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The effects of Globalization on Economic Growth:
An analysis based on the country's income level

VERSÃO DEFINITIVA APÓS DEFESA

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Resumo

A análise aos efeitos da globalização no crescimento económico quer em países ricos como em pobres tem vindo a ganhar espaço na literatura do crescimento económico. Neste estudo é possível verificar alguns impactos da globalização no crescimento económico dependendo do nível de rendimentos do país. Este estudo é feito com um painel de dados balanceado segundo a metodologia de *Autorregressive Distributed Lag* (ARDL), com um horizonte temporal relativamente grande 1970-2013 de forma a verificar os efeitos dos três indicadores de globalização do indicador *Konjunkturforschungsstelle* (KOF) no crescimento económico. Os países que compõem os painéis de dados estão de acordo com os diferentes níveis de rendimento - país definidos pelo banco mundial. O objetivo desta análise é tentar verificar se, de acordo com o nível de rendimentos de cada país, estes terão um comportamento diferente relativamente aos efeitos da globalização no crescimento económico. Os principais resultados mostram que nos países com rendimentos mais altos, a globalização económica tem efeitos positivos e estatisticamente significantes no curto e no longo prazo. De facto, é também a única elasticidade presente no longo prazo, as outras vertentes da globalização não têm qualquer impacto nos países de rendimentos altos à exceção da globalização politica. A globalização politica tem um impacto negativo e estatisticamente significante no curto prazo nestes países. Os restantes países ainda que de diferentes níveis de rendimentos, rendimentos médio altos e medio baixos/baixos apresentam resultados semelhantes entre si, apenas têm a globalização social com elasticidade tanto no curto como no longo prazo. Estas apresentam ser positivas e estatisticamente significantes. Estes resultados poderão ajudar a desenhar melhores politicas para cada tipo de economia dependendo do seu nível de rendimentos.

Palavras Chave

Crescimento Económico; Painel- ARDL; Globalização

Resumo Alargado

As relações entre globalização e crescimento económico têm vindo a ser amplamente analisadas. Devido à complexidade em medir a globalização, os resultados destas relações nem sempre foram convergentes. A literatura existente, que aborda esta temática, tem tido como principal foco, verificar se a globalização é benéfica e se ajuda os países a crescerem e a desenvolverem-se ou se pelo contrário, tem efeitos negativos e pode ser prejudicial à economia. É difícil perceber quando foi o inicio do fenómeno globalização. Muitos historiadores partem do principio que a primeira grande fase da globalização deu-se no século XV com o inicio da expansão marítima e desde aí as relações internacionais não mais param ao redor do mundo.

Devido à sua complexidade, a literatura existente denota ter tido como principais dificuldades a medição da globalização de forma empírica para poder estuda-la e verificar quais os seus efeitos. Nas primeiras análises empíricas que estudam este tipo de fenómenos começaram por medir a globalização pela abertura económica, abertura comercial, barreiras a entrada e entradas de capital estrangeiro. Recentemente foi criado um índice de globalização pelo *Konjunkturforschungsstelle* (KOF) (Dreher, 2006). Este novo índice faz uso de 23 indicadores do foro social, económico e politico. Este indicador permitiu assim estudar a globalização de forma empírica, passando assim de uma análise teórica e de difícil análise prática a uma analise possível de ser estudada econometricamente.

É desta forma que neste trabalho a globalização foi testada, especificamente foi usada cada uma destas vertentes da globalização em separado para tentar verificar o seu impacto, em três diferentes grupos de países segundo o seu nível de rendimentos. Os três grupos de países são assim países de rendimentos altos, países de rendimentos médio altos e por fim países de rendimentos baixos e médio baixos definidos pelo *World Bank*. Para medir o crescimento económico foi usada a variável de produto interno bruto (PIB) per capita a preços constantes e na moeda corrente de cada país. Foram ainda usados o índice de preços do consumidor (IPC), a despesa final de consumo por país, estas variáveis são tradicionalmente usadas em estudos empíricos de crescimento económico. Por fim foi ainda utilizada a variável de total de rendimentos de recursos naturais, de forma a verificar se esta tem um papel decisivo consoante o tipo de país e na presença de globalização.

Devido a falta de dados para alguns países, muitos países foram excluídos de forma a construir painéis de dados balanceados. O critério foi feito de forma a ter o maior número de anos possível e não o de ter mais países com menos anos devido a metodologia em análise ser ARDL e neste tipo de metodologia é importante ter muitos anos. O terceiro grupo de países, ao contrario dos

primeiros dois grupos inclui países de rendimentos baixos e médio baixos, ou seja, dois grupos distintos de países. Isto deveu-se ao facto de, caso fossem separados ficariam com uma dimensão N(número de países) muito baixa e para análise em macro painéis é importante ter um T (numero de anos)>N. A dimensão de N deve também de ser larga e estes pelas suas características económicas podem ser analisados em conjunto.

Foram feitas análises de dependência seccional entre os dados, onde se verificou a sua presença em todos os painéis de países o que seria expectável uma vez que os países foram agrupados pela sua semelhança de nível de rendimentos e tratam-se de macro painéis que usualmente têm dependência seccional nos dados. Foram analisadas as raízes unitárias de segunda geração devido a presença de dependência seccional nos dados, verificou-se a existência de variáveis I(1) e variáveis I(0). Uma vez que a metodologia ARDL funciona com estas características encontradas e os painéis de dados se tratam de macro painéis foi utilizado o teste Hausman para verificar qual o estimador a ser aplicado, os estimadores poderiam ser *Mean Goup(MG)*, *Pooled Mean Group* (PMG) ou *Dynamic Fixed Effects* (DFE). O estimador indicado pelo teste de Hausman foi o DFE.

Uma vez tratando-se de dados em painel alguns testes de especificação tiveram ainda de ser realizados para conhecer melhor as características das séries em análise. Foi realizado de novo o teste de Hausman mas agora para verificar se a série deveria ser analisada segundo a metodologia do método dos mínimos quadrados (OLS), efeitos aleatórios ou efeitos fixos (FE). Foi verificado que todos os painéis de dados deveriam ser analisados com FE por conseguinte foram feitos os testes de especificação segundo características de FE. Deste modo, estimaram-se o teste de Wald modificado para verificar a presença de heterocedasticidade, o teste de Pesaran para verificar a presença de independência entre os dados seccionais com o mesmo propósito usando Breusch-Pagan Langragian que é mais apropriado em macro painéis. Realizou-se ainda o teste de Wooldridge para autocorrelação e ainda o teste de Baltagy-Wu LBI com o mesmo propósito.

Uma vez que foram detectados os fenómenos de heterocedasticidade, autocorrelação de primeira ordem e dependência de dados seccionais e que o horizonte temporal é longo, optou-se pelo estimador Driscoll Kraay. As elasticidades de longo prazo foram calculadas posteriormente, já as semi-elasticidades foram retiradas diretamente do estimador Driscoll Kraay. De forma a verificar a robustez dos resultados foram ainda estimados os modelos segundo efeitos fixos e efeitos fixos robustos. Uma vez que usam o mesmo estimador os coeficientes serão iguais, mas é possível ver que as significâncias estatísticas variam, o que indica que o estimador Driscoll Kraay corrigiu a presença de heterocedasticidade, autocorreção e a dependência de dados seccionais.

