

REM WORKING PAPER SERIES

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Cândida Ferreira

REM Working Paper 048-2018

September 2018

REM – Research in Economics and Mathematics

Rua Miguel Lúpi 20,
1249-078 Lisboa,
Portugal

ISSN 2184-108X

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Globalisation and economic growth: A panel data approach

Cândida Ferreira

ISEG, UL – Lisbon School of Economics and Management of the Universidade de Lisboa
UECE - Research Unit in Complexity and Economics
REM – Research in Economics and Mathematics
Rua Miguel Lupi, 20, 1249-078 - LISBOA, PORTUGAL
e-mail: candidaf@iseg.ulisboa.pt

Financial support by FCT (Fundação para a Ciência e a Tecnologia), Portugal is gratefully acknowledged. This article is part of the Strategic Project (UID/ECO/00436/2013).

Abstract

Using different kinds of panel unit root and cointegration tests as well as panel estimations this paper seeks to improve upon the existing literature by testing the possible relationship between globalisation and the real GDP of 29 countries across almost all continents for the period 1970–2013. The results obtained allow us to confirm that globalisation is clearly relevant to economic growth, mostly when globalisation is *proxied* by variables related to international transactions, but also when it is *proxied* with the globalisation indexes and sub-indexes provided by the database of the Swiss think-tank KOF. There is also clear evidence that the long-run relationships, measured through panel cointegration, are stronger among the countries belonging to the same continent, Europe, as well as among those with a higher GDP per capita.

Keywords: Economic growth; globalisation; KOF indexes; panel estimations; cointegration.

JEL Classification: C22, E10, F41, F62.

Globalisation and economic growth: A panel data approach

1. Introduction

The origins of the belief that globalisation, namely through trade liberalisation, would promote economic growth go back to at least the classical authors identified with “market forces and mercantilism” (well detailed, for instance, in Cameron, 1993). Authors such as Obstfeld (1994) strongly support that international economic integration accelerates economic growth.

Moreover, globalisation has often been considered as a key factor for economic development and growth by relevant international economic organisations (International Monetary Fund, 2000; World Bank and International Monetary Fund, 2007; Organisation for Economic Co-Operation and Development, 2010).

This optimistic view is also supported by many economists and researchers (among others, Frankel and Romer, 1999; Vamvakidis, 2002; Fischer, 2003; Dollar and Kraay 2004; Mahler, 2004; Amavilah, 2009; Chang and Lee, 2010). In general, these authors consider that globalisation can be identified with a high degree of trade openness, increasing competitiveness and advantages in national and international markets. Thus, from an economic and policy perspective, the relationship between globalisation and economic growth is considered undoubtedly relevant.

However, there is also evidence that globalisation is a rather complex phenomenon and it is sometimes associated with some undesired effects, such as increased pollution or inequality and not clearly promoting economic development and growth (see, for example, Wood, 1998; Rodriguez and Rodrik, 2000; Agenor, 2002; Frankel and Rose, 2005; Rodrik, 2007; Bergh and Nilsson, 2010; Ezcurra and Rodríguez-Pose, 2013; Potrafke, 2013; Eppinger and Potrafke, 2015).

Despite the controversial issues related to the globalisation phenomena, there is a general agreement about the idea that globalisation progressively makes people and countries more interdependent and that this interdependence is not strictly economic, as it also includes political and social interdependences. Therefore, the definition of relevant measures of globalisation is not easy to formulate as reliable indicators of globalisation should consider economic, political and social aspects.

The multiple dimensions of globalisation were constructively considered among others by Dreher (2006) and updated by Dreher et al. (2008) who created an overall index of globalisation covering economic, social and political integrations. These authors critically analyse the differences between the existing globalisation indexes, clearly underlying their inherent limitations, but also defending the relevance of these indexes as promising means for providing concrete data to measure globalisation meaningfully, despite the different methodologies, choices of variables and weights.

Nowadays, this index is known as the KOF index of globalisation and is provided by the Swiss Economic Institute – Konjunkturforschungsstelle. (Details regarding the construction of the KOF index are presented in Appendix A).

Since its construction, the KOF globalisation index and its main sub-indices have been used in several empirical analyses. For example, Chang and Lee (2010) use panel data including 23 countries within the Organisation for Economic Co-operation and Development (OECD) for the period 1970–2006 and apply panel cointegration techniques to test the long-term co-movements and causality between economic growth and the overall KOF globalisation index and its three main dimensions: economic, political and social integrations. The main conclusions point to the existence of long-term unidirectional causality running from the overall index of globalisation, economic globalisation and social globalisation to economic growth. Chang et al. (2011) also test the relationship between growth in gross domestic product (GDP)

and the KOF globalisation index and its three main dimensions using panel cointegration techniques, considering the G7 countries in the period 1970–2006. They conclude that both the overall globalisation index and the social globalisation index have a direct positive impact on GDP growth. The same variables are used in panel cointegration estimations by Ying et al. (2014) to test the long-term relationships between economic growth and globalisation in the Association of Southern Asian Nations (ASEAN) over the period 1970–2008, concluding that economic globalisation has a significantly positive influence on economic growth, but social globalisation has a negative influence on economic growth and political globalization has a non-significant negative effect.

Gurkul and Lach (2014) use panel estimates to analyse the contribution of several KOF globalisation indices and sub-indices to economic growth in 10 Central Eastern European (CEE) countries for the period 1990–2009 and conclude that there is a robust growth-stimulating effect of globalisation processes, especially for the social and economic dimensions, while the role of the political dimension of globalisation is not found to be statistically significant.

Chang et al. (2015) test the existence of non-linear relationships between real output and the KOF globalisation index and its three main dimensions (economical, political and social) through quantile cointegration regressions and considering the G7 countries over the period 1970–2006. They mostly conclude that the three dimensions of globalisation act as engines of real output and play a key role in long-term growth.

Kazar and Kazar (2016) use the KOF globalisation index to investigate the relationship between globalisation, financial development and economic growth, with panel cointegration techniques, in OECD and non-OECD countries classified according to their income levels from 1980 to 2010 and obtain different conclusions according to the country classification. More precisely, they conclude that the driving force of economic growth in terms of globalisation for

low-income and non-OECD high-income countries is mainly the social globalisation dimension; for high-income OECD and upper middle-income economies, it is the political globalisation dimension; for lower middle-income countries, it is the economic globalisation dimension.

Nowadays there is a general recognition of the relevance of the globalisation phenomena for the academic and scientific community, for policymakers as well as for the general public, and the relationship between the different aspects of globalisation and economic growth still deserves further examination.

One of the specific issues deserving further attention is the question whether globalisation promotes economic growth differently according to the degree of development of the considered countries. Another relevant question is the geographical proximity of the countries, facilitating the international trade but also being able to increase the economic, political and social identification of the countries.

Taking these issues into consideration, in this paper we contribute to the literature not only by analysing the relevance of the distinct dimensions of globalisation to economic growth but also testing the existence of potential differences in the behaviour of European versus non-European countries as well as of the more-developed versus less-developed countries. We consider a universe of 29 countries across almost all continents for the period 1970–2013, and with a panel approach we apply different kinds of unit root tests, cointegration tests and panel fixed effects and dynamic GMM regression estimations.

The remainder of this paper is organised as follows: Section 2 describes and discusses the methodological aspects; Section 3 presents the used data and the results obtained; Section 4 concludes.

2. Methodology

This study uses panel data techniques to analyse the possible influence of globalisation in economic growth. The advantages and disadvantages of using panel data have been already clearly discussed (see, for example, Baltagi, 2008; Wooldridge, 2010). Here it is worthwhile to underline that the use of panel data provides not only more informative data, more degrees of freedom and more efficient estimations but also less collinearity among the considered variables.

This paper first analyses the stationarity of the series using three panel unit root tests: Levin-Lin-Chu tests (Levin et al, 2002), Fisher-type (ADF) tests (Choi, 2001; Maddala and Wu, 1999) and Hadri Lagrange multiplier tests (Hadri, 2000). Then, it tests the existence of long-term relationship between economic growth and globalisation with panel cointegration tests: Pedroni (1999, 2004), Kao (1999) and Westerlund (2007) tests. It also analyses the possible influence of globalisation on economic growth with panel data regression estimations: panel fixed effect estimations, Arellano-Bond dynamic panel estimations (Arellano and Bond, 1991) and system dynamic panel estimations (Blundell and Bond, 1998).

2.1. Panel unit root tests

The analysis of the stationarity of the variables considers as starting point a simple panel-data model with a first-order autoregressive (AR) component:

$$y_{it} = \rho_i y_{i,t-1} + \delta_i Z_{it} + u_{it} \quad (1)$$

where $i = 1, \dots, N$ indexes the cross units; $t = 1, \dots, T$ indexes the time periods; y_{it} is the variable being tested; ρ_i is the AR coefficient; and u_{it} is the error term, assumed to be independent and identically distributed. The Z_{it} term represents individual constant deterministic effects specified for each unit root test, such as panel-specific means or panel-specific means and a time trend.

In general, panel unit-root tests are used to test the null hypothesis $H_0: \rho_i = 1$ for all i versus the alternative $H_a: \rho_i < 1$. Depending on the specific test, H_a may hold for all the cross units, i , or just for part of them.

