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DO (DE-)GLOBALISATION AND ECONOMIC GROWTH GO HAND IN HAND? A STUDY FOR THE EU

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Dissertation

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Curriculum Vitae

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Abstract

The deceleration of international trade and investment growth after the 2008 Global Financial Crisis suggests a process of de-globalisation. The objectives of this dissertation are to review the relevant literature and conduct an empirical study about the phenomenon in 28 countries of the European Union (EU), from 2000 to 2019.

The definitions of (de-)globalisation (Karunaratne, 2012; Witt, 2019) and the measure of the phenomenon itself are objects of discussion in the scientific literature. In this study, the effect of (de-)globalisation regarding world trade, global foreign direct investment and global value chains, in the EU's economic growth, will be analysed.

This dissertation will draw on the *Konjunkturforschungstelle* Globalisation Index (KOF Globalisation Index), a composite index which includes economic (trade and financial), social and political globalisation (Gygli, Haegl, Potrafke & Sturm, 2019). The methodology will be in a first phase the descriptive analysis of the (de-)globalisation trends in the EU, from 2000 to 2019, and in a second phase a quantitative analysis with an econometric model to explain the impact of globalisation on the evolution of the growth in the EU. Control variables will be added, such as a binary variable capturing the occurrence of the 2008 crisis.

The main conclusions are: there is a slowdown in globalisation since the 2008 crisis in the EU, with the KOF Globalisation Index's economic dimension showing the most unstable behaviour; globalisation is positively associated with economic growth, with social and *de jure* KOF Globalisation Index's dimensions being the most relevant; the increase in the degree of openness boosts economic growth, as well as Information and Communication Technology exports; the increase in international trade taxes increases economic growth; the increase in the weight of Foreign Value Added in exports decreases economic growth; and the years 2010 and 2015-2018 have a positive effect on economic growth.

Keywords: De-globalisation; Globalisation; Growth; KOF Globalisation Index; International Trade; Foreign Direct Investment; Global Value Chains; European Union

JEL codes: F14, F21, F62

Resumo

A desaceleração do crescimento do comércio e do investimento internacionais após a Crise Financeira Global de 2008 sugere um processo de desglobalização. Os objetivos desta dissertação são rever a literatura relevante e realizar um estudo empírico sobre o fenómeno em 28 países da União Europeia (UE), de 2000 a 2019.

As definições de (des)globalização (Karunaratne, 2012; Witt, 2019) e a medida do fenómeno em si são objeto de discussão na literatura científica. Neste estudo, será analisado o efeito da (des)globalização no comércio mundial, no investimento direto estrangeiro global e nas cadeias de valor globais, no crescimento económico da UE.

Esta dissertação basear-se-á no Índice de Globalisação *Konjunkturforschungstelle* (Índice de Globalisação KOF), um índice composto que inclui a globalização económica (comercial e financeira), social e política (Gygli, Haegl, Potrafke & Sturm, 2019). A metodologia será, numa primeira fase, a análise descritiva das tendências de (des)globalização na UE, de 2000 a 2019, e numa segunda fase uma análise quantitativa com um modelo econométrico para explicar o impacto da globalização na evolução do crescimento na UE. Serão acrescentadas variáveis de controlo, tais como uma variável binária que capte a ocorrência da crise de 2008.

As principais conclusões são: há um abrandamento da globalização desde a crise de 2008 na UE, com a dimensão económica do Índice de Globalização KOF a mostrar o comportamento mais instável; a globalização está positivamente associada ao crescimento económico, sendo as dimensões sociais e *de jure* do Índice de Globalização KOF as mais relevantes; o aumento do grau de abertura, as exportações de Tecnologias de Informação e Comunicação, e o aumento dos impostos sobre o comércio internacional impulsionam o crescimento económico; o aumento do peso do Valor Acrescentado Estrangeiro nas exportações diminui o crescimento económico; e os anos 2010 e 2015-2018 têm um efeito positivo no crescimento económico.

Palavras-chave: Desglobalização; Globalização; Crescimento; Índice de Globalização KOF; Comércio Internacional; Investimento Direto Estrangeiro; Cadeias de Valor Globais; União Europeia

Códigos JEL: F14, F21, F62

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List of Abbreviations

ASEAN – Association of Southeast Asian Nations

EMU – European Monetary Union

EU – European Union

FDI – Foreign Direct Investment

FVA – Foreign Value Added

G20 – Group of Twenty

G7 – Group of Seven

GDP – Gross Domestic Product

GFC – Global Financial Crisis

GFCF – Gross Fixed Capital Formation

GVC – Global Value Chains

ICT – Information and Communication Technology

ILO – International Labour Organisation

IMF – International Monetary Fund

KOF Globalisation Index – *Konjunkturforschungstelle* Globalisation Index

MNC – Multinationals

OECD – Organisation for Economic Co-operation and Development

UK – United Kingdom

UN – United Nations

USA – United States of America

WDI – World Development Indicators

WTO – World Trade Organisation

1. Introduction

The process of economic globalisation has happened, chronologically, in cycles of acceleration and deceleration of growth (Witt, 2019). International trade and globalisation had a sharp and structural increase after the Second World War, and the economies became more interdependent (World Trade Organisation (WTO), 2008). However, after the Global Financial Crisis (GFC) of 2008 (which started in the United States of America – USA – and impacted the world economy in subsequent years), studies about the de-globalisation phenomenon became more prevalent (Anil, 2018; International Monetary Fund (IMF), 2018; Witt, 2019). The possible effects of de-globalisation are particularly important in the integrated area of the European Union (EU), which represents the zone with bigger weight in international commerce.