Os resultados apresentam corresponder as espectativas iniciais da análise, ou seja para diferentes níveis de rendimentos de país, o crescimento económico vai ser influenciado de forma diferente pelas diversas formas de globalização. Os países mais ricos beneficiam unicamente da globalização

económica no longo prazo. No curto prazo a globalização politica tem um impacto negativo nestes países algo que não foi verificado ainda na literatura, mas Dreher (2008), alerta para o facto de este fenómeno poder ser verificado quando os países tentam aumentar a redistribuição. Em países de rendimentos médio altos e países de rendimentos baixos e médio baixo os resultados apresentam ser semelhantes. Pois a globalização apenas influencia o crescimento económico nestes países através da globalização social. A sua influencia é positiva e estatisticamente significativa, tanto no curto como no longo prazo.

Analisando o termo de correção de erro, este apresenta uma velocidade de ajustamento lenta, mas estatisticamente significativa. Significa isto que a globalização necessita de algum tempo para poder influenciar o crescimento económico, mas o seu impacto verificar-se-á.

Em conclusão, poderá apontar-se que países mais ricos devem manter os níveis de globalização económicos altos para beneficiar o crescimento económico, os outros grupos de países em análise devem aumentar as componentes que determinam a globalização social forma a dar condições ao país para aumentar o crescimento económico.

Abstract

The discussion about effects of globalization on economic growth in rich and poor countries has been winning an important role in economic growth literature. In this study, it is possible to verify some of the effects from globalization on economic growth depending on the country's income. It develops an ARDL Balanced Panel with a long time span 1970-2013 to verify the effects of three different KOF indicators of globalization on economic growth. A panel ARDL was chosen because this allows for long- and short-run effects. So, it was made with three different country income levels following the World Bank Definition. The aim of this analysis is verifying if according each different types of income country could have different behaviours from globalization to economic growth. The results show that in high income countries, the economic globalization has a positive and significant impact in the short- and in the long-run. Indeed, in the long-run this is the only elasticity present, and the other kinds of globalizations do not have any effect on economic growth, except political globalization. Political globalization has a negative and significant effect on economic growth, but only in the short-run. The two other income types have similar results, i.e. only social globalization in the short- and long -run elasticities. These later impacts are positive and statistically significant. This results help policy makers to design better policies to improve their economies.

Key words

Economic Growth; Panel-ARDL; Globalization

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Acronyms List

CIPS	Cross-sectional augmented panel unit root test
VIF	Variance Inflation Factor
ARDL	Autoregressive Distributed Lag
CSD	Cross Section Dependence
GDP	Gross Domestic Product
FDI	Foreign Direct Investment
LCU	Local Currency Unit
PMG	Pooled Mean Group
MG	Mean Group
DFE	Dynamic Fixed Effects
FE	Fixed Effects
FE.R	Fixed Effects Robust
FE-D.K.	Fixed Effects Driscoll Kraay
OLS	Ordinary Last Squares
ECT	Error Corrector Term
EG	Economic Growth
KOF	Konjunkturforschungsstelle
OPEN	Sachs and Warner Openness Index
WDR	World Development Outward Orientation Index
LEAMER	Leamer's Openness Index
BLACK	Average Black Market Premium
Tariff	Average Import Tariff on Manufacturing
QR	Average Coverage of Non-Tariff Barriers
HERITAGE	The Heritage Foundation Index of Distortions in International Trade
CTR	Collected Trade Taxes Ratio
WOLF	Wolf's Index of Import Distortions

1. Introduction

As globalization is a phenomenon with a multitude of characteristics, being them visible or not. The biggest problem always was studying it empirically. Globalization is a phenomenon very important in economics, so it is important to analyze it. Some examples to understand the importance of globalization are: when a country has information about another country, due to social globalization, that country can take better decisions when negotiating with that specific country; when a country benefits from foreign investment, that country can have advantages in knowledge and investment; and when diplomatic relationships benefits two countries, that is certainly a comparative advantage in a competitive world. These are only small examples about what a globalized world could influence the economy.

On that base, literature started to study globalization by the economic side, with some components of economic growth. In the literature on this subject, the main problem of this research was to study this question empirically, consequently generating many different results. Authors like Stiglitz (2004) worked on this question theoretically providing some possible positive and negative effects of globalization. In 2006 an index of globalization was created by Dreher (2006), this allowed us to use the globalization empirically for economic studies taking into account different factors. Using 23 different indicators to measure globalization through economic, social and political integrations. With this indicator, it was possible to eliminate one of the biggest problems in this investigation, because previously, only the economic factors were used to measure globalization.

The globalization is more than an economic phenomenon. Some questions remain underdeveloped empirically: Is the effect of globalization equal for all countries? Does it exist one or more aspects of globalization that contribute mostly to economic growth (EG) in each type of country? These were the main questions that this study tries to find an answer to, due to no clear answer in the existing literature. This study focuses in a large set of countries, but separated by different income levels, defined by the World Bank, through a panel ARDL methodology. This was used to verify the effects of globalization on economic growth in the short- and long-run in each type of income group. The econometric software STATA 14 was used. That way was possible verify how different country income levels can react to the globalization phenomenon and if they have different impacts from different strands of globalization.

This study try to contributes to the literature, by focusing on analysing the effects of globalization on economic growth by country income level, when are taken into considerations the natural resource rents. This is important to understand how different levels of income lead to different impacts from different strands of globalization in their economies.

Besides the introduction this study follows as: section two provides a literature review on the relations between economic growth and globalization. Both the data and methodology are presented in section three, where a preliminary analysis of data is also provided. Section four discloses results and discussion. Finally, section five presents the main conclusions.

2. Literature Review

Globalization is a complex phenomenon and it is difficult to date its beginning. This emerged with the necessity of different countries to interact mainly in their political, economic and social factors. As expected this phenomenon brought positive and negative effects to countries. This kind of effects has been studied for a few years because it is important to understand the negative impacts and how to soften them, as well as understand and promote the positive ones. On that base, literature started to study globalization by the economic perspective, with some components of economic growth. Foreign Direct Investment (FDI), Openness and Trade were the mostly used indicators, but some authors also used other as measures of globalization, like country-specific dummies for open market, open barriers or changes in tariffs, trade restrictions, etc. This has made globalization measurement a little subjective to be studied. Using an index of outward orientation, Dollar (1992) proved that outward economies in developing countries improve growth faster than inward economies. Many other authors like Edwards (1998) or Vamvakidis (2002) found similar results. But not always the results are convergent, for example Jin (2006) found a negative impact from openness to growth.

With respect to literature using FDI as proxy of globalization, Blomstrom *et al*, (1992) verified that for countries which can absorb FDI and use it to improve their economies it is crucial to have a minimum level of infrastructures. The literature that uses this indicator have convergence in their results. As found by Carkovic & Levine (2002) the FDI itself does not have any significant impact on economic growth (EG). Furthermore, Li & Liu (2005) corroborate with these findings and add that human capital is essential for FDI to promote the EG. Chakraborty & Nunnenkamp (2008) also studied FDI but with the particularity of including a primary sector in post reform India. They verified that FDI can improve all sectors besides the primary sector. Therefore, FDI could be a good promotor of EG, as long as it possesses good structures and human capital to improve EG.

It is important to be as most comprehensive as possible, and these indicators previously mentioned, measure only a part of globalization, namely the economic integration. However, literature has been focusing more in one complete indicator of globalization. A study between globalization and EG that use only FDI, measures of openness or other indicators of liberalization market as a proxy to globalization is not entirely complete. Therefore, it is important also analyse the globalization through the social and political integration. This question is solved by Dreher (2006) updated in Dreher *et al*, (2008). The author built a new index of globalization, composed by three different sub-indexes, including 23 different variables as measure of globalization. These different sub-indexes are composed by: economic, political and social integration, generating an overall index of globalization. In his study about this new indicator, Dreher (2006) found that, in average,

countries more globalized have better economic growth rates. Many other authors defend that connections between economic growth and globalization exist, and have used these indicators of globalization in different set of countries and with different economic specifications. The main results seems to converge, in other words, globalization is a promotor of economic growth, like the results found by (Chang & Lee, 2010; Chang et al, 2011; Gurgul & Lach 2014). But as in FDI, in low income countries or countries with low development have also some hardship to improve their economies with globalization. Looking for OIC countries, divided by three levels of income Samimi & Jenatabadi (2014) found that only countries with high- and middle-incomes can benefit from globalization compared with low-income countries that do not show any benefits. Similar results were found by Rao & Vadlamannati (2011) studying African poor countries, where the authors found that, globalisation can promote economic growth, but with very low statistically significances.