The test proposed by Levin et al (2002) is adequate for heterogeneous panels of moderate size, such as the panels included in this paper. This test may be viewed as a pooled Dickey Fuller test, or as an Augmented Dickey Fuller test, including lags of the tested variable:

$$\Delta y_{it} = \alpha y_{i,t-1} + \sum_{j=1}^p \beta_{ij} \Delta y_{i,t-j} + \delta_i Z_{it} + u_{it} \quad (2)$$

With this test H_0 : panels contain unit root and H_a : panels are stationary.

The Fisher (ADF or Phillips Perron) tests combines the p-values of the panel-specific unit root tests using the four methods proposed by Choi (2001): three of these methods differ in whether they consider the inverse χ^2 , the inverse-normal, or the inverse-logit transformation of p-values, while the fourth method is a modification of the inverse χ^2 transformation and is recommended when N tends to infinity. With this test H_0 : all panels contain unit root and H_a : at least one panel is stationary.

The Hadri (2000) panel unit root test is recommended mostly for large T and moderate N . It uses the residuals from individual OLS regressions of the tested variable, y_{it} , on the deterministic components, constant and trend, to compute Lagrange-multiplier statistics. Contrary to the previous ones, this is a stationary test, considering H_0 : all panels are stationary and H_a : some panels contain unit roots.

2.2. Panel cointegration tests

Cointegration techniques provide an appropriate conceptual framework to analyse the long-term relationship between two series. The existence of cointegration implies that causality exists between the considered series, although it does not indicate the direction of the causal

relationship. The general definition of cointegration follows that of Engle and Granger (1987), meaning that two non-stationary series, x_t and y_t , with the same order of integration, will be considered cointegrated (and long-term equilibrium relationships exist) if there is a stationary linear combination of these series, z_t , which can be defined using the equation $z_t = x_t - a - by_t$ where a and b are constant terms.

Panel cointegration tests are similar to panel unit root tests as some of them are based on group means estimates, other tests are pooled estimates; they may also consider (or not) cross-sectional dependencies.

Pedroni (1999, 2004) test the null hypothesis of no cointegration in non-stationary panels and can be regarded as a panel equivalent of the well-known Engle and Granger (1987) cointegration test applied in time series analysis. In general terms, Pedroni considers the following type of regression:

$$y_{it} = \alpha_i + \beta_{1i}x_{1,it} + \beta_{2i}x_{2,it} + \dots + \beta_{Mi}x_{M,it} + e_{it} \quad (3)$$

where y_{it} is the variable being tested, $i = 1, \dots, N$ are the cross units, $t = 1, \dots, T$ the time periods, $m = 1, \dots, M$ are the independent variables. The variables are assumed to be integrated of order one for each cross unit i of the panel and, under the null of no cointegration the residual e_{it} will also be $I(1)$.

The test allows member specific effects and deterministic trends for the parameters α_i as well as individual variations of the slope coefficients, β_i , meaning that the cointegration vectors may be heterogenous across members of the panel.

Using the residuals from these static, long-run, regressions, Pedroni provides seven specific panel cointegration test statistics. Four of them are panel statistics, based on pooling the residuals of the regressions along the within dimension of the panels: panel-v, panel-rho, panel-PP and panel-ADF statistics. The other three are group statistics, based on pooling the residuals along the between dimension of the panels: group-rho, group-PP and group-ADF statistics.

However, it is recognised (for example, in Neal, 2014) that the relative power of these seven Pedroni statistics is not totally clear and that they can provide contradictory results; nevertheless, similar results of several of these seven statistics can be interpreted as a sign of robustness of the Pedroni's panel cointegration test results.

Kao (1999) test can be regarded a generalization of Dickey-Fuller and Augmented Dickey-Fuller tests in the context of panel data.

Like Pedroni's test, the Kao's panel cointegration test assumes the null hypothesis of no cointegration of the residuals of panel regressions to define the asymptotically normal distribution and provide the test statistics. Both tests assume the presence of single cointegrating vector, but contrary to the Pedroni's, the Kao's test does not allow the heterogeneity across individual units, namely individual specific short run effects and different lag-lengths in the test regressions.

The Westerlund (2007) panel cointegration test is also derived under the null hypothesis of no cointegration, but contrary to the Pedroni and Kao tests, this test is not based on the residuals of the long run static regressions. The Westerlund's test is based on structural rather than residual dynamics and assesses the significance of the adjustment coefficient in an error corrector model of the following type:

$$\begin{aligned} Dy_{it} = & c_i + a_{i1} * Dy_{it-1} + \dots + a_{ip} * Dy_{it-p} + b_{i0} * Dx_{it} + b_{i1} * Dx_{it-1} + \dots + b_{ip} \\ & * Dx_{it-p} + a_i(y_{it-1} - b_1 * x_{it-1}) + u_{it} \end{aligned} \quad (4)$$

The test is very flexible and works well in unbalanced, heterogeneous and/or relatively small panels, allowing for dependence both between and within the cross-panel units. It provides four test statistics: G_t , G_a , P_t and P_a . The G_t and G_a statistics test $H_0: a_i = 0$ for all i versus $H_a: a_i < 0$ for at least one of the series, i , starting from a weighted average of the individually-estimated coefficients a_i and their respective t-ratios. The P_t and P_a test statistics consider the pooled information of all panel cross-section units to test $H_0: a_i = 0$ for all i versus $H_a: a_i < 0$ for all

cross-section units. Thus, the rejection of the H_0 must always be taken as the rejection of the cointegration for the whole panel. Any single cross-unit can cause the rejection of the H_0 and it is not possible to identify which cross-unit is responsible for this rejection.

2.3 Panel regression estimations

Panel data regression estimates allow great flexibility in modelling the differences in the individual cross units' behaviours. A basic static panel regression model can be represented with the following equation:

$$y_{it} = \alpha_t + \beta X_{it} + \gamma Z_i + v_i + u_{it} \quad (5)$$

where y_{it} is the variable being tested; $i = 1, \dots, N$ are the cross units; $t = 1, \dots, T$ the time periods; α_t is the intercept (here, varying with t but independent of i); X_{it} are the independent variables that can vary both with i and t ; Z_i are the time-invariant independent variables that vary only with i ; β and γ are the coefficients associated to the X_{it} and Z_i variables; v_i is an error term that is assumed to vary with i but not with t ; u_{it} is another error term but this one is assumed to vary both with i and t .

Among the possible methods to estimate this kind of equations we will focus first on fixed and random effects panel estimations and then on system dynamic panel estimations.

Fixed effect estimates are particularly adequate when we are interested in analysing the impact of variables that vary over the time. Fixed effects explore the relationship between the explaining variables and the outcome within each cross unit, considering that each cross unit has its own characteristics, v_i , that may (or not) influence the explaining variables. Therefore, we may use fixed effects estimations if we consider that v_i is correlated with the time-varying variables X_{it} but we cannot estimate the coefficients, γ , representing the effects of the time invariant variables Z_i .

Random effects estimations assume that the distribution of the variable being tested, y_{it} , is not conditional on single individual characteristics; moreover, it is assumed that the unobserved variables are uncorrelated with all the observed variables.

Therefore, the crucial distinction between fixed and random effects is whether the unobserved individual effect includes elements that are correlated (or not) with the regressors.

To decide between fixed or random effects we can run a Hausman test analysing if ν_i is correlated (or not) with the time-varying variables X_{it} that is:

H_0 : There is no correlation between the error term and the independent variables ($y_{it} = \alpha_0 + \beta X_{it} + \nu_i + u_{it}$).

H_A : There is statistically significant correlation between the error term and the independent variables ($y_{it} = \beta X_{it} + \nu_i + u_{it}$).

The results of the Hausman tests will then point to random effects if the estimated β coefficients of these two equations are consistent and efficient under H_0 but not under H_A ; and fixed effects will be indicated if the estimated β coefficients are consistent under H_0 and H_A .

However, neither fixed- nor random-effects models can deal with endogenous regressors, which may reveal an important concern in the context of the considered model. In order to deal with this limitation, we use dynamic panel estimates, developed by Arellano and Bover (1995) and Blundell and Bond (1998), which can not only address the endogeneity problems (although only for weak endogeneity and not for full endogeneity, as explained by Bond (2002)) but also reduce the potential bias in the estimated coefficients.

Here we chose the dynamic one-step system GMM (Generalized Method of Moments) estimations. The system GMM method uses cross-country information and jointly estimates the equations in first difference and in levels, with first differences instrumented by lagged levels of the dependent and independent variables and levels instrumented by first differences of the regressors.

To analyse the consistency of the GMM estimations, namely the validity of the additional instruments, we follow the tests proposed by Arellano and Bond (1991). They are used to test autocorrelation, that is, the assumption that the error term is not serially correlated using the differenced error term, so, by construction, the autocorrelation of the first order, $AR(1)$, is supposed to be validated but not the autocorrelation of the second order, $AR(2)$, or autocorrelation of a higher order. Additionally, the validity of the instruments is tested through the Hansen J statistic, which is robust to heteroskedasticity and autocorrelation.

3. Data and empirical results

3.1. Data

This paper tests the possible relationship between globalisation and the economic growth of 29 European and non-European countries, spread across almost all continents: Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Iceland, India, Indonesia, Ireland, Italy, Japan, Luxembourg, Malta, Mexico, Netherlands, Norway, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Turkey, United Kingdom (UK) and United States of America (US).