Some authors mention that globalisation in trade has reached its peak in the period from 2007 to 2010, and that this has occurred for foreign direct investment (FDI) from 2007 to 2011 (Witt, 2019). Olivié and Gracia (2020) argue that from 2012 on there is a period characterised by a decrease on the dynamic growth of globalisation (even though this hasn't materialized in a true de-globalisation). The causes of the deceleration of the globalisation process after 2008 and whether this is cyclical or truly structural and disruptive (de-globalisation) will also be object of this study.

International trade trends will be analysed, as well as the trends of FDI and of global value chains (GVC). In the case of developed economies, the examination of GVC is particularly relevant to explain the process of global production (Casella, Bolwijn, Moran & Kanemoto, 2019). These aspects will be studied for the EU in the period 2000-2019.

This dissertation will have three main objectives:

(i) a comprehensive literature review, based on a thorough extraction of relevant references mainly from the bibliographic databases Web of Science and Scopus;

(ii) a description and analysis of how the nature of globalisation, understood as a multi-faceted and broad concept, contributes to economic growth in the EU-28; and

(ii) an explanation of how new trends in international trade and production, via the development of Information and Communication Technology (ICT) and GVC, contribute to economic growth in the EU-28.

In a first moment, the methodology used will be descriptive, to investigate the process of (de-)globalisation analysing the trends of international trade and investment, foreign value added (FVA), KOF composite index and their relationship with the evolution of economic growth in the EU. In a second moment, there will be an econometric investigation, to examine alterations in the economic growth of the EU, presenting alternative models with panel data.

The use of composite indices to measure globalisation and de-globalisation has been the option of recent studies of the relevant literature on this topic. There is a range of indices that are utilised. For instance, Olivié and Gracia (2020) use the composite indicator Elcano Global Presence Index and Figge and Martens (2014) utilise the Maastricht Globalisation Index. Potrafke (2015) refers to around 120 empirical studies that use the KOF Globalisation Index. One of the most used indices is the KOF Globalisation Index. It distinguishes trade and financial globalisation, objects of this study, and is available to measure the phenomenon across countries and long-time series (Gygli, Haelg, Potrafke & Sturm, 2019; Potrafke, 2015). The new version of this index, from 2018, includes a separation between *de facto* and *de jure* globalisation as will be explained later.

This dissertation aims to contribute to the literature related to globalisation in the EU space, recurring to composite indicators of international trade and GVC, and linking globalisation to economic growth. The GFC has increased the volatility of international trade and financial flows, increasing the uncertainty in the global economy trends (in particular, in the European integrated space) in the subsequent years. These are major reasons for the relevance of this study.

This work is divided into the two main following parts: the literature review and the empirical study. After the introduction, a second section is dedicated to the literature review, in which the concepts of globalisation and de-globalisation (section 2.1.), the ways of measuring globalisation (section 2.2.) and the links between globalisation and economic growth (section 2.3.) are developed. Section 3 refers to the methodology, starting by listing and justifying the

choice of research questions (section 3.1.), followed by the characterisation of the variables to be considered in this study (section 3.2.) and the enunciation of the relevant models and estimation methods (section 3.3.). The fourth section presents the descriptive analyses and the trends of globalisation and de-globalisation (section 4.1.), followed by the estimated results and its discussion arising from the econometric modelling, which relates economic growth to globalisation variables in the EU (section 4.2.). In the end, the main conclusions will be presented.

2. Literature Review

In this section, the theoretical framework with the explanation of the main concepts that inform the work is presented. Notably, the different ways in which globalisation and de-globalisation are understood and measured, and the connections between economic growth and globalisation.

2.1. Concepts and Review of Key Literature on Globalisation and De-globalisation

Globalisation is one of the major economic phenomena of the last decades, and it can be described as the "increasing interdependence among nations" (Witt, 2019, p. 1054). As stated by Dreher (2006, p.1092) globalisation corresponds to the "process of creating networks of connections among actors at intra- or multi-continental distances, mediated through a variety of flows including people, information and ideas, capital, and goods". According to the IMF (2000, Section II "What is Globalization?", para. 6), "economic "globalisation" is a historical process, the result of human innovation and technological progress. It refers to the increasing integration of economies around the world, particularly through trade and financial flows. The term sometimes also refers to the movement of people (labour) and knowledge (technology) across international borders". Masson (2001, p.2) defines globalisation as a "phenomenon whose economic dimensions involve increases in the flows of trade, capital, and information, as well as mobility of individuals across borders". Scholte (2002, p.8-13) points towards four definitions of globalisation: internationalisation (as increase of transactions and interdependence between national economies), liberalisation (as elimination of legislative restrictions related to movements of resources), universalisation (as convergence in issues in the cultural, economic, legal and political spheres) and westernisation (as a kind of colonisation from the Western nations in relation to the rest of the world – nowadays, with the emergence of Asia in the global market, it can be considered that this phenomenon is no longer led by the West).

