% of GDP);

The panel includes 30 European countries (Annex 1), the European Union aggregate and the World aggregate for comparison. The data was retrieved from the World Bank database.

Some European countries were deliberately excluded from this analysis either on lack of relevant data (Ireland, Macedonia, Montenegro, Serbia, Kosovo, Albania, Bosnia and Herzegovina,

and Iceland) or a very different economical situation, leading to outliers (Malta, Luxembourg, Lichtenstein, Vatican).

The time span is from 1992 until 2011, a choice dictated by the availability of data and the fact that, up to 1992, the countries that belonged to the former communist bloc had no or small amounts of foreign direct investments, thus emphasizing the irrelevance of an earlier period of study.

The statistical software used was EViews 7.0, SPSS 17.0 and Microsoft Excel 2007.

2.2 Econometric model and Methodology

In order to assess the influence of FDI on business cycles' synchronization, we will employ a panel data analysis.

After a certain model is validated, we use the corresponding variables to form hierarchical clusters of countries in order to prove the business cycle synchronization by affiliation to the same cluster.

The proposed model is:

$$\%GDP_{i,t} = \alpha_0 + \alpha_1 FDI_{i,t}^{in} + \alpha_2 FDI_{i,t}^{out} + \varepsilon_{t,i}$$

This equation is subject to panel analysis, accounting for no/fixed/random effects concerning cross-section and period, thus leading to five possible models (no effects; fixed/fixed; random/fixed; fixed/random; random/random) from which to choose the most relevant.

The equation is relevant if the estimates for the coefficients α_1, α_2 are significantly different from 0.

The validation of a certain model requires the completion of the following steps:

1. Stationarity check of the time series used in the model (to determine the possibility of co-integration);
2. Panel co-integration tests (if necessary, as stated by step 1);
3. Panel data analysis with fixed/random effects;
4. Granger panel causality.

2.2.1 *Stationarity check (Panel unit root tests)*

The panel co-integration is denoted by the existence of unit roots in the data series. For this study we have chosen the Im, Pesaran and Shin (IPS, hereafter), which is based on the well-known Dickey-Fuller procedure.

The IPS test for the presence of unit roots in panels combines information from the time series dimension with that from the cross section dimension, such that fewer time observations are required for the test to have power. Since the IPS test has been found to have superior test power by researchers in economics to analyze long-run relationships in panel data, we will also employ this procedure in this study.

2.2.2 *Panel co-integration tests*

The next step is to test for the existence of a long-run co-integration among FDI and the independent variables using panel co-integration tests suggested by Pedroni (2004). The procedures proposed by Pedroni make use of estimated residual from the hypothesized long-run regression of the following form:

$$y_{i,t} = \alpha_i + \delta_i t + \beta_{1i} x_{1i,t} + \beta_{2i} x_{2i,t} + \cdots + \beta_{Mi} x_{Mi,t} + e_{i,t}$$

for t = 1,.....,*T; i* = 1,....,*N; m* = 1, ..., *M,*

where *T* is the number of observations over time, *N* number of cross-sectional units in the panel, and *M* number of regressors. In this set up, α_i is the member specific intercept or fixed effects parameter which varies across individual cross-sectional units. The same is true of the slope coefficients and member specific time effects, $\delta_i t$.

2.2.3 *Panel analysis with fixed/random effects*

The panel data estimation is employed in the study to capture the dynamic behavior of the parameters and to provide more efficient estimation and information of the parameters. The panel data techniques are used because of their superiority over cross-section and time series in using correlations in the information available, which are not detectable in cross-sections or in time series alone (Baltagi and Kao, 2000). As Hsiao (1986) and Baltagi (1995) argued, panel data sets possess several major advantages. Panel data suggest individual heterogeneity to reduce the risk of

obtaining biased results and provide a large number of data points (observations) to increase the degrees of freedom and variability and to be able to study the dynamics of adjustment. The Panel data model includes three different methods:

- **Fixed effects method**

The Fixed effects method treats the constant as belonging to a certain group, thus (section)-specific, i.e. it allows for different constants for each group (section). The Fixed effects are also called the Least Squares Dummy Variables (LSDV) estimators. The model for fixed effect method is:

$$y_{i,t} = \alpha + \beta x_{i,t} + \mu_i + v_{i,t}$$

where, $\mu_i$and $v_{i,t}$ are the decomposition of disturbance term. While μ_i represents the individual specific effect, $v_{i,t}$ represents the 'remainder disturbance', that varies over time and entities (capturing everything the random behavior of $y_{i,t}$).