Economic growth is represented by the natural logarithm of real GDP with data sourced from the World Development Indicators provided by the World Bank (series “GDP at market prices, constant 2010 US\$”). Globalisation is first *proxied* by variables related to international transactions, namely the natural logarithm of exports and the natural logarithm of imports, with data also sourced from the World Development Indicators (series “Exports of goods and services, constant 2010 US\$” and “Imports of goods and services, constant 2010 US\$”), as well as “openness to the rest of the world”, defined as the ratio of the sum of exports and imports to GDP.

Globalisation is also represented by the natural logarithm of the nine KOF globalisation indexes and sub-indexes, measuring the three main dimensions of globalisation: economic, social and political globalisation (as detailed in Appendix A).

In our estimations we consider the following panels of countries (all for the period 1970-2013):

Panel 1 – including the mentioned 29 countries (a panel with 1305 observations);

Panel 2 – including the sub-sample of the European countries (18 countries; 810 observations);

Panel 3 – including the sub-sample of the non-European countries (11 countries; 450 observations);

Panel 4 – including the sub-sample of the 23 “developed” countries, that is, those countries with a GDP per capita > 20 000 constant 2010 US\$, in 2014: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sweden, UK and US (a panel with 810 observations);

Panel 5 – including the sub-sample of the 6 “non-developed” countries, that is, those countries with a GDP per capita < 20 000 constant 2010 US\$, in 2014: Brazil, India, Indonesia, Mexico, South Africa, Turkey (a panel with 270 observations).

3.2. Results obtained

The empirical estimations were performed using the Stata software and following the methodological steps outlined in the previous section. Accordingly, here we first present the results obtained with panel unit root tests, then with panel cointegration tests and finally with panel regression estimations: fixed and random effects estimations as well as system dynamic panel estimations.

3.2.1. Results obtained with panel unit root tests

First, we examine the stationarity of the series, implementing the mentioned unit root tests: Levin-Lin-Chu test, Fisher-type (ADF) test and Hadri test. The results obtained (both in levels and differences) are presented in Table 1.

The results are not totally unanimous but in general allow us to conclude that, at least according to one of the performed unit root tests, the considered variables are non-stationary at their levels and become stationary at their first differences, showing that these variables are integrated in the order one.

The results obtained with the Levin-Lin-Chu test point more evidently to the non-stationarity of the series in levels and to their stationarity in differences.

In what regards to the results obtained with the Fisher test, there are no doubts about the stationarity of the series in differences and in some cases also to their stationarity in levels (mostly for the index and sub-indexes related to the Social Globalisation and to some extent also to the GDP series).

Moreover, according to the results obtained with the Hadri test, all the considered series are clearly non-stationary in their levels and some of them can also be non-stationary in their differences; the main doubts now are related not only to the GDP series and the index and sub-indexes related to the Social Globalisation (particularly B2 – Informational Flows) but also to the Overall Globalisation Index series.

Table 1 – Results obtained with panel unit root tests (p-values)

PANEL 1 ⁽¹⁾													
	GDP	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
LLC: levels	0.9382	0.3866	0.2758	0.7530	0.4164	0.3281	0.5412	0.3243	0.0044	0.7296	0.0001	0.0002	0.7377
differ.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Fisher: levels	0.0000	0.9164	1.0000	1.0000	0.3991	0.8892	0.5491	0.0216	0.0600	1.0000	0.0000	0.0040	0.1230
differ.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hadri: levels	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
differ.	0.0000	0.7525	0.9936	0.8474	0.0007	0.0749	0.0000	0.0000	0.0000	0.0000	0.1542	0.5964	0.0000

PANEL 2⁽²⁾

	GDP	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
LLC: levels differ.	0.2597 0.0000	0.7931 0.0000	0.4763 0.0000	0.0568 0.0000	0.0312 0.0000	0.0594 0.0000	0.0242 0.0000	0.0520 0.0000	0.0005 0.0000	0.3705 0.0000	0.0001 0.0000	0.0096 0.0000	0.3015 0.0000
Fisher: levels differ.	0.0000 0.0000	0.5830 0.0000	0.9981 0.0000	1.0000 0.0000	0.4371 0.0000	0.9782 0.0000	0.2453 0.0000	0.1190 0.0000	0.0059 0.0000	1.0000 0.0000	0.0000 0.0000	0.1229 0.0000	0.1832 0.0000
Hadri: levels differ.	0.0000 0.0000	0.0000 0.0029	0.0000 0.0034	0.0000 0.2481	0.0000 0.0000	0.0000 0.0015	0.0000 0.0061	0.0000 0.0144	0.0000 0.0000	0.0000 0.0000	0.0000 0.3196	0.0000 0.9791	0.0000 0.0001

PANEL 3⁽³⁾

	GDP	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
LLC: levels differ.	0.9086 0.0000	0.6692 0.0000	0.5307 0.0000	0.9814 0.0000	0.8410 0.0000	0.9070 0.0000	0.8164 0.0000	0.7796 0.0000	0.1608 0.0000	0.6255 0.0000	0.0342 0.0000	0.0508 0.0000	0.7968 0.0000
Fisher: levels differ.	0.0012 0.0000	0.9845 0.0000	0.9945 0.0000	0.9929 0.0000	0.3776 0.0000	0.3346 0.0000	0.8795 0.0000	0.0337 0.0000	0.8740 0.0000	1.0000 0.0000	0.0000 0.0000	0.0030 0.0000	0.2043 0.0000
Hadri: levels differ.	0.0000 0.0000	0.0000 0.7564	0.0000 0.9742	0.0000 0.7560	0.0000 0.1621	0.0000 0.5098	0.0000 0.0008	0.0000 0.0000	0.0000 0.1543	0.0000 0.0000	0.0000 0.1790	0.0000 0.0788	0.0000 0.0073

PANEL 4⁽⁴⁾

	GDP	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
LLC: levels differ.	0.4421 0.0000	0.9894 0.0000	0.9735 0.0000	0.9859 0.0000	0.0819 0.0000	0.3411 0.0000	0.0255 0.0000	0.0430 0.0000	0.0000 0.0000	0.8691 0.0000	0.0000 0.0000	0.0001 0.0000	0.2143 0.0000
Fisher: levels differ.	0.0000 0.0000	0.7744 0.0000	0.9998 0.0000	1.0000 0.0000	0.1092 0.0000	0.8363 0.0000	0.1925 0.0000	0.0014 0.0000	0.0096 0.0000	1.0000 0.0000	0.0000 0.0000	0.0014 0.0000	0.0183 0.0000
Hadri: levels differ.	0.0000 0.0000	0.0000 0.7300	0.0000 0.9952	0.0000 0.8761	0.0000 0.0008	0.0000 0.0066	0.0000 0.0473	0.0000 0.0102	0.0000 0.0000	0.0000 0.0000	0.0000 0.1381	0.0000 0.9800	0.0000 0.0172

PANEL 5⁽⁵⁾

	GDP	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
LLC: levels differ.	0.5269 0.0000	0.0695 0.0000	0.0329 0.0000	0.1539 0.0000	0.7232 0.0000	0.5386 0.0000	0.7848 0.0000	0.4971 0.0000	0.9273 0.0000	0.1780 0.0000	0.0942 0.0000	0.2691 0.0000	0.3412 0.0000
Fisher: levels differ.	0.1056 0.0000	0.9489 0.0000	0.9184 0.0000	0.7721 0.0000	0.9993 0.0000	0.7378 0.0000	0.9995 0.0000	0.9997 0.0000	0.9793 0.0000	0.9999 0.0000	0.9395 0.0000	0.5575 0.0000	0.9984 0.0000
Hadri: levels differ.	0.0000 0.0033	0.0000 0.6122	0.0000 0.6481	0.0000 0.2686	0.0000 0.1232	0.0000 0.8754	0.0000 0.0001	0.0000 0.0000	0.0000 0.4238	0.0000 0.0000	0.0000 0.3944	0.0000 0.0055	0.0000 0.0002

⁽¹⁾ PANEL 1 includes all the 29 countries considered in our estimations: Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Iceland, India, Indonesia, Ireland, Italy, Japan, Luxembourg, Malta, Mexico, Netherlands, Norway, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Turkey, UK and US.

⁽²⁾ PANEL 2 includes the sub-sample of the 18 European countries.

⁽³⁾ PANEL 3 includes the sub-sample of the 11 non-European countries.

⁽⁴⁾ PANEL 4 includes the sub-sample of the 23 more developed countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sweden, UK and US.

⁽⁵⁾ PANEL 5 includes the sub-sample of the 6 less developed countries: Brazil, India, Indonesia, Mexico, South Africa and Turkey.

Source: Author's calculations using the Stata statistical software.

3.2.2. Results obtained with panel cointegration tests

Cointegration tests provide an appropriate framework to analyse the possible existence of long-run relationship between two series. Among the available panel cointegration tests we apply three of the most popular ones: Pedroni, Kao and Westerlund tests. The results obtained are reported in Table 2. Not surprisingly, due to the characteristics of the different tests, the results are not all evidently in line.

Looking at the results obtained with the Kao's cointegration test we can conclude that there is clear evidence of the existence of long-run relationships between the growth of the real GDP and almost all the *proxy* variables for globalisation. The few exceptions are mostly related to two of the KOF sub-indexes representing the social globalisation: B1 (Personal Contacts) for Panel 3 (including the sub-sample of the 11 non-European countries) and Panel 5 (including the sub-sample of the 6 less developed countries); and B2 (Informational Flows) only for Panel 4 (including the sub-sample of the 23 more developed countries).