Globalisation brings many advantages, such as "the principle of comparative advantage, economies of scale, cost competitiveness, increased flow of FDI, creation of more employment and reduction in poverty" (Anil, 2018, p.35). However, it is also often criticised

because it may offer greater benefits to multinationals (MNC) and not to local firms and consumers, it can lead to job losses in the domestic market, and it can have an undesirable environmental impact (Anil, 2018).

De-globalisation, on the other hand, can be defined as the decreasing interdependence existent between nations (Witt, 2019). This allows each country to adhere to a unique economic strategy – one which can take into consideration its own cultural and social standards and principles, opportunities for sustainable development and economic well-being (Postelnicu, Dinu & Dabija, 2015, p. 6).

The process of economic globalisation happened in waves along history. Karunaratne (2012) points to five big globalisation and de-globalisation waves between the end of the 19th century and the financial crisis of 2008. There was a first period of globalisation after the industrial revolution (1870-1914), when the Gold Standard was prevalent, followed by two periods of de-globalisation: the period of protectionism after the First World War and until the Great Depression (1914-1930) and the Second World War period (1939-1946). In the period after the Second World War, the globalisation process had an important growth, segmented in two phases: from 1946 to 1973, under the Bretton Woods system, there was an international trade boom, and after that there was a phase in which the international mobility of capital grew, with a quick growth in international trade from 1986 on (World Bank, 2020).

Some authors point out that the process of de-industrialisation propelled the de-globalisation process. The diminishing activity of multinational enterprises was influenced by an overhaul in the functioning of global supply chains and by the delocalisation of some job posts in the manufacturing industry from Europe to other places with lower wages. This de-industrialisation development impacted all rich nations, resulting in less employment in manufacturing over time (Tomlinson, 2012).

Although there is evidence of de-globalisation periods in the 20th century, economic studies of this phenomenon started becoming more relevant from the crisis of 2008 onwards. There are differing views on the issue. Manzi (2019) argues that in the post-crisis period of 2008, globalisation entered a new phase, with deceleration and stagnation of the internationalisation process – there is a possibility that this could consist of the inversion of

the globalisation process itself (de-globalisation) globally. Evenett (2019) considers that the rise in commercial protectionism is without any doubt an indicator of de-globalisation. Herrero (2019) defends that there is evidence of a de-globalisation process after 2008, worsened by the WTO's tendency to play a less relevant role in recent years. On the other hand, Bordo (2017) argues that despite the reduction in international trade and FDI, the retraction of GVC and the increase in regulation, this corresponds to a globalisation cycle and not to a disruptive process of de-globalisation.

Other authors focus on the transformation of the process. They state that although the economic and military forms of globalisation have declined, soft globalisation (characterised by its cultural, touristic, informational and educational expressions) has increased. There is, then, no de-globalisation, but instead a transformation in the way globalisation occurs and is more prevalent (Olivié & Gracia, 2020). Some authors use the term "slowbalisation" to describe the slowing down of GDP (Gross Domestic Product), trade and FDI (Kandil, Battaïa & Hammami, 2020).

Some scientific literature studies the relation between globalisation, growth, and inequality among countries. It points towards positive effects of globalisation on economic growth, although with unequal results on the inequality dynamic among countries (Lang & Tavares, 2018). Tensions between developed and developing countries have been surging. The consequences in the economic, social and political spheres of the 2008 crisis and a recovery that has not taken place at the same time in several countries, along with new technologies that threaten some jobs, can lead to disagreements between economies from these two markets (Ortega, Otero-Iglesias & Steinberg, 2018). These authors defend that several public policies can be put in place to prevent de-globalisation and protectionist measures. The researchers suggest that the G20 (Group of Twenty) should consider that globalisation should be a process marked by inclusion and should take efforts and implement measures in this sense.

Studies have shown that globalisation has helped to reduce the number of people in poverty, having had a greater impact on India and China (United Nations, 2015). A slowing down of globalisation, or a process of de-globalisation would then, according to Ortega et al. (2018), be undesirable, since both emerging and mature economies could feel the negative

consequences. The researchers mention Milanović's "Elephant Curve", which describes a rise in real incomes for part of the population worldwide, in the period from 1988 to 2008, and the creation of a global middle class (Milanović, 2016).

Technological developments and jobs automation would affect mostly developing economies (since in more developed countries a lot of jobs have already been automated), thus questioning technological justice (Turianskyi, Pérez & Ortega, 2018). With advances in technology, the middle class has become more vulnerable to job loss (Ortega et al., 2018). However, the ICT sector presented an important role in the globalisation process, both in developed and in developing countries, stimulating economic growth (Niebel, 2018).

Ortega et al. (2018) consider that the G20 has been criticised by defenders of anti-globalisation, and that this is evident in their Hamburg Action Plan from 2017, in which this body has stated they aim to "reduce excessive global imbalances in a way that supports global growth" and "promote greater inclusiveness, fairness and equality in our pursuit of economic growth and job creation" (G20, 2017). Rodrik (2018) has argued for a re-orientation in policies, since he believes that the current political system has failed in establishing a fair global economy, especially for those who have lost with globalisation.

Ortega et al. (2018) state that while the losers of globalisation (mainly the low and middle classes of emerging economies) should be compensated, developing markets should also be free to keep exporting, paying attention to sustainability (as should developed markets). More mature economies could contribute to globalisation by sharing their knowledge on eco-friendly practices and on ways to prevent corruption. Besides that, these authors note that there are questions and themes such as international terrorism, technological progress and climate change that are not possible to be accompanied nationally, and that need the scenario of globalisation to be properly dealt with.