With the necessity to understand if democracy is a required condition in order to globalization be more effective, Lee et al, (2015), made a study in 30 provinces of an autocratic country (China). They found that democracy is not a condition, concluding yet that economic and political globalization promote economic growth and only that the social globalization has a negative impact.

The relationship between natural resources and economic growth have been studied more intensively due to its impact on economies. Since Sachs & Warner (1995), who originated a study about the natural resources and economic growth, the "resource curse" hypothesis has been emerged. This theory seems to be one of the most controversial in economic literature. Following Havranek et al, (2016), who composed a study about 43 studies on this research question, the authors concluded that this topic research has a weak consensus. The present study does not pretend to use the variable of natural resource rents to verify if the abundance of natural resource is a blessing or a curse. But, what is the role of these rents on economic growth in the presence of globalisation.

As it is observed in the literature, the phenomenon of globalisation shows different behaviours depending on the country specificities. As such, countries should be analysed separately according to their characteristics, in this case by income levels. In table one, it is possible to understand the main characteristics of the more cited articles analysing the impacts of globalization on economic growth with focus on the works using the KOF indicator as a globalization measure.

TABLE 1: AUTHORS WORKING WITH GLOBALISATION AND ECONOMIC GROWTH

Authors	Period	Sample	Methodology	Measure of globalization	Main Results
Dollar (1992)	1976-1985	95 Developing countries	Pooled Cross section	(Openness) cross- country measure of outward economic oriented based on price level of 121 countries	Verified that outward economies grew faster than inward economies.
Edwards (1998)	1960-1990	93 countries	Regression of TFP Growth	(Openness) Nine different indicators of openness: 1. OPEN; 2. WDR; 3. LEAMER; 4. BLACK; 5. Tariff; 6. QR; 7. HERITAGE; 8. CTR; 9. WOLF	Verified that more open countries have faster productivity growth.
Vamvakidis (2002)	1870-1990	22 countries	Cross country growth regressions	(Openness) Six different indicators of openness: 1. Tariff Rate; 2. Non-Tariff Rate; 3. Duty Ratio; 4. Trade Share; 5. PPP adjusted Trade Share; 6. Openness Dummy Sachs and Warner (1995).	Found a positive impact from openness to growth between 1920 to 1990 seeing the whole period but seeing by decades. Found that this relation it was negative in first decades, and in recent decades has been getting positive.
Jin (2006)	1960-1997	South Korean	VAR Model	(Openness) Imports/GDP	Found that shocks on openness have negative impacts on growth rates, but was not find any relation in long run effects.
Blomström (1992)	1960-1985	101 countries	Regression with two tailed test	FDI	Found a positive effect from FDI to growth, but only for countries with a relatively high level-income because poor countries cannot absorb new technologies due to being needed certain level of development to absorb new technologies provide from foreign investment.
Crakovic & Levine (2002)	1960-1995	72 countries	Panel Data OLS and GMM	FDI	After correct some endogeneity problems in this relation they did not find a statistical and robust influence from FDI as independent in Economic growth.
Chakraborty & Nunnenkamp (2008)	1987-2000	India	Panel cointegration	FDI	Found that FDI in post reform, India had promoted economic growth, verifying yet that FDI affected all economic sectors but do not have any influence in primary sector.
Li & Liu (2005)	1970-1999	84 countries	Panel data with Single and Simultaneous equation system techniques	FDI	Found a significant and endogenous relation from FDI to Economic growth not for all sample period but only from the mid -1980s in both country types, and found yet that human capital is an important determinant to absorb technology.

Dreher (2006)	1970-2000	123 countries	Panel data OLS and GMM	KOF	Found that in average, countries with more globalization has higher growth rates.
Chang & Lee (2010)	1970-2006	23 countries	Pedroni's panel cointegration and panel VECM	KOF	After to distinguish the long and short- run, found that all dimensions of globalization and overall globalization are in generally promotors of economic growth in OECD.
Rao et al (2011)	1974-2004	Singapore, Malaysia, Thailand, India and Philippines	Solow Model, ARDL and Two-stage nonlinear least squares instrumental variables	KOF	Used a Steady State Growth Rate (SSGR) model as growth measurement, concluded that countries with higher globalization policies have higher SSGR, but the impact of globalization on economic growth is not the same for the countries in study.
Rao & Vadlamannati (2011)	1970-2005	21 countries	Extreme bounds analysis and Fixed Effects	KOF	Analysing the effects of globalization on growth in African Poor countries found a small but significant and positive effects on growth.
Chang et al (2011)	1970-2006	7 countries	Panel Cointegration	KOF	Found a positive impact from overall and social globalization on economic growth in G7 countries.
(Chang et al (2013)	1990-2009	Azerbaijan, Armenia, Georgia, Russia and Turkey	LSDVC and GMM	KOF	Not only focusing on impacts from various strands of globalization, but with energy export, found that with high levels of energy export and political, social and economic globalization these countries experienced higher growth rates.
Gurgul & lach (2014)	1990-2009	10 countries	Panel Date (OLS, Fixed Effects and Random Effects)	KOF	Analysing the different components of globalization find for CEE countries that economic and social globalization are good stimulators of economic growth mainly in the first two decades of transition for CEE.
Samimi & Jenatabadi (2014)	1980-2008	OIC countries	GMM	KOF	Analysing OIC countries divided by income level, found that, economic growth only can benefit from globalization in high and middle income countries, and low income countries cannot gain from it.
Lee el al (2015)	1970-2006	30 provinces of China	Two Step GMM	KOF	Made an analysis of the effect of globalization on economic growth with all dimensions and overall globalisation in an autocratic country (China), to see if democracy is a condition to globalization promote growth. Verified that democracy in China is not a necessary condition and yet that overall globalization and economic and political dimensions are positive but little significant on impact growth and the social dimension has a significant and negative impact.

Majidi (2017)	1970-2014	100 Developing Countries	Fixed Effects KOF Panel Data	Made an analyse into 100 developing countries divided by upper and lower middle incomes. Found that in upper middle income political and economic growth has a negative and significant impact on economic growth, and for lower middle income countries, found a positive impact from overall and political globalisation.

3. Data and Method

This section is divided in three sub sections. The first one in witch the sources and a detailed data description is presented. In the second one, it is presented presents the descriptive statistics of the data. Finally, the last one presents the method used in order to study the effects of globalization.