In what regards to the statistics obtained with the Pedroni cointegration test the results allow us to conclude that in almost all situations at least one or more reported test statistics point to the existence of cointegration relationships between the real GDP and the globalisation *proxies*. The main exceptions are to be found in the results obtained for Panel 5 (with the 6 less developed countries) particularly for two of the considered proxies: Openness and B- Social Globalisation. From the other side, the robustness of the results obtained is more evident for the panel including only the 18 European countries (Panel 2) and the one including the 23 more developed countries (Panel 4).

Table 2 – Results obtained with panel cointegration tests

PANEL 1 ⁽¹⁾												
	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
Pedroni:												
Panel-v	1.501**	2.023**	0.5266	2.528***	1.498**	2.521***	1.851**	1.442*	1.026	1.59**	-0.1524	1.53**
Panel-rho	1.701**	1.207*	1.896**	0.8456	1.568**	0.4948	0.5227	1.675**	1.497**	0.3587	2.557***	1.246*
Panel-PP	0.9838	0.4526	0.6416	0.3579	0.9635	-0.4215	-0.9344	0.8714	0.3259	-1.269	1.525**	0.4185

Panel-ADF	-1.079	-0.931	-0.804	-0.48	0.5974	-2.104**	-1.4*	-0.106	0.5884	0.722	0.483	-0.3736
Group-rho	2.575***	2.356**	2.889***	1.776**	2.375**	1.515***	1.409*	2.478***	2.714***	1.461**	3.353***	2.303**
Group-PP	1.524**	1.196*	1.402*	0.8473	1.475**	0.2003	0.02836	1.43**	1.128	-0.116	2.061**	1.423*
Group-ADF	-1.033	-0.591	-0.559	-1.063	0.2476	-2.57***	-0.7787	-1.013	0.3424	-0.487	0.4094	0.1921
Kao	33.61***	35.20***	-11.29***	-8.41***	-13.76***	1.61	2.63***	-2.29**	1.19	21.00***	24.50***	5.04***
Westerlund:												
Gt	-2.2***	-2.63***	-2.502***	-2.218***	-1.278	-2.933***	-1.796	-2.08**	-2.13**	-1.635	-1.392	-1.768
Ga	-9.3**	-8.094	-6.913	-6.112	-3.336	-5.101	-4.972	-5.528	-5.697	-2.876	-2.354	-5.247
Pt	-10.5***	-13.4***	-11.78***	-9.358*	-5.855	-13.15***	-7.439	-6.638	-10.6***	-6.411	-5.877	-7.837
Pa	-6.196**	-5.92**	-3.686	-3.495	-2.106	-3.719	-3.283	-2.027	-4.799	-1.952	-1.843	-4.100

PANEL 2⁽²⁾

	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
Pedroni:												
Panel-v	2.183**	1.875**	0.3174	1.028	0.4469	1.208*	0.7553	1.796**	0.451	0.8084	-0.1176	0.8621
Panel-rho	0.6016	0.694	1.571**	1.299*	1.518**	1.313*	1.415*	0.3983	1.439**	1.58**	1.941**	1.938**
Panel-PP	0.4702	0.04226	1.094	1.219*	1.158*	1.096	0.9858	.0788	0.7775	-1.348*	1.453*	1.98**
Panel-ADF	0.06878	-1.346*	-0.7871	-0.1206	-0.114	-1.201*	-0.7053	-1.829**	0.7581	0.0961	0.7713	0.5837
Group-rho	1.67**	1.983**	2.719***	2.19**	2.573***	2.188**	2.65***	1.522**	2.682**	2.731**	3.03***	2.799***
Group-PP	1.243*	1.097	2.098**	1.995**	2.074**	1.815**	2.074**	0.6553	1.86**	2.414*	2.496**	2.773***
Group-ADF	-0.3892	-1.458**	-0.4076	-0.8626	-0.5248	-1.929**	-0.5669	-2.375**	0.8134	-0.2735	0.6665	0.7885
Kao	39.96***	36.35***	-6.93***	-8.41***	-10.67***	23.68***	13.41***	-7.51***	-2.03**	23.55***	25.66***	18.89***
Westerlund:												
Gt	-2.246**	-2.69***	-2.459***	-2.600***	-1.383	-3.533***	-2.175**	-2.45***	-2.32***	-2.001	-1.445	-2.012
Ga	-9.570**	-9.45**	-7.551	-7.415	-4.338	-5.712	-6.047	-7.133	-6.737	-3.562	-2.730	-6.070
Pt	-11.3***	-14.1***	-9.665***	-9.467***	-5.964	-13.70***	-9.089***	-10.8***	-9.01***	-8.02**	-5.221	-8.223**
Pa	-10.6***	-9.54***	-4.404	-4.053	-3.092	-4.039	-4.749	-4.762	-4.718	-2.788	-1.691	-4.952

PANEL 3⁽³⁾

	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
Pedroni:												
Panel-v	0.1284	0.1914	0.2826	1.498*	0.6208	1.184	0.887	-0.3103	0.5766	0.7084	-0.02995	0.4653
Panel-rho	0.6747	0.8635	0.0666	-0.196	0.7054	-0.366	-0.598	1.298*	-0.0063	-0.9359	1.07	0.6171
Panel-PP	-0.7769	-0.0554	-1.627**	-1.077	-0.1472	-1.581**	-2.188**	0.2592	-1.535**	-2.88***	-0.3245	-0.3735
Panel-ADF	-2.39**	-0.0435	-2.016**	-1.591**	0.0934	-1.657**	-2.131**	-1.809**	-1.703**	-2.53***	-1.095	-0.9536
Group-rho	1.3567*	1.657**	1.228*	1.078	1.296*	0.9677	0.8793	2.001**	1.262*	0.756	1.517**	1.478*
Group-PP	-0.4188	0.6251	-0.9323	-0.3206	0.2094	-0.7904	-0.8133	0.7752	-0.7189	-1.32*	0.2929	0.2663
Group-ADF	-1.527**	0.5873	-1.671**	-1.556**	-0.1194	-1.052	-1.631	-1.209*	-1.874**	-1.67**	-1.084	-0.8768
Kao	6.56***	8.28***	-3.59***	3.62***	-4.11***	6.37***	8.57***	0.62	8.89***	15.44***	11.29***	11.23***
Westerlund:												
Gt	-2.116	-2.55***	-2.572***	-1.595	-1.106	-1.950	-1.174	-1.463	-1.829	-1.036	-1.306	-1.369
Ga	-8.855	-5.872	-5.868	-3.980	-1.696	-4.100	-3.212	-2.901	-3.996	-1.754	-2.556	-3.901
Pt	-5.922	-7.55***	-7.130***	-4.137	-2.947	-5.225	-2.323	-1.709	-6.119	-1.831	-3.279	-3.366
Pa	-5.346	-5.178	-3.380	-2.787	-1.584	-3.080	-1.772	-0.787	-4.882	-0.999	-2.117	-3.134

PANEL 4⁽⁴⁾

	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
Pedroni:												
Panel-v	0.8001	1.03	0.2324	1.146	0.3731	0.9502	1.442*	0.8224	0.1904	0.8863	-0.4959	0.9347
Panel-rho	1.721**	1.543**	1.286*	1.26*	1.692**	1.257*	0.03741	1.196	1.746**	-0.0623	2.13**	0.9594
Panel-PP	1.224*	0.8468	0.09786	1.104	1.234*	0.5989	-1.056	.3184	0.8364	-1.417*	1.231*	0.377
Panel-ADF	1.157	-0.5294	-1.09	0.7075	1.149	-0.8412	-1.721**	-1.17	0.02462	0.7353	0.6799	-0.2842
Group-rho	2.104**	1.879**	2.366**	2.178**	2.439**	2.16**	1.567**	1.956**	2.745***	1.862**	3.085***	2.143**
Group-PP	1.347*	0.8075	0.7969	1.663**	1.693**	1.327*	0.4606	0.7486	1.607**	0.6404	1.956**	1.484*
Group-ADF	-1.412*	-0.6107	-1.193	-0.05334	0.6452	-1.798**	-0.8098	-1.973**	0.5332	0.4265	0.4848	0.3167
Kao	33.81***	32.68***	-12.23***	-14.38***	-17.35***	12.13***	8.61***	-9.90***	-0.85	27.48***	26.25***	10.06***
Westerlund:												
Gt	-2.170**	-2.54***	-2.436***	-2.533***	-1.466	-3.303***	-1.995	-2.33***	-2.33***	-1.859	-1.268	-1.840
Ga	-9.044**	-8.399	-7.326	-7.253	-4.326	-5.693	-5.389	-6.484	-6.429	-3.255	-1.881	-5.466
Pt	-10.4***	-13.7**	-11.5***	-10.598***	-7.647	-14.34***	-9.154**	-11.0***	-11.6***	-8.023	-4.665	-8.184
Pa	-5.553	-5.778*	-4.645	-4.075	-3.481	-3.941	-4.094	-4.201	-5.324	-2.441	-1.459	-4.453