The crisis of 2008, with the epicentre in the USA's subprime mortgage market, was the worst crisis to reach financial markets since the 1930s. This recession has deeply affected the world economy, and its resolution as well as the prevention of future crises can only be achieved with an examination of its causes (Ciobanu & Bejou, 2009). These authors consider that international cooperation can play an important role in finding the solution for crises such as this one, through the formation of new alliances and the creation of legal and institutional

standards and regulations. The researchers emphasise that "it is important not to slip into a period of de-globalisation by constructing a new "Berlin Wall" of protectionism that will separate the advanced economies from their emerging counterparts" (Ciobanu & Bejou, 2009, p.294).

The recent global increase in protectionism, as well as changes in regulation and technological innovation influence international trade (and the distribution of its gains), as well as international investment flows and their concomitant impact. The 2008 crisis and the recent pandemic have increased the volatility of international trade and financial flows, making the economic situation in the next few years more uncertain worldwide. In fact, the Covid-19 pandemic has affected the international business activities globally, for example in terms of the functioning and design of supply chains, transports, tourism, schools, and universities (Barua, 2020). This has meant that professionals in charge of international business operations have had to learn how to deal with uncertainty in this new scenario (Sharma, Leung, Kingshott, Davcik & Cardinali, 2020).

Despite the relative slowdown in the growth of international trade flows and FDI in relation to GDP, an effective de-globalisation process does not seem to be taking place. Antràs (2020, p.1) claims that there is "little systematic evidence indicating that the world economy has already entered an era of de-globalisation. Instead, the observed slowdown in globalisation is a natural sequel to the unsustainable increase in globalisation experienced in the late 1980s, 1990s and early 2000s", although in the medium and long term of the post Covid-19 situation "if income inequality brews isolationism, slowbalisation may well turn quickly into de-globalisation" (Antràs, 2020, p.43).

The different aspects of globalisation (and of de-globalisation) and their relationship with economic growth are worthy of being further investigated in the European integrated space.

These are reasons that make the current research timely and relevant, and, to the best of our knowledge, there has been no similar study on these issues.

2.2. Measurement Issues – The KOF Globalisation Index

Another issue of utmost relevance is the method of measuring globalisation and de-globalisation. There are several ways of measuring de-globalisation, just like what happens with globalisation. According to Anil (2018), some examples of ways of measuring de-globalisation are examining the border restrictions in place, the constraints or lack of them on FDI, the imposed average tariffs, the rates of net immigration (its measurement has a certain degree of complexity, as argued by Khadria on 2001), and the behaviour over the years of exports and imports (in relation to national income or to population). Usually, research on the effects of these processes on economies use trade and FDI indicators (Lang & Tavares, 2018).

To complement the study of the globalisation process, GVC (as a share of global exports) will also be included – a particularly important variable in the analysis of economic growth of developed countries. GVC make possible for a product to be manufactured and assembled in different countries. In fact, one fundamental aspect of recent globalisation is the geographical segmentation of the production process. Nowadays, different countries trade know-how and this knowledge and skills from several companies is part of the production; this is something that characterises GVC (World Bank, 2021).

MNC's participation in international trade is very relevant, and GVC are almost always led by important MNC, which are key elements in the analysis of recent globalisation. Considering GVC in the analysis of globalisation (and of de-globalisation) plays an essential role in developed countries to identify the tight relations between international trade (exports and imports) and FDI. The slowing down of FDI is related with the re-centering of commerce in MNC; on the other hand, it is argued that the recent rise in the roadblocks to international trade will favor the growth of FDI (Casella et al., 2019). The GVC analysis is important for understanding "the increasing reliance on regional economic cooperation, which is explained by the relatively greater importance of regional, over global, value chains" (Casella et al., 2019, p. 138).

Since "understanding economic globalisation as a multinational process is also closer to the common usage and definitions of the term than an individual indicator like openness, and helps to account for the possibility that the comprehensive concept may be more than the

sum of its constituent parts" (Lang & Tavares, 2018, p.7), the introduction of a composite indicator is considered important. From the beginning of the 21st century on, different globalisation indicators have been created (Figge & Martens, 2014; Gygli et al., 2019)[1]. One of the biggest problems of these indicators for quantitative studies is whether there is data available for longer series.

In this research, the indicator chosen is the KOF Globalisation Index (Dreher, Gaston & Martens, 2008; Gygli et al., 2019). That index is elaborated and made available by the Swiss Economic Institute – *Konjunkturforschungsstelle*. The KOF Globalisation Index was initially introduced by Dreher (2006) and updated in Dreher et al. (2008), and measures three dimensions of globalisation: economic, social, and political. The economic dimension of globalisation includes international trade of goods and services and financial globalisation (capital flows and stocks of foreign assets and liabilities); the social dimension of globalisation includes interpersonal (interactions that take place between citizens living in different countries), informational (fluxes of ideas, knowledge and images via technological channels and patents) and cultural globalisation (access to goods from MNC such as those from McDonald's restaurants or IKEA stores, besides dissemination of music and sports events beyond borders); and the political dimension includes the spreading of governmental politics and international cooperation. The KOF index has been used in several studies that analyse globalisation and accurately depicts the phenomenon in its distinct facets (Samimi & Jenatabadi, 2014; Potrafke, 2015). The fact that this index captures the different dimensions of globalisation and the availability of data since 1970 for nearly all countries made it the most popular indicator in more recent studies (Gygli et al., 2019).