- **Random effects method**

The Random effects method is an alternative method of estimation which handles the constants for each section as random parameters rather than fixed. Under this model, the intercepts for each cross-sectional unit are assumed to arise from a common intercept α (which is the same for all cross-sectional units and over time), plus a random variable ϵ_i that varies cross-sectionally but is constant over time. ϵ_i measures the random deviation of each entity's intercept term from the 'global' intercept term α. We can write the random effects panel model as

$$y_{i,t} = \alpha + \beta x_{i,t} + \omega_{i,t}, \text{where } \omega_{i,t} = \epsilon_i + v_{i,t}.$$

Here $x_{i,t}$ is still a 1×k vector of explanatory variables, but unlike the fixed effects model, there are no dummy variables to capture the heterogeneity (variation) in the cross-sectional dimension. Instead, this occurs via the $\epsilon_i$terms. The parameters (α and the β vector) are estimated consistently, but instead of OLS, Generalized Least Square method (GLS) is used.

- **Hausman Specification Test:**

The test evaluates the significance of an estimator versus an alternative estimator. It helps one evaluate if a statistical model corresponds to the data. This test compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model (Hausman, 1978). If correlated (H_0 is rejected), a random effect model produces biased estimators, thus a fixed effect model is preferred.

- **Granger causality**

The approach of Granger (1969) relating to whether x causes y is to see how much of the current y may be explained by the past values of y and subsequently to see whether, by adding lagged values to x, we succeed in improving the explanation of y. We state that x Granger causes y if x helps us in correctly predicting y, respectively if the coefficients of the lagged x are jointly statistically significant.

Granger causality runs, for all possible pairs of (x,y) series in the group, bi-variate regressions of the form:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \cdots + \alpha_j y_{t-j} + \beta_1 x_{t-1} + \cdots + \beta_j x_{t-j} + \varepsilon_t$$

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \cdots + \alpha_j x_{t-j} + \beta_1 y_{t-1} + \cdots + \beta_j y_{t-j} + \nu_t$$

The reported F-statistics are Wald statistics for each equation, for the joint hypothesis:

$$\beta_1 = \beta_2 = \cdots = \beta_j = 0$$

The null hypothesis is, for the first regression, that x does not Granger– cause y and, for the second regression, that y does not Granger–cause x.

- **Hierarchical clusters**

The cluster analysis produces a graphical picture (known as dendrogram) which shows how an entity can be associated with others in respect of some pre-selected characteristic. In this paper this type of "characteristic" is a measure of country *i*'s determinants, namely the GDP growth and total FDI with all other countries (*k*). The clustering algorithm will try to associate other countries, *j*, with country *i* on the basis of minimizing the distance between them in respect of the chosen characteristic. The measure of distance between countries *i* and *j* is the Euclidean, i.e.

$$d_{ij} = \sqrt{\sum_{k=1}^{n}(x_{ki} - x_{kj})^2 + \sum_{k=1}^{n}(y_{ki} - y_{kj})^2 + \sum_{k=1}^{n}(z_{ki} - z_{kj})^2}$$

A clustering algorithm then proceeds in an iterative manner, replacing the first cluster (i and j) found by a replacement value in order to proceed to the next round and so on. The resulting dendrogram (Hierarchical average-linkage cluster tree) gives a basis for determining by eye a number of clusters.

3. DISCUSSION OF RESULTS AND FINDINGS

3.1 Stationarity of the series

A time series is stationary when its statistical properties such as mean, variance, autocorrelation, etc. are all constant over time (Jaba, 2003). As previously stated, a useful test in this regard is the Im, Peseran, Shin (2003) (IPS), based on ADF, but adapted to panel data. The results of the unit root test are presented in Table 1 and show that the hypothesis that the series contain a unit root can be rejected, thus the series are stationary. Because they are stationary in level, there is no need for co-integration.