PANEL 5⁽⁵⁾

	Exports	Imports	Openness	A Economic Globalisation	A1 Actual Flows	A2 Restrictions	B Social Globalisation	B1 Personal Contact	B2 Informa- tional Flows	B3 Cultural Proximity	C Political Globalisation	G Overall Globalisation Index
Pedroni:												
Panel-v	1.049	0.3447	0.2913	1.332*	0.9831	1.001	0.5986	0.7658	-0.1705	0.7254	0.4654	1.265*
Panel-rho	-0.3378	-0.1704	0.2534	-0.5663	-0.3421	-0.4956	0.03846	-0.2478	0.3866	-0.0306	0.1226	-0.4433
Panel-PP	-1.445*	-1.128*	-1.003	-1.599**	-1.168	-1.876**	-1.044	-1.441*	-1.044	-1.292*	-1.281*	-1.437*
Panel-ADF	-1.633**	0.4601	-0.1579	-1.394*	-1.457*	-0.9448	-0.7009	-1.786**	-1.471**	-1.42**	-0.9323	-0.6763
Group-rho	0.4312	0.8962	0.96	0.299	0.3954	0.7156	0.7831	0.6541	1.144*	0.7813	1.037	0.4287
Group-PP	-1.055	-0.3941	-0.4492	-1.135*	-0.8433	-1.07	-0.5723	-0.8038	-0.4675	-0.6395	-0.6103	-0.8301

Group-ADF	-1.286*	0.7067	0.5778	-1.707**	-1.241*	-0.05388	-0.7162	-1.19	-1.229*	-1.323*	-0.2717	0.04631
Kao	9.560**	13.12***	-3.62	2.59***	-1.61	2.27**	6.66***	-0.39	6.21***	10.63***	5.91***	8.71***
Westerlund:												
Gt	-2.030*	-3.01***	-2.753***	-1.011	-0.556	-1.515	-1.032	-1.113	-1.381	-0.774	-1.867	-1.493
Ga	-10.27*	-6.926	-5.329	-1.742	0.460	-2.829	-3.371	-1.865	-2.891	-1.424	-4.167	-4.407
Pt	-4.414	-5.167*	-4.951*	-1.687	-1.139	-2.895	-0.669	-0.228	-2.651	-0.538	-3.539	-2.362
Pa	-7.798**	-6.169	-2.978	-1.694	-0.774	-2.663	-0.812	-0.136	-3.276	-0.461	-3.253	-3.179

(1) PANEL 1 includes all the 29 countries considered in our estimations: Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Iceland, India, Indonesia, Ireland, Italy, Japan, Luxembourg, Malta, Mexico, Netherlands, Norway, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Turkey, UK and US.

(2) PANEL 2 includes the sub-sample of the 18 European countries.

(3) PANEL 3 includes the sub-sample of the 11 non-European countries.

(4) PANEL 4 includes the sub-sample of the 23 more developed countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sweden, UK and US.

(5) PANEL 5 includes the sub-sample of the 6 less developed countries: Brazil, India, Indonesia, Mexico, South Africa and Turkey.

Source: Author's calculations using the Stata statistical software.

3.2.3. Results obtained with panel regression estimations

As mentioned before, among the possible methods to estimate panel equations we focussed on fixed and random effects estimations and on system dynamic panel estimations.

In order to go on testing the possible existence of differences between European and non-European countries as well as between more and less developed countries, we compare the results obtained for the considered panels: first, we compare the results obtained for Panels 1, 2 and 3; and then we compare the results obtained for Panels 1, 4 and 5. In all situations we estimate a model including as explaining variables all *proxies* for globalisation (Model I) and then, eliminating the explaining variables that are highly correlated¹ we estimate a simpler model (Model II) including only the Exports, the Openness and the three main indexes representing the relevant dimensions of globalisation: Economic Globalisation, Social Globalisation and Political Globalisation.

The choice between fixed and random effects was made considering the results obtained with the Hausman test and point to the validity of the fixed effects estimations which are presented

¹ The correlation matrixes are not presented in the paper but will be available if requested.

in Appendixes B1 and B2². It is well recognised that this kind of estimations is particularly adequate for the analysis of the impact of variables that vary over the time and explore the relationship between the explaining variables and the outcome within each cross unit (here, each of the considered countries).

The results reported in Appendixes B1 and B2 (and summarized in Tables 3 and 4), in general, point to the validity of the fixed effects panel estimations. In all situations the growth of the Exports, Imports and Openness are statistically very relevant to the growth of the real GDP. Not surprisingly, the results are not so unanimous when globalisation is *proxied* with the KOF indexes and sub-indexes. Nevertheless, there are no doubts that the evolution of some of these indexes and sub-indexes is statistically very relevant to the real GDP growth, particularly the index B – Social Globalisation and one of its sub-indexes: B3 – Cultural Proximity.

The relevance of the globalisation *proxies* to economic growth was also tested with the application of dynamic one-step system GMM (Generalized Method of Moments) estimations which have the advantage of dealing well with eventual endogeneity of some of the considered regressors and of reducing the potential bias of the estimated coefficients.

The results obtained with dynamic one-step system GMM estimations are presented in Appendixes C1 and C2 (and summarized in Tables 3 and 4) and clearly validated by the results of the Wald and Sargan tests. In what regards to the Arellano-Bond tests, the results do not always reject the hypothesis of no autocorrelation of the second order; but with one single exception (Model I, Panel 2 in Appendix C1) they clearly validate the rejection of the null hypothesis of no autocorrelation of the first order.

These results confirm that in all situations the growth of the Exports, Imports and Openness are statistically very relevant to the growth of the real GDP. In what regards to the influence of the evolution of the KOF globalisation indexes and sub-indexes, the dynamic GMM estimations

² The results obtained with random effects estimates and the Hausman test are also available if requested.

confirm the findings of the fixed effects estimations, that is, the statistical relevance of the index B – Social Globalisation (and now also of its three sub-indexes). But with the dynamic estimations, the other two dimensions of globalisations, here represented by the indexes A – Economic Globalisation and C – Political Globalisation well as of their indexes (with very few exceptions) are statistically very relevant to economic growth.

Table 3 summarises the results obtained both with fixed and dynamic GMM panel estimations for the whole sample of 29 countries (Panel 1) and for two of the considered sub-samples: Panel 2 including the 18 European countries and Panel 3 with the 11 non-European countries. For these three panels we report the results obtained including all the considered *proxies* for globalisation (in Model I) and then only with those that are not highly correlated (in Model II). The results obtained for Model I (first part of Table 3) allow us to conclude that in all situations Exports and Imports clearly grow in line with the real GDP. For the other side, the Openness growth (meaning the logarithm of the ratio of the sum of Export and Imports to GDP) is opposite to the real GDP growth, revealing that too much dependence of the rest of the world is not beneficial to economic growth.

The results obtained for the KOF indexes and sub-indexes reveal that, in general, the indexes representing Economic Globalisation and Social Globalisation grow in line with real GDP; the same occurs with the Political Globalisation but only for the European countries.

A more careful analysis of the results obtained for the sub-indices indicate that although the evolution of the index A – Economic Globalisation grows in line with GDP, the results for the sub-indexes A1 – Actual Flows and A2 – Restrictions are not so unanimous. The same applies to B - Social Globalisation as, for example, two of its sub-indexes: B2 - Informational Flows and B3 – Cultural Proximity clearly do not grow in line with the real GDP. These discrepancies may be due to the composition of the KOF indexes and sub-indexes (specified in Appendix A)

and not so clearly to relevant differences in the behaviour of the European countries in comparison to the non-European ones.

Looking at the results obtained with the simplified model (Model II in the second part of Table 3) we confirm the conclusions obtained for the Exports, Openness and Social Globalisation. Now, although not always statistically relevant, the growth of the Economic Globalisation is clearly not in line with economic growth. But in what regards to Political Globalisation now there is evidence that its evolution is in line with the real GDP growth. Moreover, these results clearly corroborate that there are no specific differences in the behaviour of the European and the non-European countries.

TABLE 3 – Results obtained with fixed effects and dynamic GMM system panel estimations (European versus non-European countries)

MODEL I			
Variables	PANEL 1⁽¹⁾	PANEL 2⁽²⁾	PANEL 3⁽³⁾
Constant			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Exports			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Imports			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Openness			
Fixed-effects	- ***	- ***	- ***
Dynamic GMM system	- ***	- ***	- ***
A – Economic Globalisation			
Fixed-effects	+ ***	-	+
Dynamic GMM system	+ ***	+ ***	+ **
A1 - Actual Flows			
Fixed-effects	- ***	+	-
Dynamic GMM system	- ***	-	- ***
A2 – Restrictions			
Fixed-effects	- ***	+ ***	.*
Dynamic GMM system	- ***	+	- ***
B - Social Globalisation			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	- ***	+
B1 - Personal Contact			
Fixed-effects	-	+ ***	- ***
Dynamic GMM system	- ***	+ ***	- ***

B2 - Informational Flows			
Fixed-effects	- ***	-	- ***
Dynamic GMM system	- ***	- ***	- ***
B3 - Cultural Proximity			
Fixed-effects	- ***	- ***	- ***
Dynamic GMM system	- ***	- ***	- ***
C – Political Globalisation			
Fixed-effects	- **	+	-
Dynamic GMM system	- ***	+ ***	-
G – Overall Globalisation Ind			
Fixed-effects	+	- *	-
Dynamic GMM system	+ ***	- ***	+
Number of observations	1,305	810	495

MODEL II

Variables	PANEL 1 ⁽¹⁾	PANEL 2 ⁽²⁾	PANEL 3 ⁽³⁾
Constant			
Fixed-effects	+ ***	- ***	+
Dynamic GMM system	+ ***	+ ***	+ ***
Exports			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Openness			
Fixed-effects	- ***	- ***	- ***
Dynamic GMM system	- ***	- ***	- ***
A – Economic Globalisation			
Fixed-effects	-	- ***	+ **
Dynamic GMM system	- **	- ***	- ***
B - Social Globalisation			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
C – Political Globalisation			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	-	+ ***
Number of observations	1,305	810	495

+ Positive effect; - negative effect; * Statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%.