Gygli et al. (2019) introduce a second revision of this index, distinguishing between *de facto* and *de jure* measures in the three dimensions, as shown in Annex I.

The dimensions under *de facto* measure the international flows and activities; the same dimensions under *de jure* incorporate the politics and the conditions that can favour or limit those flows and activities – following up on the studies of Feld and Voigt (2003) and Voigt et al. (2015) (*apud* Gygli et al., 2019).

[1] A synthesis of the most used globalisation indices in literature from the 2000s on is presented by Gygli et al. (2019, p.548).

It has available data until 2018 (today), and currently covers 203 countries and 43 variables (*de facto* and *de jure* variables) – which other indices don't. The KOF Globalisation Index uses a scale of one to a hundred, where higher values describe greater globalisation – from "0" for no globalisation to "100" for maximum globalisation (Lang & Tavares, 2018).

Very low levels of globalisation are associated to less developed countries and with larger dimension; and higher levels of globalisation are associated to more developed countries and, of these ones, to the ones of smaller dimension (Dorn, Fuest & Potrafke, 2018).

2.3. Globalisation and Economic Growth

The role of globalisation as a potential driver of economic growth has gained increasing importance in recent economic literature. Traditionally, an economy which opens itself to the outside world "may experience an increase in expected consumption growth and a substantial rise in national welfare" (Obstfeld, 1994, p.1310).

As was studied in point 2.2, globalisation is recognized as a multifaceted phenomenon, not limited to the economic aspects *strito sensu*, but also including forms of interdependence in social and political aspects. Hence, many of the empirical studies on the relationship between globalisation and growth have gained importance after the work of Dreher (2006).

Chang and Lee (2010) concluded for the long-term relationship between indicators of general globalisation, and social and economic growth, for 23 OECD (Organisation for Economic Co-operation and Development) countries between 1970 and 2006.

Barry (2010), based on data from 1995-2005 for 41 countries from Sub-Saharan Africa, established that globalisation had positive effects on economic growth in countries with scarce natural resources.

Chang, Lee and Hsieh (2011), for the same period from 1070 to 2006, for the countries of G7 (Group of Seven: Germany, Canada, USA, France, Italy, Japan and the UK (United Kingdom)) concluded that both global globalisation and the social aspect have a positive impact on economic growth.

Polasek and Sellner (2011) found out there was a positive relationship between trade and

FDI on the economic growth of 27 EU countries (data from the years 2001-2006).

Mutascu and Fleischer (2011) determined that, for Romania between 1972 and 2006, in the medium and long term, globalisation maximises economic growth.

Leitão (2012) concluded that, for the USA market, considering data between 1995 e 2008, globalisation promotes economic growth.

Meraj (2013) analysed the consequences of opening to the outside world in the Bangladeshi economy's growth, between 1871 and 2005, concluding for the positive effects of globalisation on economic growth.

Ying, Chang and Lee (2014) deduced that for the period from 1970 to 2008, in the ASEAN (Association of Southeast Asian Nations) countries, economic globalisation had positive effects on economic growth but that, on the contrary, globalisation in the social and political aspects had negative effects on economic growth.

Gurkul and Lach (2014) inferred that for 10 Central Eastern European countries, in the period from 1990 to 2009, the economic and social dimensions have a potentiating effect on economic growth.

Kilic (2015), based on a sample from the years 1981-2011 of 74 developed countries, concluded that economic growth is positively affected by the economic and political globalisation, while globalisation on the social front worsened economic growth.

Chang, Lee and Hsieh (2015), with a sample of G7 countries between 1970 and 2006, deduced that the three dimensions of globalisation (Dreher, 2006) boosted long-term economic growth.

Kazar and Kazar (2016), with data from 1980 to 2010 for OECD and non-OECD countries, inferred that the three dimensions of globalisation promote differently the growth of countries, depending on the level of income of each one at the outset. For example, for more developed countries the political dimension of globalisation is relevant to economic growth, while for countries of medium development it is the economic dimension of globalisation that most enhances economic growth.

Kilic, Acdoyuran and Calhan (2017), with data from seven countries (India, Japan, China, Hong Kong, Germany, USA and UK) between 2000 and 2015, concluded that there was a bidirectional causality relationship between the exports of ICT and economic growth. The authors underlined the importance of ICT exports to boost economic growth.

Besides that, Niebel (2018), recurring to a sample of 59 countries from the period 1995-2010 (developing, emerging and developed countries), unequivocally concluded that there was a positive link between ICT and economic development.

Ferreira (2020), for a sample of 29 countries of several continents, for the period of 1070-2013, deduced that globalisation – measured by the variable of international trade (exports, imports and the degree of openness) and by the indices and sub-indices of KOF globalisation – was relevant for economic growth.

Hasan (2019) intended to analyse the impact of globalisation (overall, economic, social, and political) on the economic growth of five South Asian countries (Bangladesh, Bhutan, India, Nepal, and Pakistan) in the period from 1971 to 2014. The results suggest that the indicators of overall globalisation, of economic globalisation, and of political globalisation stimulate and accelerate economic growth in the long run. On the contrary, in the short run the globalisation dimensions do not have significant effects on economic growth.