3.1 Data

The focus of this work was not only to analyse the behaviour of economic growth when in the presence of the overall globalisation indicator, but with the three different strands of the globalization index. Analysing through different income level groups. The econometric analysis of this work was performed with resource by Stata 14 making use of a balanced panel with annual data frequency for the period 1970-2013. The end of data is 2013 due to the available data for the KOF indicator, that only goes until 2013. To make a balanced panel, manifold countries were eliminated from the dataset. It was preferable to eliminate countries with few data instead of eliminating years, and keep the data for all time span due to the model in analysis, the ARDL. For this kind of model, it is better to have data with long time spans. The analysis was composed using three different panels according to the World Bank's definition of income, namely: (1) high-income level composed by nineteen countries, specifically Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea Republic, The Netherlands, Norway, Portugal, Spain, Sweden, United States and Uruguay. (2) upper-middle income composed by ten countries, specifically Algeria, Colombia, Dominican Republic, Ecuador, Gabon, Malaysia, Mexico, Peru, South Africa and Thailand. And (3) lower middle- and low-income countries composed by sixteen countries, namely Bolivia, Burkina Faso, Cameroon, Egypt, El Salvador, Gambia, Guatemala, Honduras, India, Indonesia, Kenya, Madagascar, Morocco, Philippines, Senegal and Togo. The data source for the data was the World Bank for all series except for globalization that was taken from KOF database.

TABLE 2: VARIABLES IN STUDY

Variable	Definition	About variable
LYPC	Gross Domestic Product per capita	The series was obtained in constant local Currency Unit.
LNRENT	Total Natural Resources Rents	The series was obtained in % of GDP
LCPI	Consumer Price Index	The series is in 2010 prices
LC	Final Consumption Expenditure	The series was obtained in constant local currency unit
LEGLB	Economic Globalisation	Kof values
LPGLB	Political Globalisation	Kof values
LSGLB	Social Globalisation	kof Values

Notes: The data from World Bank and KOF database was obtained before December 2016.

The use of the consumer price index and final consumption expenditure serve as control variables, to adjust for the typical economic effects when working with economic growth. The natural resources rents were used to analyse the dependency of natural resource rents. The globalization variable was applied separated by economic, social and political integration and not with overall globalisation index. Thus, it is possible to analyse the impact of each one on EG. In more detail, the economic globalization includes the main economic parameters, typically, the flows of goods, capital and services and the perception of market exchanges. This measure is composed by eight indicators separated by two dimensions. First, is the actual flows, which are composed by: Trade, FDI, Portfolio Investment and Income Payments to Foreign Nationals all in percentage of GDP. Second, is the economic market restrictions, which are composed by Hidden Import Barriers, Mean Tariff Rate, Taxes on international Trade (in percentage of current revenue) and Capital Account Restrictions. The political globalisation has the aim to measure the diffusion of government and policies. This indicator is composed by the number of Embassies in Country, Membership in International Organizations, Participation in UN Security Council Missions. Lastly, the social globalization is characterized by measuring the spread of ideas, people and information from and to other countries. This is composed by three different dimensions. First, the data on personal contact composed by Outgoing Telephone Traffic, Transfers (in percentage of GDP), International Tourism, Telephone average costs of call to USA, Foreign Populations (in percentage of total population). Second, composing the data on information Flows, measurable by Telephone mainlines (per 1000 people), Internet hosts (per capita), Internet users (as a share of population), Cable television, Daily newspapers and Radios, these last three in per sample of thousand people. The third component of social globalization is data on cultural proximity, that is composed only by two indicators. The number of MCDonald's restaurants and IKEA *per capita*. To better understand how it is calculated and what was the ponderation attributed in each of these indicators, it is possible to consult Dreher *et al*, (2008) for more detail.

3.2 Preliminary tests

As the time span is high, it is expected to see dynamic relationships between the series. For this study, it was applied an ARDL panel analysis to verify if in the short- and long-run exists different behaviours. The use of an Autoregressive distributed lag (ARDL) has the particularity to work well when the variables of the model are I(0), I(1) or fractionally integrated. The variables are in natural logarithms "L" and differences of logarithms "D". The natural logarithm was applied to linearize the relationship between variables.

To start the econometric analyses, it is important to know the characteristics of the variables in study. As the data form a macro panel, the presence of cross-section dependence (CSD) is very common. Therefore, it is important to check if CSD is present, because some attentions must be taken to not produce misleading or spurious results. To test cross-section dependence in panel, it was performed the Pesaran CD test Pesaran (2004). Table 3 shows the descriptive statistics, and the presence of CSD for the three different scenarios in the analysis.

TABLE 3: DESCRIPTIVE STATISTICS AND CSD

Descriptive Statistics						Cross Section Dependence (CSD)		
High Income								
Variables	Obs	Mean	Std. Dev.	Min	Max	CD-test	Corr	abs(corr)
LYPC	836	11.1254	1.8234	8.7985	17.1296	83.3***	0.96	0.96
LEGLB	836	4.1347	0.2697	3.242	4.5755	82.05***	0.946	0.946
LSGLB	836	4.1419	0.3305	3.0656	4.5271	76.05***	0.877	0.877
LPGLB	836	4.4111	0.1955	3.2285	4.5892	67.3***	0.776	0.776
LCPI	836	3.71	1.5679	-8.8483	4.8431	84.31***	0.972	0.972
LC	836	27.5812	2.3237	24.0123	34.4111	84.33***	0.972	0.972
LNRENT	836	-0.7674	1.6394	-5.5998	3.0651	20.83***	0.24	0.43
DLYPC	817	0.0209	0.0287	-0.1149	0.1202	35.43***	0.413	0.43
DLEGLB	817	0.01	0.0255	-0.0655	0.1475	31.17***	0.364	0.368
DLSGLB	817	0.0146	0.0451	-0.0421	0.4739	2.1**	0.024	0.076
DLPGLB	817	0.0069	0.0363	-0.2089	0.4048	39.08***	0.456	0.479
DLCPI	817	0.0665	0.0927	-0.354	0.7539	60.65***	0.707	0.709
DLC	817	0.026	0.0267	-0.1702	0.131	26.71***	0.311	0.334
DLNRENT	817	0.02	0.3881	-1.7722	2.2094	37.33***	0.435	0.448

Descriptive Statistics						Cross Section Dependence (CSD)		
Upper Middle Income								
Variables	Obs	Mean	Std. Dev.	Min	Max	CD-test	Corr	abs(corr)
LYPC	440	11.1069	2.3836	7.6104	16.1603	24.34***	0.547	0.614
LEGLB	440	3.7754	0.3432	2.8579	4.4001	29.09***	0.654	0.659
LSGLB	440	3.5229	0.371	2.85	4.3456	38.78***	0.872	0.872
LPGLB	440	4.0545	0.2905	3.207	4.4690	29.65***	0.666	0.666
LCPI	440	2.0800	3.9493	-16.1271	4.7698	42.91***	0.964	0.964
LC	440	27.4415	2.4260	22.9978	33.6313	42.51***	0.955	0.955
LNRENT	440	1.894	1.2047	-2.1847	4.2743	23.47***	0.528	0.529
DLYPC	430	0.0201	0.0485	-0.2983	0.3137	7.25***	0.165	0.2
DLEGLB	430	0.0146	0.0464	-0.2254	0.2286	0.93**	0.021	0.13
DLSGLB	430	0.0157	0.0570	-0.0563	0.4576	6.23***	0.142	0.161
DLPGLB	430	0.0156	0.1038	-0.6314	0.5552	3.34***	0.076	0.151
DLCPI	430	0.1483	0.3207	-0.1243	4.3283	11.52***	0.262	0.294
DLC	430	0.0423	0.0513	-0.1872	0.3070	5.1***	0.116	0.183
DLNRENT	430	0.0391	0.3974	-1.7857	1.5376	21.94***	0.499	0.499
Low and Lower Middle Income								
Variables	Obs	Mean	Std. Dev.	Min	Max	CD-test	Corr	abs(corr)
LYPC	704	10.7	2.1961	6.7696	17.2956	24.41***	0.336	0.569
LEGLB	704	3.6409	0.3257	2.2089	4.2357	49.42***	0.68	0.687
LSGLB	704	3.2322	0.4278	1.9149	4.0376	60.6***	0.834	0.834
LPGLB	704	4.0066	0.3664	2.8329	4.5398	61.36***	0.844	0.844
LCPI	704	2.9649	2.1441	-10.1697	4.8826	70.36***	0.968	0.968
LC	704	27.1452	3.0308	22.0015	36.1951	68.08***	0.937	0.937
LNRENT	704	1.5084	0.8708	-0.626	3.6811	21.43***	0.295	0.359
DLYPC	688	0.0133	0.0394	-0.1877	0.1702	5.85***	0.081	0.15
DLEGLB	688	0.0145	0.0582	-0.3023	0.2579	2.78***	0.039	0.154
DLSGLB	688	0.0142	0.065	-0.3061	0.6550	6.43***	0.09	0.158
DLPGLB	688	0.0211	0.0810	-0.3287	0.4538	7.09***	0.099	0.158
DLCPI	688	0.0999	0.2275	-0.0878	4.7749	16.54***	0.23	0.256
DLC	688	0.0365	0.0542	-0.4061	0.3364	4.69***	0.065	0.157
DLNRENT	688	0.0199	0.3308	-1.415	2.1073	23.61***	0.329	0.335