⁽¹⁾ PANEL 1 includes all the 29 countries considered in our estimations: Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Iceland, India, Indonesia, Ireland, Italy, Japan, Luxembourg, Malta, Mexico, Netherlands, Norway, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Turkey, UK and US.

⁽²⁾ PANEL 2 includes the sub-sample of the 18 European countries.

⁽³⁾ PANEL 3 includes the sub-sample of the 11 non-European countries.

Source: Estimation results reported in Appendixes B1 and C1.

The results presented in Table 4 allow us to compare the behaviour of the more developed countries of our sample (included in Panel 4) and of the less developed countries (in Panel 5), considering the two estimated models.

In general, these results confirm the conclusions obtained with the previous table but now the results are still more homogeneous revealing that there are no remarkable differences in the behaviour of the more and the less-developed countries. The consistency of the results obtained is particularly evident in Model II (second part of Table 4) allowing us to conclude that, during the considered period and for the included countries, the influence of globalisation on economic growth does not evidently depend on the degree of development of the countries.

TABLE 4 – Results obtained with fixed effects and dynamic GMM system panel estimations (more-developed versus less-developed countries)

MODEL I			
Variables	PANEL 1⁽¹⁾	PANEL 4⁽⁴⁾	PANEL 5⁽⁵⁾
Constant			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Exports			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Imports			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Openness			
Fixed-effects	- ***	- ***	- ***
Dynamic GMM system	- ***	- ***	- ***
A – Economic Globalisation			
Fixed-effects	+ ***	- ***	+ ***
Dynamic GMM system	+ ***	-	+ ***
A1 - Actual Flows			
Fixed-effects	- ***	-	- ***
Dynamic GMM system	- ***	- ***	- ***
A2 – Restrictions			
Fixed-effects	- ***	-	- ***
Dynamic GMM system	- ***	+	- ***
B - Social Globalisation			
Fixed-effects	+ ***	- ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
B1 - Personal Contact			
Fixed-effects	-	+ **	-
Dynamic GMM system	- ***	- ***	- ***

B2 - Informational Flows			
Fixed-effects	- ***	-	- *
Dynamic GMM system	- ***	- ***	-
B3 - Cultural Proximity			
Fixed-effects	- ***	- *	- ***
Dynamic GMM system	- ***	- ***	- ***
C – Political Globalisation			
Fixed-effects	- **	- ***	+ ***
Dynamic GMM system	- ***	- ***	-
G – Overall Globalisation Ind			
Fixed-effects	+	+ ***	- ***
Dynamic GMM system	+ ***	+ *-	-
Number of observations	1,305	1,035	270

MODEL II

Variables	PANEL 1 ⁽¹⁾	PANEL 4 ⁽⁴⁾	PANEL 5 ⁽⁵⁾
Constant			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Exports			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
Openness			
Fixed-effects	- ***	- ***	- ***
Dynamic GMM system	- ***	- ***	- ***
A – Economic Globalisation			
Fixed-effects	-	- **	-
Dynamic GMM system	- **	- ***	-
B - Social Globalisation			
Fixed-effects	+ ***	+ ***	+ ***
Dynamic GMM system	+ ***	+ ***	+ ***
C – Political Globalisation			
Fixed-effects	+ ***	+ ***	+ **
Dynamic GMM system	+ ***	+	+ ***
Number of observations	1,305	1,035	270

+ Positive effect; - negative effect; * Statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%.

⁽¹⁾ PANEL 1 includes all the 29 countries considered in our estimations.

⁽⁴⁾ PANEL 4 includes the sub-sample of the 23 more developed countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sweden, UK and US.

⁽⁵⁾ PANEL 5 includes the sub-sample of the 6 less developed countries: Brazil, India, Indonesia, Mexico, South Africa and Turkey.

Source: Estimation results reported in Appendixes B2 and C2.

4. Concluding remarks

This paper contributes to the literature by testing the relevance of globalisation to real economic growth in 29 countries across almost all continents in the relatively long interval 1970-2013, considering the relevant aspects of globalisation.

It also tests the existence of potential differences in the behaviour of European versus non-European countries as well as of more-developed versus less-developed countries, thus considering 5 panels of countries: Panel 1 including all the 29 countries; Panel 2 including only the European countries and Panel 3 with the non-European countries; Panel 4 with the more-developed countries and Panel 5 including the less-developed countries.

First, we test the stationarity of the series and the results obtained with different panel unit root tests point to the conclusion that in general the considered variables are non-stationary at their levels and become stationary at their first differences.

Then, we test the existence of long-run relationships between the variables representing globalisation and economic growth using different kind of panel-cointegration tests. The results obtained are not totally unanimous; however, they point to the evidence of cointegration between real GDP and the variables representing globalisation. Moreover, and confirming the relevance of international economic integration, the robustness of the results is stronger for the European countries (in Panel 2) and for the more-developed countries (in Panel 4), revealing the existence of stronger long-run relationships among the countries belonging to the same continent, Europe, and among those with a higher GDP per capita.

Finally, the results obtained with panel fixed effects and system dynamic estimations, clearly demonstrate that globalisation is very relevant to economic growth. This conclusion is particularly evident when we take into account international trade (exports, imports and the degree of openness) but it is also in general demonstrated when globalisation is *proxied* by the KOF indexes and sub-indexes.

Furthermore, the results of these panel regression estimates do not identify remarkable differences in the behaviour of the European versus non-European countries nor between the behaviour of the more-developed versus the less-developed countries.

Summarising, we may conclude that this paper empirically confirms that the relationships between the multiple dimensions of globalisation and economic growth are undoubtedly relevant in all considered panels of countries, corroborating the results obtained, among others, by Gurkul and Lach (2014) and Chang et al (2015).

The results obtained also allow us to confirm the relevance of the geographical proximity and of the degree of development of the countries but only in what regards to the existence of long-run, cointegration relationships, between the different dimensions of globalisation and economic growth, in line with the results obtained, for example, by Kazar and Kazar, 2016.

Further research is still needed in this field, namely considering other globalisation indexes, for different periods and groups of countries, with linear and non-linear methods of estimation. Stronger evidence is also needed, regarding the existence of causality relationships between economic growth and the different aspects of globalisation as well as of potential asymmetries in the benefits or losses, clearly associated with the globalisation phenomena, in different kinds of countries.

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Appendix A – Components of the KOF globalisation index

A – Economic Globalisation
A1 – Actual Flows: Trade (percent of GDP) Foreign Direct Investment, flows (percent of GDP) Foreign Direct Investment, stocks (percent of GDP) Portfolio Investment (percent of GDP) Income Payments to Foreign Nationals (percent of GDP)
A2 – Restrictions: Hidden Import Barriers Mean Tariff Rate Taxes on International Trade (percent of current revenue) Capital Account Restrictions
B – Social Globalisation
B1 – Personal Contact: Telephone Traffic Transfers (percent of GDP) International Tourism Foreign Population (percent of total population) International Letters (per capita)
B2 – Information Flows: Internet Users (per 1000 people) Television (per 1000 people) Trade in Newspapers (percent of GDP)
B3 – Cultural Proximity: Number of McDonald's Restaurants (per capita) Number of Ikea (per capita) Trade in Books (percent of GDP)
C – Political Globalisation
Embassies in Country Membership in International Organizations Participation in UN Security Council Missions International Treaties
G – Overall Globalisation Index

Source: <http://globalisation.kof.ethz.ch/>

Appendix B1 – Results obtained with panel fixed-effects estimations (European versus non-European countries)

MODEL I			
Variables	PANEL 1 ⁽¹⁾	PANEL 2 ⁽²⁾	PANEL 3 ⁽³⁾
Constant:			
Coefficient	1.086958	.5585058	1.449581
Z	19.63	15.33	11.47
P> z	0.000	0.000	0.000
Exports			
Coefficient	.4940186	.5072636	.4964844
Z	176.92	231.50	88.93
P> z	0.000	0.000	0.000
Imports			
Coefficient	.4884062	.4886618	.4760967
Z	169.58	195.57	113.46
P> z	0.000	0.000	0.000
Openness			
Coefficient	-.9775479	-1.004102	-.968926
Z	-326.63	-383.82	-164.40
P> z	0.000	0.000	0.000
A – Economic Globalisation			
Coefficient	.0840087	-.0113831	.037892
Z	3.16	-0.65	0.74
P> z	0.002	0.517	0.458
A1 - Actual Flows			
Coefficient	-.0371719	.0042357	-.0214218
Z	-3.94	0.74	-1.09
P> z	0.000	0.460	0.276
A2 – Restrictions			
Coefficient	-.0639957	.025743	-.0441791
Z	-4.99	3.02	-1.67
P> z	0.000	0.003	0.095
B - Social Globalisation			
Coefficient	.0633791	.0447539	.1988144
Z	4.49	3.57	7.77
P> z	0.000	0.000	0.000
B1 - Personal Contact			
Coefficient	-.0002885	.0397026	-.0633973
Z	-0.03	4.75	-3.22
P> z	0.97	0.000	0.001
B2 - Informational Flows			
Coefficient	-.0196578	-.0051458	-.0449374
Z	-3.16	-1.23	-3.92
P> z	0.002	0.218	0.000
B3 - Cultural Proximity			
Coefficient	-.0137475	-.0035796	-.0416503
Z	-7.60	-3.64	-11.48
P> z	0.000	0.000	0.000
C – Political Globalisation			
Coefficient	-.0275994	.0138018	-.0035393
Z	-2.40	1.45	-0.15
P> z	0.017	0.148	0.881
G – Overall Globalisation Ind			
Coefficient	.0340659	-.0528364	-.0196833
Z	1.06	-1.66	-0.33
P> z	0.287	0.097	0.741
Number of observations	1,305	810	495
R-squared	0.9997	0.9997	0.9995
	F(12,1264) = 56967.76 Prob > F = 0.0000	F(12, 780) = 187538.32 Prob > F = 0.0000	F(12,472) = 18512.51 Prob > F = 0.0000