Table 1 - IPS panel unit root test result

Variable	IPS panel unit root test result (Level) Null: Unit root (assumes individual unit root process)
%GDP	-6.88076 (0.0000)***
FDI^{in}	-4.75875 (0.0000)***
FDI^{out}	-4.08803 (0.0000)***
P-values are in parentheses.*** shows significance at 1%.	

Source: own processing in EViews 7.0

This result is not surprising because we have used a growth rate for the GDP, which already contains a differentiation of first order, thus the stationarity of the %GDP series. The FDI inflows and outflows expressed as percentages of GDP also render stationary series. In this regard, even if co-integration among variables is not statistically significant, it makes sense to study the Granger causality of the variables.

3.2 Equations estimation

We further proceed to the estimation of the parameters and their significance for each of the proposed models by resorting to Least Squares (LS). In Table 2, the effects of FDI inflows, FDI outflows and FDI total aggregate on the annual GDP growth rate are depicted.

The estimation with no effects has the model

$$\%GDP_{i,t} = \alpha_0 + \alpha_1 FDI_{i,t}^{in} + \alpha_2 FDI_{i,t}^{out} + \varepsilon_{t,i},$$

while the equation involving fixed effects is

$$\%GDP_{i,t} = \alpha_0 + \alpha_1 FDI_{i,t}^{in} + \alpha_2 FDI_{i,t}^{out} + \mu_i + \nu_{i,t},$$

Furthermore, the equation with random effects is

$$\%GDP_{i,t} = \alpha_0 + \alpha_1 FDI_{i,t}^{in} + \alpha_2 FDI_{i,t}^{out} + \omega_{i,t}, \omega_{i,t} = \epsilon_i + \nu_{i,t}$$

Table 2 - Equation parameters estimations

Variable	No effects	Fixed/Fixed	Fixed(country) Random (year)	Random(country) Fixed (year)	Random/Random
FDI^{in}	0.372495 0.0000	0.241811 0.0000	0.253771 0.0000	0.178229 0.0003	0.187504 0.0001
FDI^{out}	-0.149166 0.0044	-0.246981 0.0000	-0.247023 0.0000	-0.179599 0.0002	-0.179007 0.0002
c		1.877214 0.0000	1.830154 0.0000	1.932314 0.0000	1.894003 0.0012
R^2	0.041344	**0.392341**	0.112508	**0.339167**	0.025061
Idiosyncratic random			0.7342	0.9557	0.7101
Cross-section random			----------	0.0443	0.0329
Period random			0.2658	----------	0.2570

Source: own processing in EViews 7.0

Although all the p-values are significant for all models, the R^2 of the models point out that only the Fixed/Fixed, respectively the Random (country)/Fixed (year) models are appropriate. A choice between the two is made by using the Hausman test (1978), which compares a more efficient but volatile model against a less efficient but robust one, to certify that the results are consistent.

Table 3 - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.399781	2	0.1108

Source: own processing in EViews 7.0

With a confidence level of 5%, as the p-value indicates, the null hypothesis is accepted, thus we conclude that the Random (country)/Fixed (year) effects model is both consistent and more efficient and it shall be used detrimental to the Fixed/Fixed model.

This model implies that while the economic conditions are generally the same in one year for all European countries, it is the characteristics of a certain country which lead to FDI inflows or outflows, thus influencing the annual growth rate of the GDP, a vision in line with previous literature (Li and Liu (2004), Otto et al. (2001)).

Hence, the chosen equation is

$$\%GDP_{i,t} = \alpha_0 + \alpha_1 FDI_{i,t}^{in} + \alpha_2 FDI_{i,t}^{out} + \omega_{i,t}, \omega_{i,t} = \epsilon_i + \nu_{i,t},$$

which becomes:

$$\%GDP_{i,t} = 1.9323 + 0.17822\ FDI_{i,t}^{in} - 0.17959\ FDI_{i,t}^{out} + \omega_{i,t}$$

where ϵ_i(cross − sectional effect) $and\ v_{i,t}$,(period effect) are available on demand.

3.3 Granger causality

In order to assess the long-run relationship between FDI and GDP, we have tested the Granger causality among the three variables considered, taking various lag lengths. The lag shows the amount of time that an FDI has a certain influence on GDP growth.