Notes: The null hypothesis of CSD: cross section independence. ***,**,* denotes statistically significant at 1%, 5% and 10% level respectively. The Stata command *xtcd* was used to achieve the results for cross section dependence.

As is visible in the previous table, the presence of CSD is notable, and that is more evident due to be a long-time span analysis. The CSD can be present due to factors like, the existence of economic shocks in the economy. Therefore, countries have the same reaction to the shocks, for example, in the presence of macroeconomic events or financial crisis, even not geographically linked. The CSD could also be present due to events in countries geographically linked. The countries react in the same way as they have similar policies, or take the same measures (Moscone & Tosetti 2010). It is also important to verify if a correlation between

variables is present. For a study to perform consistent and valid results, correlation between variables cannot be present. In Table 4 it is possible to see that there are no correlations between variables. The variance inflation factor (VIF) test was also performed to verify the multicollinearity between variables. It is possible to see that the values are very low, having a mean value below than 5.

TABLE 4: MATRICES OF CORRELATIONS AND VIF STATISTICS

High Income														
	lypc	leglb	lsglb	lpglb	lcpi	lc	lnrent		dlypc	dleglb	dlsglb	dlpglb	dlcpi	dlc	dlnrent
LYPC	1							*DLYPC*	1						
LEGLB	-0.3031	1						*DLEGLB*	0.0536	1					
LSGLB	-0.2115	0.7684	1					*DLSGLB*	0.069	0.028	1				
LPGLB	-0.1998	0.5866	0.7241	1				*DLPGLB*	0.0196	0.0194	0.1818	1			
LCPI	0.0887	0.3865	0.5518	0.3689	1			*DLCPI*	0.0066	0.0491	0.0406	0.0022	1		
LC	0.8366	-0.473	-0.2056	-0.2099	0.204	1		*DLC*	0.7716	-0.0845	0.0876	0.0802	0.0439	1	
LNRENT	-0.1682	0.3632	0.3453	0.2157	-0.0029	-0.2973	1	*DLNRENT*	0.0424	0.1994	-0.0061	-0.0793	0.08	-0.0494	1
Vif		3.28	4.28	2.14	1.8	1.71	1.26			1.05	1.04	1.05	1.01	1.02	1.06
Mean Vif				2.43								1.04			

Upper Middle Income														
	lypc	leglb	lsglb	lpglb	lcpi	lc	lnrent		dlypc	dleglb	dlsglb	dlpglb	dlcpi	dlc	dlnrent
LYPC	1							*DLYPC*	1						
LEGLB	-0.0022	1						*DLEGLB*	-0.057	1					
LSGLB	0.3266	0.6947	1					*DLSGLB*	0.0466	0.0736	1				
LPGLB	-0.124	0.2705	0.4084	1				*DLPGLB*	0.0277	0.011	0.0769	1			
LCPI	0.2145	0.559	0.5173	0.1168	1			*DLCPI*	-0.2701	0.0569	-0.0414	-0.0127	1		
LC	0.8529	0.1396	0.3439	0.0675	0.2115	1		*DLC*	0.4787	-0.0303	-0.0008	0.0784	-0.2576	1	
LNRENT	0.0698	0.1429	0.0626	0.2594	0.0726	-0.1266	1	*DLNRENT*	0.0955	0.1821	-0.0499	0.0658	-0.0342	-0.0165	1
Vif		2.25	2.59	1.31	1.56	1.2	1.12			1.05	1.02	1.02	1.08	1.08	1.05
Mean Vif				1.67								1.05			

Low and Lower Middle Income

	lypc	leglb	lsglb	lpglb	lcpi	lc	lnrent		dlypc	dleglb	dlsglb	dlpglb	dlcpi	dlc	dlnrent
LYPC	1							*DLYPC*	1						
LEGLB	-0.1423	1						*DLEGLB*	-0.0343	1					
LSGLB	-0.3781	0.6261	1					*DLSGLB*	0.07	0.0522	1				
LPGLB	0.1156	0.398	0.3447	1				*DLPGLB*	0.0074	0.0188	0.0073	1			
LCPI	0.1995	0.3693	0.3098	0.4123	1			*DLCPI*	-0.1198	0.0388	-0.0136	-0.0023	1		
LC	0.8729	-0.0691	-0.4147	0.3456	0.216	1		*DLC*	0.5309	-0.0656	0.0456	0.0087	-0.0599	1	
LNRENT	0.3537	0.1174	-0.2252	0.1297	-0.0117	0.337	1	*DLNRENT*	0.0069	0.1762	-0.0671	-0.0135	0.0219	0	1
Vif		2	2.83	1.75	1.39	2.01	1.26			1.04	1.01	1	1.01	1.01	1.04
Mean Vif				1.87							1.02				

To access the order of integration of the variables, only the second generation of panel unit root tests was performed due to the existence of CSD in the model. Performing the CIPS test (Pesaran 2007), Table 5 shows the results. This test is more robust to heterogeneity and unit roots when under a nonstandard distribution.

TABLE 5: PANEL UNIT ROOT TESTS (CIPS)

High income			Upper Middle Income	
	Without trend	With trend	Without trend	With trend
LYPC	1.18	3.067	2.027	2.165
LEGLB	-1.758**	0.751	1.394	1.516
LSGLB	-4.014***	-1.994**	-1.849**	-1.952**
LPGLB	-4.539***	-4.295***	-2.999***	-1.301*
LC	2.829	3.816	0.240	-1.307*
LCPI	0.067	1.360	0.702	5.784
LNRENT	-0.391	-0.663	-3.525***	-3.228***
DLYPC	-12.816***	-11.791***	-10.458***	-9.710***
DLEGLB	-16.886***	-15.668***	-12.591***	-12.010***
DLSGLB	-19.590***	-18.872***	-14.421***	-13.834***
DLPGLB	-19.693***	-19.151***	-12.865***	-11.970***
DLC	-12.281***	-11.373***	-11.654***	-10.918***
DLCPI	-7.190***	-5.464***	-4.296***	-5.364***
DLNRENT	-18.416***	-17.792***	-13.678***	-13.098***

Low and Lower Middle Income		
	Without trend	With trend
LYPC	-0.362	-0.117
LEGLB	-0.565	1.634
LSGLB	-4.542***	-4.148***
LPGLB	-3.948***	-2.173**
LC	-1.877**	1.616
LCPI	-0.798	1.403
LNRENT	-2.261**	-1.249
DLYPC	-13.863***	-12.961***
DLEGLB	-16.829***	-15.837***
DLSGLB	-17.777***	-16.854***
DLPGLB	-17.626***	-16.645***
DLC	-14.909***	-14.112***
DLCPI	-11.554***	-11.201***
DLNRENT	-18.362***	-17.863***

Notes: ***,**,* denotes statistically significant at 1%, 5% and 10% level respectively. The Null of CIPS test: The series are I(1). The *multipurt* Stata command was used.