Radulović and Kostić (2020) studied the impact of globalisation on economic growth in the case of 19 countries of the EMU (European Monetary Union – Austria, Belgium, Cyprus, Germany, Spain, Estonia, Finland, France, Greece, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Portugal, Slovakia and Slovenia) from 1970 to 2016. According to this study, in the short run, both the economic and social dimensions of globalisation had a positive impact on economic growth (while political globalisation had a negative effect on the economic growth) of EMU countries. On the other hand, in the long run only the economic dimension of globalisation had a positive effect on economic growth, while the social and political dimensions of globalisation had a negative effect on the economic growth of Eurozone countries.

A synthesis of the literature that relates globalisation in its different dimensions and economic growth is presented in the following table.

Table 1 – Globalisation and Economic Growth

Author(s)	Sample	Period	Conclusions
Chang and Lee (2010)	23 OECD countries	1970-2006	Long term: strong connection from general, economic and social globalisation to economic growth
Barry (2010)	41 countries of Sub-Saharan Africa	1995-2005	Globalisation promotes economic growth of countries with scarce natural resources
Chang et al. (2011)	G7	1970-2006	Overall globalisation and social globalisation foster economic growth
Polasek and Sellner (2011)	27 EU countries	2001-2006	Trade and FDI stimulate economic growth
Mutascu and Fleischer (2011)	Romania	1972-2006	In the medium and long term, globalisation maximises economic growth
Leitão (2012)	USA	1995-2008	Globalisation increases economic growth
Meraj (2013)	Bangladesh	1871-2005	Globalisation has a positive effect on economic growth
Gurkul and Lach (2014)	10 countries of Central Eastern Europe	1990-2009	Economic and social globalisation boost economic growth
Ying et al. (2014)	ASEAN countries	1970-2008	Economic globalisation promotes economic growth and political globalisation negatively affects economic growth
Kilic (2015)	74 developed countries	1981-2011	Political and economic globalisation stimulates economic growth; the social dimension of globalisation restricts economic growth
Chang et al. (2015)	G7	1970-2006	The three dimensions of globalisation boost economic growth in the long term

Source: Own elaboration

Table 1 – Globalisation and Economic Growth (continuation)

Author(s)	Sample	Period	Conclusions
Kazar and Kazar (2016)	OECD and non-OECD countries	1980-2010	The three dimensions of globalisation foster economic growth in a different way according to the initial income level of countries
Kilic et al. (2017)	seven countries (India, Japan, China, Hong Kong, Germany, USA and UK)	2000-2015	ICT exports boost economic growth
Niebel (2018)	59 countries (developing, emerging and developed countries)	1995-2010	Positive link between ICT and economic development
Hasan (2019)	Bangladesh, Bhutan, India, Nepal and Pakistan	1971-2014	Long-run: overall, economic and political globalisation accelerate economic growth
Ferreira (2020)	29 countries	1970-2013	Globalisation (Trade and KOF Index) stimulate economic growth
Radulović and Kostić (2020)	Eurozone countries	1970-2016	Short run: economic and social globalisation has a positive impact on economic growth; political globalisation has a negative effect on economic growth. Long run: economic globalisation has a positive impact on economic growth; social and political dimensions of globalisation have a negative effect on economic growth.

Source: Own elaboration

3. Methodology

3.1. Research Hypotheses

As already stated, the globalisation process in the present century has deepened until the 2008 crisis but has been slowing down after 2012. There are authors who argue that this embodies a process of "slowbalisation", a cyclical change of the globalisation trend (Bordo, 2017; Antràs, 2020; Oliviè & Gracia, 2020; Kandil et al., 2020), although others refer the existence of a disruptive process of de-globalisation (Manzi, 2019; Evenett, 2019). The first research hypothesis aims to reflect this discussion in the reality of the EU.

Hypothesis 1 (H1): The globalisation process continues to characterise the evolution of the EU economy, with only a "slowbalisation" following the 2008 crisis.

To study this question, the focus will be on the chronological analysis of the evolution of the trend of the globalisation indicators adopted (in particular, of the KOF Globalisation Index).

To analyse the importance of globalisation in the economy and in the economic growth in the EU (the focus of this econometric application), the following research hypotheses result from the literature review previously developed:

Hypothesis 2 (H2): The intensification of globalisation is positively associated with economic growth.

The objective is to analyse if the degree of development of globalisation, for the different countries of the EU, is determinant to the increase of produced wealth/economic growth – measured by GDP corrected by dimension (population) and prices; using then as dependent variable GDP *per capita* at constant prices.

Here the degree of globalisation represents the worldwide opportunity available to all countries which will naturally develop specific strategies to be competitive with other countries.

The existing global opportunity and the effectiveness of the strategies implemented by the different countries and the resources involved will result in the participation/integration of

each country in the globalisation process. Thus, the economic growth of each EU country will be higher the better the country's economy, society and political action deals with the global opportunity offered. According to the KOF Institute, the degree of engagement with globalisation can be assessed in three components – economic, social and political. This is done using KOF indicators at the single aggregate level and at the level of the three pillars considered.

The aim is to assess whether the increased participation of countries in globalisation has contributed to the growth of GDP *per capita*.