Table 4 - Granger causality

Lag	$\mathbf{FDI}^{in} \nrightarrow \%GDP$	$\%GDP \nrightarrow \mathbf{FDI}^{in}$	$\mathbf{FDI}^{out} \nrightarrow \%GDP$	$\%GDP \nrightarrow \mathbf{FDI}^{out}$
Lag 1	0.3064	0.0062	**0.0119**	0.0703
Lag 2	**0.0182**	**0.0332**	**0.0020**	0.2575
Lag 3	**0.0252**	0.1413	**0.0017**	0.5296
Lag4	0.0716	0.1860	**0.0047**	0.6767

Source: own processing in EViews 7.0

The Granger causality test offers interesting results which both confirm the previous literature and bring new information about the time span on which the influence of the FDI has an effect on the annual growth of the GDP.

The study clearly shows that the FDI outflows have an immediate effect on the growth rate of the GDP, thus boosting the economy of the home country, yet the FDI inflows' influence on the economic outcome is delayed until at least the second year or even the third.

A notable difference between the two types of FDI flows is that while the outflows have a rapid and continuous influence over time on the growth rate of the GDP, the FDI inflows have a much shorter lived capacity. This is explained by the technological equalization of the receiving country, and the technological spillover as noted by Li and Liu (2004).

An interesting relation is the Granger causality from GDP growth to FDI inflows. Also noticed by Hudea and Stancu (2012), this curious relation is explainable by the fact that, as a country develops it becomes more attractive for new potential investors, confirming the works of Otto et al. (2001) and that of Kleinert and Martin (2012).

3.4 Hierarchical cluster analysis

After performing the hierarchical cluster analysis, the dendrogram suggested that five clusters were enough to explain the groups that form among European countries. However, this number can be further reduced to two. This leads to the idea of using attraction poles, namely the Western core and the Eastern core. There are some countries that, at some moment, have a business cycle which is decoupled from both cores and which we treat as a separate cluster, but, which can, in fact, represent just outliers as opposed to a separate cluster.

We define the Western pole (WP) being composed out of the following countries: Germany, France, The Nederland, Italy, Spain, The United Kingdom, Sweden and Switzerland, while the Eastern pole (EP) includes: Poland, Slovenia, Slovakia, Czech Republic, Hungary, Romania, Republic of Moldova, Bulgaria, Norway, Finland and the Baltic states (Latvia, Lithuania, Estonia), having as an attractor Russia.

We will discuss separately the cases of Belgium, Turkey and Greece since these pose certain questions regarding business cycles synchronization.

The starting point of our analysis, 1992, witnesses the existence of the two cores with the exception of Poland, Czech Republic and Greece, which belonged to the WP and the case of Turkey which due to a tremendous economical growth forms a separate cluster.

Following the enlargement of the EU in 1995 with Austria, Finland and Sweden, the WP tends to be more intra-synchronized, while countries that do not cope on the economic level (Poland, Czech Republic and Slovakia) tend to synchronize with the EP, which is slowly decoupling from Russia.

The monetary unity introduced in 1999 led to the further convergence of the WP and EP and an unusual phenomenon of decoupling from both poles of certain countries, thus forming a new homogenous cluster, consisting of: Portugal, Greece, Czech Republic, Hungary, Finland and Estonia. These countries could not cope with the new euro currency but were independent enough from the EP. Turkey maintains its status as an outsider and also Belgium departs from the WP due to the fact that foreign investment has held a systematic role in Belgium's economy. Belgium has customarily promoted international trade and foreign investment. They offer the same policies/incentives to foreign companies that apply to domestic companies. Belgium practices global equity meaning they welcome foreign investment and do not to discriminate between foreign and domestic firms. In the boom years of 1999 and 2000, foreign direct investment (FDI) inflows

into BLEU reached record levels: $133 billion in 1999 and $246 billion in 2000 (Enciclopedia of Nations).

The new further enlargement of the EU in 2004 led to the synchronization of the EP with the previously created new cluster, the inclusion of Turkey within this cluster and a detachment of Russia which only remains synchronized with the Republic of Moldova, together with the return of Portugal to the WP.