As shown on the tables above, the variables were not always of the same order of integration. Therefore, the variables are I(0) and I(1) when analysing in levels, but the most important for this study was to verify that variables I(2) are not present. In that case, it would have been not possible to use the ARDL methodology. Concluding that the panel ARDL approach is an appropriate choice to realise this study.

3.3. Method

Before proceeding with the estimations, it is very important to test for the existence of heterogeneity in panels, mainly because the data in study has a long-time span. In this kind of analysis, if it is present, the Mean Group (MG), Pooled Mean Group (PMG) or Dynamic Fixed Effects (DFE) estimators should be applied. The MG estimator makes an unweighted mean of the individual regression coefficients. This estimator is consistent, when estimating the average of long-run relationship and have the advantage of calculating the coefficient average of each cross, but it seems to be inefficient when there is homogeneity in the slope parameters (Pesaran *et al*, 1999). In case of long-run homogeneity, PMG is more consistent and efficient because it uses an averaging and pooling in estimations, that allows the intercepts, short-run coefficients and error variances, to differ freely across groups. Although it constrains the long-run coefficients to be similar across groups (Pesaran et al, 1999). To know which of these estimators should be used, the Hausman test should be applied with PMG against MG.

Whether the best estimator is the MG, this should be tested against the DFE. The DFE estimator is the less flexible model because it further restricts the speed of adjustment coefficient and the short-run coefficients to be equal (Blackburne & Frank 2007).

TABLE 6: HAUSMAN TESTS

High income			
PMGvsMG		MGvsDFE	
Chi2(14)	-537.75	Chi2(9)	0
Prob>chi2	n.d	Prob>chi2	1
Upper Midle Income			
PMGvsMG		MGvsDFE	
Chi2(14)	71.17	Chi2(6)	0.03
Prob>chi2	0	Prob>chi2	1
Low and Lower Middle Income			
PMGvsMG		MGvsDFE	
Chi2(14)	62.81	Chi2(14)	0.05
Prob>chi2	0	Prob>chi2	1

Notes: The Stata command *xtpmg* was used before performing the Hausman test.

Following the results above, the DFE estimator should be the estimator applied. This means that the heterogeneity was not found and homogeneity is present between countries in each panel.

As it is usual when working with panel data, it is very important to analyse if the data uses a fixed affects (FE) or a random effects (RE) estimator. To analyse this, the Hausman test is applied which has the null hypothesis, that the difference in coefficients are not systematic. When applying FE against RE, if the P-value is less than 5% the model should be calculated with FE, since the null hypothesis is rejected with a 5% significance. The results for high-income panel (x^2_{13}=45.06), upper middle income (x^2_9=30.50) and lower middle- and low-income (x^2_{13}=24.38) were significantly less than 1%, besides the last one that had a less than 5% significance. Therefore, the FE estimator should be applied for all panel data analysis. Which means that, the correlation between countries individual effects and the explanatory variables are present. To obtain correct and reliable results a battery of specification tests was made according to the presence of FE. First, it was the Wald test which gives information if the phenomenon of heteroskedasticity is present or not. The Wald test as the null hypothesis of homoscedasticity, i.e, not heteroscedastic. Second, it was computed the Pesaran test to verify if there is contemporaneous correlation among the crosses. This test is more robust to micro panels T<N, but was computed to confirm the Breush-Pagan LM that is more robust for macro panel T>N, and such the Breush-Pagan LM failed on the high-income countries analysis. The Pesaran's test has the null hypothesis that the residuals are not correlated. Third, Breush-Pagan Lagrange Multiplier has the null hypothesis: cross-sectional independence. Fourth, Wooldridge Test which gives information about serial correlation. This test has the null hypothesis of no serial correlation. Finally, Baltagy -Wu LBI, that tests for the presence of first order autocorrelation. Synthetically the model suffers from the issue of autocorrelation if the critical value of Baltagy-Wu LBI is less than two.

TABLE 7: SPECIFICATION TESTS

Test	High Income	Upper Middle Income	Low and Lower Middle Income
Wald	156.68***	1240.43***	227.08***
Pesaran's	22.590***	4.295***	2.885***
Breush-Pagan LM	n.d	78.769***	182.767***
Wooldridge	118.632***	258.537***	37.397***
Baltagy-Wu LBI	1.6910	1.7125	1.8430

Notes: ***,**,* denotes 1%, 5% and 10% level of significance respectively. n.d. means not defined

As it can be seen in the table above, the characteristics of each panel in the analysis are the same. The results indicate that the phenomenon of heteroscedasticity is present, contemporaneous correlation among the crosses and first order autocorrelation are as well present in the models. In the high-income panel the Breush-Pagan LM could not be calculated

because the correlation matrix of residuals is singular. Therefore, the Pesaran's test to verify the contemporaneous correlation was applied. With all of these characteristics present in the data and due to the time dimension (T) of the panels being large, for the final estimations the Driscoll & Kraay (1998) estimator was used (Hoechle 2007).

Before passing to the final estimation, some economic shocks were considered with the objective to add important information to the model. As it was possible to verify with the pre-estimation tests, CSD was present in the model. This was expected, as some behaviours are equal when looking in residuals.

The presence of some economic events that influence the results even without having anything to do with the variables in study could be a problem in the estimation. Although Driscoll-Kraay works well in presence of CSD, some events had a very large impact. Therefore, impulse dummy variables were added in the model when some events were causing big impacts on the economy. Events like revolutions that changed political paradigm completely, financial collapses, oil peaks are some examples of shocks that affect the economy. Togo and Gabon were two countries that was not found information for many atypical shocks in their economy, but it is known that during those years they had a significant number of structural problems, including conflicts and military regimes.

The method used to identify these outliers was observing the residuals, and when large disparities were found, a dummy variable was added to smooth the impact of the shock. When comparing the first model (without smoothing the impact of the shocks) against the model with the dummies, the results are similar in the coefficients but with better statistical significances. With the inclusion of dummy variables, the impacts from the variables in analysis on economic growth did not change. All the dummy variables are statistically significance at level of 1%. This could mean once they improve the model. In the table 8, it is possible to see the important events caused big impacts on the economic growth in certain countries, and consequently that were smoothed with dummy variables.