MODEL II

Variables	PANEL 1 ⁽¹⁾	PANEL 2 ⁽²⁾	PANEL 3 ⁽³⁾
Constant:			
Coefficient	5.213121	3.689494	7.889485
Z	23.84	20.01	15.29
P> z	0.000	0.000	0.000
Exports			
Coefficient	.7828376	.8553384	.6549952
Z	71.70	103.73	25.09
P> z	0.000	0.000	0.000
Openness			
Coefficient	-.7701534	-.8467629	-.6542049
Z	-56.73	-56.3	-23.59
P> z	0.000	0.000	0.000
A – Economic Globalisation			
Coefficient	-.0337304	-.0716028	.1305425
Z	-1.16	-3.25	1.93
P> z	0.246	0.001	0.054
B - Social Globalisation			
Coefficient	.1641996	.1401238	.2181421
Z	9.05	8.15	6.23
P> z	0.000	0.000	0.000
C - Political Globalisation			
Coefficient	.140733	.0943587	.1676855
Z	6.54	5.04	4.13
P> z	0.000	0.000	0.000
Number of observations	1,305	810	495
R-squared	0.9854	0.9811	0.9313
	F(5,1271) = 5189.42 Prob > F = 0.0000	F(5,787) = 8152.00 Prob > F = 0.0000	F(5,479) = 1299.51 Prob > F = 0.0000

⁽¹⁾ PANEL 1 includes all the 29 countries considered in our estimations: Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Iceland, India, Indonesia, Ireland, Italy, Japan, Luxembourg, Malta, Mexico, Netherlands, Norway, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Turkey, UK and US.

⁽²⁾ PANEL 2 includes the sub-sample of the 18 European countries.

⁽³⁾ PANEL 3 includes the sub-sample of the 11 non-European countries.

Source: Author's calculations using the Stata statistical software.

**Appendix B2 – Results obtained with panel fixed-effects estimations
(more-developed versus less-developed countries)**

MODEL I			
Variables	PANEL 1⁽¹⁾	PANEL 4⁽⁴⁾	PANEL 5⁽⁵⁾
Constant:			
Coefficient	1.086958	.8768845	1.820839
Z	19.63	18.20	10.51
P> z	0.000	0.000	0.000
Exports			
Coefficient	.4940186	.5352875	.478238
Z	176.92	193.83	75.59
P> z	0.000	0.000	0.000
Imports			
Coefficient	.4884062	.4529317	.4857959
Z	169.58	155.86	82.21
P> z	0.000	0.000	0.000
Openness			
Coefficient	-.9775479	-.9847407	-.9458493
Z	-326.63	-413.55	-104.66
P> z	0.000	0.000	0.000
A – Economic Globalisation			
Coefficient	.0840087	-.0662658	.3326576
Z	3.16	-2.53	4.00
P> z	0.002	0.011	0.000
A1 - Actual Flows			
Coefficient	-.0371719	-.0112456	-.1427697
Z	-3.94	-1.50	-3.58
P> z	0.000	0.134	0.000
A2 – Restrictions			
Coefficient	-.0639957	-.0062098	-.1241308
Z	-4.99	-0.51	-2.90
P> z	0.000	0.608	0.004
B - Social Globalisation			
Coefficient	.0633791	-.0752687	.1749331
Z	4.49	-3.63	6.12
P> z	0.000	0.000	0.000
B1 - Personal Contact			
Coefficient	-.0002885	.0251239	-.0249532
Z	-0.03	2.10	-1.16
P> z	0.970	0.036	0.248
B2 - Informational Flows			
Coefficient	-.0196578	-.0011476	-.0223295
Z	-3.16	-0.21	-1.67
P> z	0.002	0.834	0.096
B3 - Cultural Proximity			
Coefficient	-.0137475	-.0028668	-.0193961
Z	-7.60	-1.80	-4.01
P> z	0.000	0.072	0.000
C – Political Globalisation			
Coefficient	-.0275994	-.0981937	.1098093
Z	-2.40	-6.40	-3.57
P> z	0.017	0.000	0.000
G – Overall Globalisation Ind			
Coefficient	.0340659	.2658963	-.3217851
Z	1.06	5.20	-4.09
P> z	0.287	0.000	0.000
Number of observations	1,305	1035	370
R-squared	0.9997	0.9988	0.9988
	F(12,1264) = 56967.76 Prob > F = 0.0000	F(12,1000) = 72306.63 Prob > F = 0.0000	F(12,252) = 17581.95 Prob > F = 0.0000

MODEL II			
Variables	PANEL 1 ⁽¹⁾	PANEL 4 ⁽⁴⁾	PANEL 5 ⁽⁵⁾
Constant:			
Coefficient	5.213121	3.428037	11.81624
Z	23.84	19.14	16.71
P> z	0.000	0.000	0.000
Exports			
Coefficient	.7828376	.8587226	.5127176
Z	71.70	93.74	15.31
P> z	0.000	0.000	0.000
Openness			
Coefficient	-.7701534	-.8530636	-.4428268
Z	-56.73	-76.47	-9.64
P> z	0.000	0.000	0.000
A – Economic Globalisation			
Coefficient	-.0337304	-.0371413	-.0143534
Z	-1.16	-1.57	-0.15
P> z	0.246	0.0117	0.883
B - Social Globalisation			
Coefficient	.1641996	.1081775	.4073128
Z	9.05	6.25	9.00
P> z	0.000	0.000	0.000
C – Political Globalisation			
Coefficient	.140733	.1431486	.1117819
Z	6.54	6.59	2.54
P> z	0.000	0.000	0.012
Number of observations	1,305	1,035	370
R-squared	0.9854	0.9696	0.9468
	F(5,1271) = 5189.42 Prob > F = 0.0000	F(5,1007) = 6423.96 Prob > F = 0.0000	F(5,259) = 922.52 Prob > F = 0.0000

⁽¹⁾ PANEL 1 includes all the 29 countries considered in our estimations.

⁽⁴⁾ PANEL 4 includes the sub-sample of the 23 more developed countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sweden, UK and US.

⁽⁵⁾ PANEL 5 includes the sub-sample of the 6 less developed countries: Brazil, India, Indonesia, Mexico, South Africa and Turkey.

Source: Author's calculations using the Stata statistical software.

Appendix C1 – Results obtained with dynamic panel GMM system estimations (European versus non-European countries)

MODEL I			
Variables	PANEL 1 ⁽¹⁾	PANEL 2 ⁽²⁾	PANEL 3 ⁽³⁾
Constant			
Coefficient	.8221959	.5353991	1.078009
Z	20.41	21.63	14.55
P> z	0.000	0.000	0.000
Exports			
Coefficient	.5460217	.5018203	.5161787
Z	103.05	246.45	74.05
P> z	0.000	0.000	0.000
Imports			
Coefficient	.44585	.4932674	.4669033
Z	84.33	239.51	75.80
P> z	0.000	0.000	0.000
Openness			
Coefficient	-.9907164	-1.005459	-.9850489
Z	-522.73	-599.32	-267.47
P> z	0.000	0.000	0.000
A – Economic Globalisation			
Coefficient	.2423789	.0690972	.1402909
Z	3.36	2.73	1.89
P> z	0.001	0.006	0.059
A1 - Actual Flows			
Coefficient	-.1593442	-.0055414	-.0913949
Z	-5.66	-0.65	-3.05
P> z	0.000	0.517	0.002
A2 – Restrictions			
Coefficient	-.1508827	.0137071	-.1124432
Z	-4.29	1.30	-2.64
P> z	0.000	0.194	0.008
B - Social Globalisation			
Coefficient	.2474694	.1250688	.2454501
Z	8.03	9.24	6.00
P> z	0.000	0.000	0.000
B1 - Personal Contact			
Coefficient	-.125196	.0262334	-.0994019
Z	-9.59	3.22	-6.17
P> z	0.000	0.001	0.000
B2 - Informational Flows			
Coefficient	-.1014201	-.015642	-.0674244
Z	-6.77	-3.22	-3.32
P> z	0.000	0.001	0.001
B3 - Cultural Proximity			
Coefficient	-.0468723	-.0089321	-.0589703
Z	-11.20	-7.06	-12.48
P> z	0.000	0.000	0.000
C - Political Globalisation			
Coefficient	-.0846391	.0622931	-.0593212
Z	-4.69	6.37	-1.51
P> z	0.000	0.000	0.132
G – Overall Globalisation Ind			
Coefficient	.1965859	-.2007619	.1200529
Z	4.13	-5.40	1.28
P> z	0.000	0.000	0.201
Number of observations	1,305	810	495
Wald	chi2(12) = 3.70e+06 (Prob. > chi2 = 0.000)	chi2(12) = 5.34e+07 (Prob. > chi2 = 0.000)	chi2(12) = 826647.09 (Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = -3.09 Pr > z = 0.002	z = 1.52 Pr > z = 0.128	z = -1.79 Pr > z = 0.074
Arellano-Bond test for AR(2) in first differences	z = -4.69 Pr > z = 0.000	z = -4.70 Pr > z = 0.000	z = -3.66 Pr > z = 0.000
Sargan test of overidentifying restrictions	chi2(76) = 501.90 Prob > chi2 = 0.000	chi2(76) = 363.69 Prob > chi2 = 0.000	chi2(76) = 313.01 Prob > chi2 = 0.000
Difference-in-Sargan tests of exogeneity of instrument subsets:			
Sargan test excluding group	chi2(33) = 54.49 Prob > chi2 = 0.011	chi2(33) = 43.76 Prob > chi2 = 0.100	chi2(33) = 85.65 Prob > chi2 = 0.000