The influence of the WP (namely the European Union) becomes more preeminent in 2008 as the Baltic States and Norway join this cluster, followed by Romania and Bulgaria in 2011, as a result of joining the Union in 2007. Belgium maintains its distinctive status among the European countries due to its particular politics.

The conclusion of this analysis is that while we are not able to state the existence of a unique European business cycle, we have empirically proved that there are two attraction poles in Europe and that states tend to migrate among these cores, according to their membership to the European Union or aspiration in this matter.

CONCLUSIONS

The paper set out to cast light on the relationship between business cycle transmission and globalization through the FDI channel.

Both globalization and business cycles are elusive economical phenomena, hence a continuous research puzzle for the academic community and an inexhaustible source of possible inquiries due to their complex nature and deep interconnection.

Until now there has not been rendered a single evaluation for either of them, thus the innovative idea of measuring business cycles synchronization through FDI does not seem far sighted, especially in the context of other studies which prove the superiority of this channel over more traditional ones like trade or similarity.

We have employed a regional study, focusing on 30 European countries and 2 aggregates, over a time span of 20 years, thus assuring that we have encapsulated at least one complete business cycle in the analysis.

Under the assumption that business cycles' synchronization is influenced by both time and space variables, we have employed a panel data analysis in order to capture both cross-sectional and period effects, out of which a mixed model (fixed period/random cross-section) was selected and statistically proven valid.

The Granger causality test has highlighted a unidirectional instant and continuous relation between FDI outflows and annual GDP growth and a bidirectional delayed and limited term (at most two years) between FDI inflows and the macroeconomic outcome of the receiving country, explained by the technology diffusion.

Lastly, in order to assess business cycle synchronization between the European countries, we have resorted to hierarchical cluster analysis which exposed the fact that while there is no unique European business cycle there are two powerful cores: the Western one, i.e. the founding states of the European Union and the Eastern one, previously dominated by Russia. The measure of globalization is given by the observed migration of the countries from the Eastern core towards the Western one, as a result of the integration process.

Further study will include an enlargement of the target population and a new clustering method, based upon fuzzy clusters.

REFERENCES

Agrawal, G., Khan, M.A. (2011) Impact *of FDI on GDP: A Comparative Study of China and India*, International Journal of Business and Management, Vol. 6, Issue 10, pp. 71-79.

Artis M., Okubo T. (2009) *Globalization and Business Cycle Transmission*, The North American Journal of Economics and Finance, Vol. 20, Issue 1, pp. 91-99.

Artis, M. (2003) *Is there a European Business Cycle?*, CESifo Working Paper Series No. 1053, October.

Baltagi, B.H. (1995) *Econometric Analysis of Panel Data*, New York: Wiley.

Baltagi, B.H. and Kao (2000) *Nonstationary Panels, Cointegration in Panels and Dynamic Panels: A Survey*, mimeo.

Baxter, M., King, R. (1999) *Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series*, Review of Economics and Statistics, Vol. 81, Issue 4, pp. 575-593.

Bhagwati, J. (2004) *In defense of globalization*, Oxford University Press, New York.

Bordo, M. D., Helbling, T. (2003) *Have National Business Cycles Become More Synchronize?*, NBER Working Paper No. 10130 .

Bordo, M., Haubrich, J.G. (2010) *Credit crises, money and contractions: An historical view*. Journal of Monetary Economics, Vol. 57, Issue 1, pp. 1-18.

Buch, C., Lipponer, A. (2005), *Business Cycles and FDI: Evidence from German Sectoral Data*, Review of World Economics, Vol. 141, Issue 4, pp. 732-759.

Burns, A., Mitchel, C. (1946) *Measuring Business cycles*, New York: NBER.

Camacho, M., Perez-Quiros, G., Saiz, L. (2006) *Are European Business Cycles close enough to be just one?* Journal of Economic Dynamics and Control, Vol. 30, Issue 9-10, pp. 1687-1706.

Canova, F. (1998) *Detrending and business cycle facts*, Journal of Monetary Economics, Issue 41, pp. 475-512.

Cooley, T. (1995) *Frontiers of Business Cycle Research*, Princeton University Press.

Darvas, Z., Szapary, G. (2004), *Business cycle synchronization in the enlarged EU: co-movements in the old and new members*, MNB Working Papers 1, pp. 1-54, February.