TABLE 8: DUMMY VARIABLES

Country	Year	Variable Name	Shock	Cause
Low and Lower Middle Income				
Cameroon	1978	idcmr1978	+	The oil Boom for Cameroon
Cameroon	1993	idcmr1993	-	Recession in Cameroon
Togo	1971	idtgo1971	+	Gnassingbé Eyadéma went to power and dissolved the political parties
Togo	1976	idtgo1976	-	Phosphate prices fall
Togo	1978	idtgo1978	+	n.a.
Togo	1980	idtgo1980	+	n.a.
Togo	1994	idtgo1994	+	n.a.
Togo	1997	idtgo1997	+	Increase in Cocoa exports
Indonesia	1998	ididn1998	-	Economic collapse, Asian Crisis
Gambia	1983	idgmb1983	+	Senegambia Formation
Madagascar	2002	idmdg2002	-	Political problems that led the country to a serious economic crisis
Upper Middle Income				
Algeria	1971	iddza1971	-	Structural changes leading to nationalization of oil companies and reallocations
Algeria	1972	iddza1972	+	Economic recovery
Gabon	1974	idgab1974	+	n.a.
Gabon	1975	idgab1975	=	n.a.
Gabon	1976	idgab1976	=	n.a.
Gabon	1977	idgab1977	-	n.a.
Gabon	1978	idgab1978	=	n.a.
Gabon	1987	idgab1987	-	n.a.
Gabon	1988	idgab1988	+	n.a.
High Income				
Greece	1972	idgrc1972	+	Phenomenon of Greek economic miracle was occurring
Greece	1973	idgrc1973	=	Greek Economic Miracle Phenomenon
Greece	1974	idgrc1974	-	Economic recession
Australia	1983	idaus1983	-	Change of government and implementation of major structural reforms
Finland	1991	idfin1991	-	Economic Depression
Portugal	1974	idprt1974	-	Change of government major political changes
Portugal	1975	idprt1975	=	Political Changes
Korea, Rep	1980	idkor1980	-	Application of Martial Law
Uruguay	1982	idury1982	-	Military dictator Gregorio Álvarez began to govern the country
Ireland	1990	idirl1990	+	Celtic Tiger Phenomenon due to measures taken and investments
Ireland	1995	idirl1995	+	Celtic Tiger Phenomenon
All countries	2009	Id2009	-	Financial crisis due to bankruptcy of big Financial institutions

Notes: + means positive shock; = means that maintained the effect of the previous year; - means negative shock; n.a. (not available) means that wasn't found any relevant information to justify the shock.

4.Results and Discussion

In table 9 it is possible to see the estimation using Driscoll-Kraay estimator for all panels. For each panel presented, the results contain all variables in the study and the reduced form, i.e., an estimation only with the statistically significant variables. The latter was used to calculate the long-run elasticities.

TABLE 9: ESTIMATION RESULTS

High income		
Variable	FE-D.K.	FE-D.K.*
Trend	0.0003	
idgrc1972	0.0459***	0.0474***
idgrc1973	0.0327***	0.0325***
idgrc1974	-0.0683***	-0.0711***
idaus1983	-0.0268***	-0.0285***
idfin1991	-0.0560***	-0.0569***
idprt1974	-0.0798***	-0.0790***
idprt1975	-0.0836***	-0.0826***
idkor1980	-0.0815***	-0.0827***
idury1982	-0.0644***	-0.0578***
idirl1990	0.0550***	0.0538***
idirl1995	0.0511***	0.0515***
id2009	-0.0381***	-0.0373***
DLEGLB	0.1192***	0.1097***
DLSGLB	0.0055	
DLPGLB	-0.0396**	-0.0424***
DLCPI	-0.0498***	-0.0343**
DLC	0.7545***	0.7440***
DLNRENT	0.0019*	0.0023*
LYPC(-1)	-0.0294**	-0.0196***
LEGLB(-1)	0.0183**	0.0224**
LSGLB(-1)	-0.0045	
LPGLB(-1)	0.0055	
LCPI(-1)	-0.002	
LC(-1)	0.0055	
LNRENT(-1)	-0.0008	
_cons	0.0997	0.1299***

Upper Middle		
Variable	FE-D.K.	FE-D.K.*
trend	-0.0009	
idgab1974	0.3491***	0.3560***
idgab1975	0.1155***	0.1131***
idgab1976	0.2547***	0.2510***
idgab1977	-0.1680***	-0.1742***
idgab1978	-0.3374***	-0.3386***
idgab1987	-0.1315***	-0.1243***
idgab1988	0.1357***	0.1426***
iddza1972	0.1487***	0.1476***
iddza1971	-0.1729***	-0.1763***
DLEGLB	-0.0434	
DLSGLB	0.0330**	0.0300***
DLPGLB	-0.0145	
DLCPI	-0.0229***	-0.0239***
DLC	0.4359***	0.4285***
DLNRENT	0.0113***	0.0097**
LYPC(-1)	-0.0402**	-0.0245***
LEGLB(-1)	0.0075	
LSGLB(-1)	0.0202*	0.0174***
LPGLB(-1)	-0.0016	
LCPI(-1)	0.0005	
LC(-1)	0.0233	
LNRENT(-1)	-0.0001	
_cons	-0.2629	0.2146***

Low and Lower Middle Income		
Variable	FE-D.K.	FE-D.K.*
trend	0.0002	
idcmr1978	0.1360***	0.1313***
idcmr1993	-0.1566***	-0.1553***
idgmb1983	0.1434***	0.1422***
idtgo1971	0.1625***	0.1635***
idtgo1976	-0.1517***	-0.1506***
idtgo1978	0.1381***	0.1354***
idtgo1980	0.1163***	0.1162***
idtgo1994	0.1286***	0.1242***
idtgo1997	0.1094***	0.1095***
idmdg2002	-0.1519***	-0.1517***
ididn1998	-0.1375***	-0.1413***
DLEGLB	-0.0207	
DLSGLB	0.0184*	0.0156
DLPGLB	0.001	
DLCPI	-0.0156***	-0.0152***
DLC	0.4070***	0.4117***
DLNRENT	0.0039	
LYPC(-1)	-0.0253**	-0.0261***
LEGLB(-1)	-0.0008	
LSGLB(-1)	0.0262***	0.0248***
LPGLB(-1)	-0.0038	
LCPI(-1)	-0.0004	
LC(-1)	-0.0032	
LNRENT(-1)	0.0029	
_cons	0.2833	0.1977***

Notes: FE-DK denotes Fixed Effecs Driscoll Kray Estimator; FE-DK* denotes the reduced form of Drisroll Kray estimator; ***,**,* denotes 1%, 5% and 10% level of significance respectively.

Table 10 presents the elasticities of the short- and long-run effects of all the models. The short-run elasticities were provided directly by the Driscoll-Kray results on Table 9, but the long-run elasticities needed to be calculated. The form used was obtained by dividing the coefficient of the variables by the coefficient of lypc(-1), both lagged once, and then the ratio was multiplied by -1.

TABLE 10: ELASTICITIES AND SPEED OF ADJUSTMENTS

	High income	Upper middle income	Low and Lower middle income
Short run elasticities			
DLEGLB	0.1097***		
DLSGLB		0.0300***	0.0156
DLPGLB	-0.0424***		
DLCPI	-0.0343**	-0.0239***	-0.0152***
DLC	0.7440***	0.4285***	0.4117***
DLNRENT	0.0023*	0.0097**	
Computed long run elasticities			
LEGLB(-1)	1.1406***		
LSGLB(-1)		0.7451***	0.9518***
Speed of adjustment	-0.0196***	-0.0245***	-0.0261***

Notes: ***,**,* denotes 1%, 5% and 10% levels of significance respectively.

The elasticities of the results showed in table 10 were calculated with the reduced model and the elasticities signals did not change comparing with the model.

The error correction term (ECT) is always negative and statistically significant, this could mean that these economic factors in the analysis have impacts in the future of economic growth. The adjustment speed is slow, suggesting that globalization is a long-term phenomenon. In other words, the effects of globalization on economic growth take too long to be effective. The results are in semi-elasticities, and in these cases, are read in percentage points (pp). When in elasticities, they are read as percentages (p), in both assuming *ceteris paribus*.