The variable that measures the degree of globalisation is the KOF indicator, defined at the general level, at the disaggregated level of its three pillars (economic, social, and political) and at the level of the two types of information conveyed – KOF *de facto* and *de jure* (Gygli et al., 2019). Economic growth will be assessed from the GDP *per capita* variable at constant prices, following the works of Ferreira (2020), Kazar and Kazar (2016), Chang et al. (2015), Chang and Lee (2010) and Dreher (2006).

Hypothesis 3 (H3): International trade and the degree of openness of the economy are positively associated with the level of economic growth.

The logic underlying H3 is the following: different countries seek, in international trade, to obtain competitive advantages and participate in the exchange of goods to improve economic growth. They try to be present in important markets to place their production, they import technologically developed equipment to improve production productivity, and they also acquire raw materials and other products that are more efficient and at lower costs to reduce unit export costs.

Thus, the degree of openness of economies represents the possibility of the economy optimising resources in open markets, having access to more productive equipment and to raw materials and other quality products at lower prices, contributing to more productive economies and ensuring economic growth (Obstfeld, 1994; Polasek & Sellner, 2011). The degree of openness of the economy is measured by the indicator of the sum of exports and imports of the economy relative to GDP.

Hypothesis 4 (H4): The increase in the FVA content of exports corresponds to a decrease

in GDP *per capita* in EU countries.

H4 derives from the fact that, nowadays, the production of companies – especially MNC, but also small businesses in different sectors of activity – often relies on GVC seeking benefits in different and multiple activities that make up the value chain of a certain final product. It becomes relevant to assess whether the greater disaggregation of value chain activities associated with increased globalisation and the whole process of optimisation and cost reduction induces positive/negative effects on the economies of European countries and, specifically, whether the relocation of part of the production to third countries leads to a decrease in domestic production. The higher intensity of production in value chains of other countries (namely China, India, Indonesia, etc.) has characterised globalisation, so it becomes important to assess its effect on European wealth production (Antràs, 2020; Casella et al., 2019). The explanatory variable to be used considers the share of the value added of exports incorporated in foreign countries (FVA) relative to the value of exports.

Hypothesis 5 (H5): The higher share of the ICT sector in exports is associated with a higher level of GDP *per capita*.

In view of the opportunities inherent in globalisation, countries' exports and imports have changed, reflecting international specialisation and the costs of different activities. European countries have actively participated in the development of sectors associated with innovation and technological development, know-how and science. The ICT sector has played a central role in the globalisation process and in defining new ways of buying and producing. Consequently, it is intended to investigate whether technology exports made by European countries, namely from the ICT sector, have captured benefits from participation in globalisation by increasing GDP *per capita* in the EU – following the work of Kilic et.al (2017) and Niebel (2018).

In addition to the variables considered in the construction of the four last hypotheses stated (H2 to H5), other variables that aim to capture the economic conditions of the countries are considered – control variables. Different countries present different economic contexts that are important to assess in contributing to explaining the EU's GDP *per capita*.

Investment in fixed capital is crucial for the competitiveness of countries in the face of

globalisation (Dreher, 2006). The taxation of international transactions appears as a form of protectionism of national economies and can lead to changes in GDP *per capita* in the EU. The labour factor available in the economy (supply of resources) influences economic growth (OECD, 2021). The inflation rate influences GDP (Dreher, 2006). Finally, an attempt is made to highlight temporal evolution, incorporating the international crisis that began in 2008 and the sovereign crises from 2011 to 2014.

3.2. Data and Variables

The sample is composed of the 28 countries that comprised the European Union on the 31st of December of 2019. The period under analysis corresponds to the present 21st century, with data from 2000 to 2019 (the data of the models that consider the KOF Globalisation Index report to 2018, due to the availability of the indicator).

The consideration of the variables in this study was based on a set of research publications that were explained in section 2, serving as a framework for the research hypotheses stated in the previous section (3.1.).

Table 2 summarizes the variables used in the descriptive analysis and econometric models. It includes the dependent variable, GDP *per capita* at constant prices of 2010, and the explanatory variables highlighted in the literature. The explanatory variables include variables that represent globalisation such as the KOF index, trade, FDI inflow, FVA, ICT exports, and international trade related taxes. Control variables are fixed capital investment, labour supply and output prices (GDP deflator). In addition, dummy variables were used to code the year 2009, the year 2010, the period of the sovereign crisis in EU countries (from 2011 to 2014), and the period after the crisis from 2015 to 2018 (in the models the reference period is from 2000 to 2007 and no binary variable is included to avoid multicollinearity, as is usually done in this type of variable).

Table 2 – Description of Variables and Respective Sources

Abbreviation	Definition	Source
GDP pc	GDP *per capita* (constant 2010 US$)	WDI (World Development Indicators)
KOFGI	KOF Globalisation Index	KOF Institute
KOFECGI	KOF Economic Globalisation Index	KOF Institute
KOFSOGI	KOF Social Globalisation Index	KOF Institute
KOFPOGI	KOF Political Globalisation Index	KOF Institute
KOFGIDF	KOF Globalisation Index *de facto*	KOF Institute
KOFGIDJ	KOF Globalisation Index *de jure*	KOF Institute
Trade	Trade (sum of exports and imports) % of GDP	WDI
FDI in	Foreign direct investment, net inflows (% of GDP)	WDI
FVA	Foreign Value Added (% of goods and services exports)	UN (United Nations) Eora
ICT	Information and Communication Technology goods exports (% of total goods exports)	WDI
Taxes	Taxes on international trade (% of revenue)	WDI
GFCF	Gross fixed capital formation (% of GDP)	WDI
Labour	Labour force participation rate, total (% of total population aged 15+) (modeled ILO (International Labour Organisation) estimate)	ILO (from WDI), WDI
Deflator	GDP deflator (=1 in 2010)	WDI

Source: Own elaboration based on WDI, ILO (from WDI), KOF Institute and UN Eora

The data sources are the WDI (from the World Bank), with the variables expressed in dollars to standardise the monetary units and make it possible to compare and calculate ratios, and the ratios produced by the source itself were used whenever possible. The other sources used were the KOF Institute, the Eora database from the UN, and the ILO (from WDI).