MODEL II

Variables	PANEL 1 ⁽¹⁾	PANEL 2 ⁽²⁾	PANEL 3 ⁽³⁾
Constant			
Coefficient	2.446349	1.297856	2.785626
Z	25.09	23.01	13.92
P> z	0.000	0.000	0.000
Exports			
Coefficient	.9547537	.9789977	.9449798
Z	263.78	371.54	94.38
P> z	0.000	0.000	0.000
Openness			
Coefficient	-.9515071	-1.037324	-.9602325
Z	-163.95	-202.30	-105.17
P> z	0.000	0.000	0.000
A – Economic Globalisation			
Coefficient	-.4636472	-.0772444	-.4718855
Z	-15.55	-3.54	-10.80
P> z	0.045	0.000	0.000
B - Social Globalisation			
Coefficient	.2317202	.0703838	.2240981
Z	12.50	4.21	9.72
P> z	0.000	0.000	0.000
C – Political Globalisation			
Coefficient	.0933037	-.0147133	.0895314
Z	4.88	-1.06	3.88
P> z	0.003	0.291	0.000
Number of observations	1,305	810	495
Wald	chi2(5) = 274140.89 (Prob. > chi2 = 0.000)	chi2(5) = 972710.68 (Prob. > chi2 = 0.000)	chi2(5) = 59884.80 (Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = -1.76 Pr > z = 0.079	z = 2.54 Pr > z = 0.011	z = -1.93 Pr > z = 0.054
Arellano-Bond test for AR(2) in first differences	z = -2.79 Pr > z = 0.005	z = -2.99 Pr > z = 0.003	z = -1.53 Pr > z = 0.126
Sargan test of overidentifying restrictions	chi2(83) = 757.92 Prob > chi2 = 0.000	chi2(20) = 21.85 Prob > chi2 = 0.000	chi2(83) = 583.95 Prob > chi2 = 0.000
Difference-in-Sargan tests of exogeneity of instrument subsets:			
Sargan test excluding group	chi2(40) = 261.24 Prob > chi2 = 0.000	chi2(40) = 446.76 Prob > chi2 = 0.000	chi2(40) = 194.45 Prob > chi2 = 0.000

⁽¹⁾ PANEL 1 includes all the 29 countries considered in our estimations: Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Iceland, India, Indonesia, Ireland, Italy, Japan, Luxembourg, Malta, Mexico, Netherlands, Norway, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Turkey, UK and US.

⁽²⁾ PANEL 2 includes the sub-sample of the 18 European countries.

⁽³⁾ PANEL 3 includes the sub-sample of the 11 non-European countries.

Source: Author's calculations using the Stata statistical software.

**Appendix C2 – Results obtained with dynamic panel GMM system estimations
(more-developed versus less-developed countries)**

MODEL I			
Variables	PANEL 1⁽¹⁾	PANEL 4⁽⁴⁾	PANEL 5⁽⁵⁾
Constant			
Coefficient	.8221959	.4866773	.9763358
Z	20.41	13.12	7.79
P> z	0.000	0.000	0.000
Exports			
Coefficient	.5460217	.5484498	.4809145
Z	103.05	183.30	57.04
P> z	0.000	0.000	0.000
Imports			
Coefficient	.44585	.4491172	.5121982
Z	84.33	154.53	69.70
P> z	0.000	0.000	0.000
Openness			
Coefficient	-.9907164	-.9954189	-1.00745
Z	-522.73	-786.39	-163.80
P> z	0.000	0.000	0.000
A – Economic Globalisation			
Coefficient	.2423789	-.0118648	.4959861
Z	3.36	-0.23	4.33
P> z	0.001	0.819	0.000
A1 - Actual Flows			
Coefficient	-.1593442	-.0461991	-.256444
Z	-5.66	-2.96	-4.23
P> z	0.000	0.003	0.002
A2 – Restrictions			
Coefficient	-.1508827	.0023445	-.2691939
Z	-4.29	0.12	-4.20
P> z	0.000	0.906	0.008
B - Social Globalisation			
Coefficient	.2474694	.106022	.1504229
Z	8.03	3.16	3.60
P> z	0.000	0.002	0.000
B1 - Personal Contact			
Coefficient	-.125196	-.0466848	-.0562499
Z	-9.59	-4.23	-4.23
P> z	0.000	0.000	0.000
B2 - Informational Flows			
Coefficient	-.1014201	-.0568676	-.022268
Z	-6.77	-5.84	-1.33
P> z	0.000	0.000	0.182
B3 - Cultural Proximity			
Coefficient	-.0468723	-.0312887	-.0302831
Z	-11.20	-11.02	-5.74
P> z	0.000	0.000	0.000
C - Political Globalisation			
Coefficient	-.0846391	-.0668728	-.033374
Z	-4.69	-2.54	-0.70
P> z	0.000	0.011	0.486
G – Overall Globalisation Ind			
Coefficient	.1965859	.2123502	-.0051156
Z	4.13	2.30	-0.04
P> z	0.000	0.021	0.965
Number of observations	1,305	1,035	270
Wald	chi2(12) = 3.70e+06 (Prob. > chi2 = 0.000)	chi2(12) = 1.07e+07 (Prob. > chi2 = 0.000)	chi2(12) = 466057.87 (Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = -3.09 Pr > z = 0.002	z = 4.63 Pr > z = 0.000	z = -3.19 Pr > z = 0.001
Arellano-Bond test for AR(2) in first differences	z = -4.69 Pr > z = 0.000	z = -4.27 Pr > z = 0.000	z = -2.23 Pr > z = 0.026
Sargan test of overidentifying restrictions	chi2(76) = 501.90 Prob > chi2 = 0.000	chi2(76) = 617.69 Prob > chi2 = 0.000	chi2(76) = 147.31 Prob > chi2 = 0.000
Difference-in-Sargan tests of exogeneity of instrument subsets:			
Sargan test excluding group	chi2(33) = 54.49 Prob > chi2 = 0.011	chi2(33) = 84.91 Prob > chi2 = 0.000	chi2(33) = 43.60 Prob > chi2 = 0.103

MODEL II

Variables	PANEL 1 ⁽¹⁾	PANEL 4 ⁽⁴⁾	PANEL 5 ⁽⁵⁾
Constant			
Coefficient	2.446349	1.234611	6.386468
Z	25.09	20.83	25.61
P> z	0.000	0.000	0.000
Exports			
Coefficient	.9547537	.9811737	.7332637
Z	263.78	427.02	61.48
P> z	0.000	0.000	0.000
Openness			
Coefficient	-.9515071	-.9963205	-.7187063
Z	-163.95	-261.10	-42.92
P> z	0.000	0.000	0.000
A – Economic Globalisation			
Coefficient	-.4636472	-.1855234	-.0729944
Z	-15.55	-8.80	-1.59
P> z	0.045	0.000	0.111
B - Social Globalisation			
Coefficient	.2317202	.066651	.1185505
Z	12.50	3.82	4.93
P> z	0.000	0.000	0.000
C – Political Globalisation			
Coefficient	.0933037	.0995094	.291908
Z	4.88	6.48	10.06
P> z	0.003	0.291	0.000
Number of observations	1,305	1,035	270
Wald	chi2(5) = 274140.89 (Prob. > chi2 = 0.000)	chi2(5) = 654183.84 (Prob. > chi2 = 0.000)	chi2(5) = 28762.86 (Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = -1.76 Pr > z = 0.079	z = 3.86 Pr > z = 0.000	z = -1.91 Pr > z = 0.056
Arellano-Bond test for AR(2) in first differences	z = -2.79 Pr > z = 0.005	z = -3.72 Pr > z = 0.000	z = -1.18 Pr > z = 0.237
Sargan test of overidentifying restrictions	chi2(83) = 757.92 Prob > chi2 = 0.000	chi2(83) = 1667.40 Prob > chi2 = 0.000	chi2(83) = 712.62 Prob > chi2 = 0.000
Difference-in-Sargan tests of exogeneity of instrument subsets:			
Sargan test excluding group	chi2(40) = 261.24 Prob > chi2 = 0.000	chi2(40) = 395.42 Prob > chi2 = 0.000	chi2(40) = 118.09 Prob > chi2 = 0.000

⁽¹⁾ PANEL 1 includes all the 29 countries considered in our estimations.

⁽⁴⁾ PANEL 4 includes the sub-sample of the 23 more developed countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sweden, UK and US.

⁽⁵⁾ PANEL 5 includes the sub-sample of the 6 less developed countries: Brazil, India, Indonesia, Mexico, South Africa and Turkey.

Source: Author's calculations using the Stata statistical software.