De Haan, J., Inklaar, R., Jong-A-Pin, R. (2008) *Will business cycles in the euro area converge? A critical survey of empirical research*, Journal of Economic Surveys, 108, pp. 234-273.

De Mello, L.R.Jr. (1997) *Foreign direct investment in developing countries and growth: A selective survey*, The Journal of Development Studies, Vol. 34, Issue 1, pp. 1-34.

De Mello, L.R.Jr. (1999) *Foreign direct investment-led growth: evidence from time series and panel data*, Oxford Economic Papers, Vol. 51, Issue 1, pp. 133-151.

De Sismondi, L.S. (1819) *Nouveaux principles d'economie, politique et de la richesse,* Paris.

Dreher, A., Vaubel R. (2009) *Foreign Exchange intervention and the political business cycle. A panel data analysis*, Journal of International Money and Finance, Vol. 28, Issue 5, pp. 755-775.

Dreher, A., Gastons, N., Martens, P. (2008) *Measuring globalization*, Spinger, New-York.

Eickmeier, S. (2007) *Business cycle transmission from the US to Germany — A structural factor approach*, European Economic Review, Vol. 51, Issue 3, pp. 521-551.

Fidrmuc, J., Korhonend, I. (2010) *The impact of the global financial crisis on business cycles in Asian emerging economies*, Journal of Asian Economics , Vol. 21, Issue 1, pp. 293-303.

Fidrmuc, J., Ikedae, T., Iwatsubo, K. (2012) *International transmission of business cycles: Evidence from dynamic correlations*, Economics Letters, vol. 114, Issue 3, pp. 252-255.

Frankel, J., Rose, A. (1998) *The endogeneity of the optimum currency area criteria*, Economic Journal, 108, pp. 1009-1025.

Frenkel M., Funke K., Stadtmann G. (2004) *A panel analysis of bilateral FDI flows to emerging economies*, Economic Systems, Vol. 28, Issue 3, pp. 281-300.

Giddens, A. (2001) *A treia cale – Renașterea social-democrației*, Polirom, Iași

Gilpin, R. (2004) *Economia mondială în secolul XXI. Provocarea capitalismului global*, Polirom, Iași.

Granger, C.W.J (1969) *Investigating causal relations by econometric models and cross-spectral methods*, Econometrica, Vol. 37, Issue 3, pp. 424-438.

Hausman, J. A. (1978) *Specification tests in econometrics*, Econometrica, Vol. 46, Issue 6, pp. 1251-1271.

Held, D., McGrew, A., Goldblatt, D., Perraton, J. (2004) *Transformări globale. Politica, economie și cultură*, Polirom, Iaşi.

Hodrick, R., Prescott, E. (1997) *Postwar U.S. Business Cycles: An Empirical Investigation*, Journal of Money, Credit and Banking , Vol. 29, Issue 1, pp. 1-16.

Hsiao, C. (1986) *Analysis of Panel Data*, Cambridge: Cambridge University Press.

Hsu, C.-C., Wu, J.-Y., Yau, R. (2011), *Foreign direct investment and business cycle co-movements: The panel data evidence*, Journal of Macroeconomics, Vol. 33, Issue 4, pp. 770-783.

Hudea, O.-S., Stancu, S. (2012) *Foreign Direct Investments, Technology Transfer and Economic Growth. A Panel Approach*, Romanian Journal of Economic Forecasting (2), pp. 85-102.

Im, K., Pesaran, H., Shin, Y. (2003) *Testing for Unit Roots in Heterogeneous Panels*, Journal of Econometrics 115, pp. 53-74.

Imbs, J. (2004) *Trade, Finance, Specialization, and Synchronization*, The Review of Economics and Statistics , Vol. 86, Issue 3, pp. 723-734.

Jaba, E. (2002) *Statistică* (3rd ed.), Ed. Economică, București.

Jansen, W., Stokman, A.C. (2004, 10) *Foreign Direct Investment and International Business Cycle Co-movement*, Working Paper 401.

Juglar, C. (1862) *Des crises commerciales et de leur retour périodique en France, en Angleterre et aux Etats-Unis*, Paris: Guillaumin et Cie.