When observing the reduced form of the model all the coefficients included have significant statistics, only semi-elasticity of social globalization in low- and lower middle-income lose the significance. The results for high-income countries, in the short-run, can be interpreted as: with an increase of 1 pp in economic globalization, an increase of around 0.11pp on economic growth occurs. The political globalization has a negative statistically significant value, this provokes a 0.04 pp decrease on economic growth per each 1 pp increase of political globalization. For the long-run, only economic globalization has an impact on economic growth, causing an increase of 1.14 p on EG per each increase of 1 p of economic globalization. In upper middle-income countries in terms of globalization the only present semi-elasticities are of social globalization, having an effect of 0.03 pp on EG per each increase of 1 pp of social globalization. In the long-run the only effect observed is from the social globalization, provoking an increase of 0.74 p on EG per each 1 p of increased in social globalization. Finally, looking at the low- and lower-middle income countries there is no existing semi-elasticity statistically significant from globalisation. In the long-run it is possible to verify a contribute from social globalization on EG around 0.95 p per each increased of 1p of social globalization, but this is the only elasticity present. The results show a statistically significance running from

economic globalization on EG, only in high-income countries. Tendentiously, these countries have a great flow in products, money, and sharing knowledge and investments. These characteristics can make a single product receive high technology and investment from different countries before being complete. Consequently, these countries have more high-tech products, better financial margins, more investments, technology and scientific development. These conditions help the improvement of EG.

The results in high-income countries also showed a negative effect from Political globalization to EG in short-run. Dreher *et al*, (2008) draws attention to the fact that this effect can happened due to political intervention in reducing inequalities. The effects of globalization on EG in the remaining groups of countries showed similar results between them. Only Social globalization have effects in these groups of countries in the short- and long-run. These characteristics suggest that these countries should improve their international networks on social integration like, internet connections, cable TV, newspapers, radios, the promotion of the movement of foreign people and learning about other countries and cultures. The students should go abroad and return with different knowledge. This could provide new information about other countries, for people in countries less globalized, making some kind of benchmarking in order to learn about and implement better practices. Therefore, they could start to take good examples from other cultures, which valorise human rights, schooling, birth control, sustainable building and become more efficient. With a high level of social globalization, a country could have conditions to start creating a good foundation for the strengthening of their economies.

Finally, other estimators were applied following the fixed effects (FE) characteristics, with the aim to compare the results and confirm the robustness of the model estimated previously with FE-D.K. In table 11 it is possible to see the results when estimated with Fixed Effects, Fixed Effects Robust and Fixed Effects Driscoll-Kraay. All the coefficients are equal since the estimator used was FE, in these conditions only the standard deviation and, therefore, the levels of significance vary. These changes happen due to the fact that the FE-D.K. takes into account the issues of CSD, heteroskedasticity and contemporaneous correlation.

TABLE 11. COMPARATIVE ESTIMATORS

High Income Countries

Variable	Coef.	FE	FE.R	FE-D.K.
trend	0.0003	*		
idgrc1972	0.0459	***	***	***
idgrc1973	0.0327	**	***	***
idgrc1974	-0.0683	***	***	***
idaus1983	-0.0268	*	***	***
idfin1991	-0.0560	***	**	***
idprt1974	-0.0798	***	***	***
idprt1975	-0.0836	***	***	***
idkor1980	-0.0815	***	***	***
idury1982	-0.0644	***	***	***
idirl1990	0.0550	***	***	***
idirl1995	0.0512	***	***	***
id2009	-0.0381	***	***	***
DLEGLB	0.1192	***	***	***
DLSGLB	0.0055			
DLPGLB	-0.0396	***	**	**
DLCPI	-0.0498	***	**	***
DLC	0.7545	***	***	***
DLNRENT	0.0019			*
LYPC(-1)	-0.0294	***	**	**
LEGLB(-1)	0.0183	***	*	**
LSGLB(-1)	-0.0045			
LPGLB(-1)	0.0055			
LCPI(-1)	-0.002	***	***	
LC(-1)	0.0055			
LNRENT(-1)	-0.0008			
_cons	0.0997			
N		817	817	817
r2		0.7381	0.7381	
r2_a		0.7232	0.7295	
F		83.7		10764.8

Upper Middle Income Countries

Variable	Coef.	FE	FE.R	FE-D.K.
trend	-0.0009			
idgab1974	0.3491	***	***	***
idgab1975	0.1155	***	***	***
idgab1976	0.2547	***	***	***
idgab1977	-0.1680	***	***	***
idgab1978	-0.3374	***	***	***
idgab1987	-0.1315	***	***	***
idgab1988	0.1357	***	***	***
iddza1972	0.1487	***	***	***
iddza1971	-0.1729	***	***	***
DLEGLB	-0.0434		*	
DLSGLB	0.033			**
DLPGLB	-0.0145			
DLCPI	-0.0229	***	***	***
DLC	0.4359	***	***	***
DLNRENT	0.0113	***	**	***
LYPC(-1)	-0.0402	**		**
LEGLB(-1)	0.0075			
LSGLB(-1)	0.0202	*		*
LPGLB(-1)	-0.0016			
LCPI(-1)	0.0005			
LC(-1)	0.0233			
LNRENT(-1)	-0.0001			
_cons	-0.2629			
N		430	430	430
r2		0.7385	0.7385	
r2_a		0.7174	0.7236	
F		48.736		10341.9

Low and Lower Middle Income Countries

Variable	Coef.	FE	FE.R	FE-D.K.
trend	0.0002			
idcmr1978	0.136	***	***	***
idcmr1993	-0.1566	***	***	***
idgmb1983	0.1434	***	***	***
idtgo1971	0.1625	***	***	***
idtgo1976	-0.1517	***	***	***
idtgo1978	0.1381	***	***	***
idtgo1980	0.1163	***	***	***
idtgo1994	0.1286	***	***	***
idtgo1997	0.1094	***	***	***
idmdg2002	-0.1518	***	***	***
ididn1998	-0.1375	***	***	***
DLEGLB	-0.0207			
DLSGLB	0.0184		*	*
DLPGLB	0.0011			
DLCPI	-0.0156	***	***	***
DLC	0.407	***	***	***
DLNRENT	0.0039			
LYPC(-1)	-0.0253	**	*	**
LEGLB(-1)	-0.0008			
LSGLB(-1)	0.0262	***	**	***
LPGLB(-1)	-0.0038			
LCPI(-1)	-0.0004			
LC(-1)	-0.0032			
LNRENT(-1)	0.0029			
_cons	0.2833			
N		688	688	688
r2		0.4955	0.4955	
r2_a		0.4643	0.4765	
F		25.4221		1547.86

5.Conclusion

This study focuses on analysing the effects of different strands of globalization on economic growth, per different income levels, and in the presence of natural resource rents. It was important to divide countries by income level to catch different effects in each type of country. In a preliminary stage the data was analysed to verify if an Autoregressive Distributed Lag approach would be a correct methodology. The tests proved that this methodology approach was appropriate. After concluding the presence of cross section dependence, heteroskedasticity and autocorrelation, the fixed effects Driscoll-Kraay was applied due to the control of these phenomena and because the estimator for macro panel chosen was the Dynamic Fixed Effects. The results observed for long-run seems to answer the initial question. This means that depending on each type of country's income level, the effects of globalization will differ.

The analyse prove that the dimension of globalization which benefits more the high-income countries, is the economic globalisation that has a positive effect. A negative short-run effect from political globalization is also present. The remain groups of countries present similar effects between them from globalisation, showing positive and statistically significant in social globalization in long-run and in the short-run only the upper middle income countries present statistically significances.

The results of natural resource rents are shown to be only statistically significant on high-income countries and in upper middle-income countries, the latter having more significance. In both income groups the effects are positive. The low- and lower middle-income countries do not present any impact. These results could help policy makers to make better decisions to improve the EG depending on income country.

5.1 Suggestions for Future Research

For future research, it would be interesting to understand if the determinants of social globalization, mainly the measures related to the information flows, are benefiting or not the economic growth in low-income countries.

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