Kleinert, J., Martin, J., Toubal, F. (2012) *The Few Leading the Many: Foreign Affiliates and Business Cycle Co-movement*, (G. a. Institute, Ed.) Working Paper No. 116, May.

Kose, M.A., Otrok, C., Prasad, E.S. (2008) *Global Business Cycles: Convergence or Decoupling?*, NBER Working Paper No. 14292 .

Krolzig, H.-M., Toro, J. (2005), *Classical and Modern Business Cycle Measurement: the European Case*, Spanish Economic Review, Vol. 7, Issue 1, pp. 1-21.

Levitt, Th. (1983) *The Globalization of Markets*, Harvard Business Review, June..

Li, X., Liu, X. (2005) *Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship*, World Development, Vol. 33, Issue 3, pp. 393-407.

Montoya, L.A., de Haan, J. (2008) *Regional business cycle synchronization in Europe?*, International Economics and Economic Policy , Vol. 5, Issue 1-2, pp. 123-137.

Moudatsou, A., Kyrkilis, D. (2009) *FDI and ECONOMIC GROWTH: Granger Causality Tests in Panel Data Model-Comparative results in the case of European Union countries EU (European Union countries) and ASEAN Association of South East Asian Nations*, EEFS2008-CONFERENCE, Poland.

National Bank of Romania (2011) *Investițile străine în România*.

Nayyar, D. (2006) *Globalization, history and development: a tale of two centuries*, Cambridge Journal of Economics, 30, Oxford University Press on behalf of the Cambridge Political Economy Society.

Otto, G., Voss, G., Willard, L. (2001) *Understanding OECD output*, Research Discussion Paper 05/2001, September.

Prasad, E., Rogoff, K., Wei, S.J., Kose, A. (2003) *Effects of Financial Globalization on Developing Countries: Some Empirical Evidence*, Economic and Political Weekly, Vol. 38, Issue 41, pp. 4319-4330.

Pedroni, P. (2004) *Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis*, Econometric Theory, Vol. 20, Issue 3, pp. 597-625.

Rugman, A., Chang, H.O. (2008) *Friedman's Follies: Insights on the Globalization/ Regionalization Debate*, Business and Politics, Vol. 10, Issue 2.

Schumpeter, J. (1939) *Business Cycles, A Theoretical, Historical and Statistical Analysis of the Capitalist Process*, London: McGraw-Hill Book Company.

Stock, J., Watson, M. (2010) *Indicators for Dating Business Cycles: Cross-History Selection and Comparisons*, American Economic Review, Papers & Proceedings, 100, pp. 16–19.

Tomlinson, J. (1999) *Globalization and Culture*, University of Chicago Press, Chicago.

Voinea, L. (2007) *Corporațiile transnaționale și capitalismul global*, Polirom, Iași.

*** IMF Staff (2000) *Globalization: Threat or Opportunity?*.

***Enciclopedia of Nations http://www.nationsencyclopedia.com/Europe/Belgium-FOREIGN-INVESTMENT.html.

***World Bank Database http://data.worldbank.org/indicator.

APPENDIX

Annex 1

Nr. crt	Country	Status
1.	Austria	Member since 1995
2.	Belgium	Founding member
3.	Bulgaria	Member since 2007
4.	Cyprus	Member since 2004
5.	Czech Republic	Member since 2004
6.	Denmark	Member since 1973
7.	Estonia	Member since 2004
8.	Finland	Member since 1995
9.	France	Founding member
10.	Germany	Founding member
11.	Greece	Member since 1981
12.	Hungary	Member since 2004
13.	Italy	Founding member
14.	Latvia	Member since 2004
15.	Lithuania	Member since 2004
16.	Netherlands	Founding member
17.	Norway	Control group
18.	Poland	Member since 2004
19.	Portugal	Member since 1986
20.	Republic of Moldova	Control group
21.	Romania	Member since 2007
22.	Russian Federation	Control group
23.	Slovak Republic	Member since 2004
24.	Slovenia	Member since 2004
25.	Spain	Member since 1986
26.	Sweden	Member since 1995
27.	Switzerland	Control group
28.	Turkey	Control group
29.	Ukraine	Control group
30.	United Kingdom	Member since 1973
31.	European Union	Control group
32.	World	Control group