It should be noted that the period selected for the sample was from 2000 to 2019, which refers to the current 21st century and in which the Euro had already been created, increasing the integration of a significant part of the EU countries. The data are for the 28 EU countries and the econometric methodology considers a common coefficient for each explanatory variable for all the country/year observations considered, i.e. 532 observations (28 countries followed for 19 years). 19 years are used since for the KOF indicators the most recent year with available data is 2018 (no data available at the time of the research for 2019).

3.3. Models and Estimation Methods

The (panel) data used in the empirical research is organised along two dimensions – one cross-sectional (the 28 countries of the EU-28) and one time-series (19 years of registers). Panel data – repeated observation over time of sectional units – have a number of advantages from a statistical and econometric point of view (Verbeek, 2017;Gujarati & Porter, 2008). When considering panel data (countries observed (28) over several years (19)) there are more information and more degrees of freedom available, i.e. 532 country-year observations, which is considered an important advantage for the estimation process, namely more efficient estimators (smaller variances). The greater diversity of information (of a sectional and temporal nature) also reduces multicollinearity (tendency towards high correlations) among explanatory variables. Panel data also make it possible to reduce the problems arising from the possible omission of explanatory variables and to account for the specificity of the behaviour of different countries by revealing a specific structure for each country, which is a characteristic that is maintained over time (Gujarati & Porter, 2008).

The models proposed in this research, built after identifying the cause-effect relationships that are intended to be estimated and tested, are represented by the following (more general) equation (Dreher, 2006; Radulović & Kostić, 2020).

$$\begin{aligned}\text{Log}(\text{GDP pc}_{it}) = {} & \beta_0 + \beta_1 \text{KOFGI}_{it} + \beta_2 \text{Log}(\text{Trade}_{it}) + \beta_3 \text{FDI in}_{it} + \beta_4 \text{Log}(\text{FVA}_{it}) + \\ & \beta_5 \text{Log}(\text{ICT}_{it}) + \beta_6 \text{Log}(\text{Taxes}_{it}) + \beta_7 \text{Log}(\text{GFCF}_{it}) + \beta_8 \text{Log}(\text{Labor}_{it}) + \beta_9 \text{Log}(\text{Deflator}_{it}) + \\ & \beta_{10} \text{d2010}_{it} + \beta_{11} \text{d2015\_18}_{it} + \lambda_i + u_{it}\end{aligned}$$

The double index refers to the country (i) and year (t) of observation of the variable and

includes the different variables, both the explained and the explanatory variables. Thus the explained variable is GDP *per capita*; the explanatory variables relating to globalisation and its different aspects are the KOFGI, Trade, FDI, FVA, ICT and Taxes variables; the control economic variables are GFCF, Labour and Deflator; and two dummy variables are also included (those that proved significant): one for the year 2010 and the other for the period 2015 to 2018.

The sectional effect (by country) is also included, represented by λ.

The term u (named "random disturbances" or "error") represents non-observable random variables that influence the dependent variable alongside the observable explanatory variables already presented.

The estimated models include the FDI variable at first and after it was found that this variable was not significant and a similar model is presented, but without this variable. The globalisation indicator of the KOF institute was also used with only one variable (the general globalisation indicator, KOFGI), as an alternative with three disaggregated indicators representing the economic (KOFECGI), social (KOFSOGI) and political (KOFPOGI) pillars, or with two disaggregated *de jure* (KOKGIDJ) and *de facto* (KOFGIDF) indicators. The base model used the aggregate KOF without and with FDI (Models 1 and 2, respectively). Subsequently, models (without FDI) were estimated with KOF disaggregated into three dimensions or into two dimensions (Models 3 and 4), with the remaining variables being the same.

It should be noted that the variables used are sometimes, as indicated in the table describing the variables, relativised and expressed in percentage terms (for instance, relativised to GDP, total exports, population) and may have been logarithmised. Many of the coefficients either represent elasticities (per cent response of GDP *per capita* to a 1% change in the explanatory variable), obtained after log transformation of both the dependent and the explanatory variable, or rates of change in GDP *per capita* (expressed as a percentage after multiplying the coefficient by 100) in response to unit changes in the explanatory variable, which is obtained when the dependent variable is logarithmic and the explanatory variable remains linear (or is a dummy variable).

In the estimation process, individual country fixed effects were considered, after performing the Hausman test, which recommended the use of fixed (and not random) effects (Verbeek, 2017, p.394-395). Note that the sectional effects account for the heterogeneity of the sample of the countries, estimating a coefficient that measures the structural differences of each country (the sectional fixed effect exists therefore for each country, that is, 28 coefficients are estimated in each model, one for each country, to account for its structural specificity).

The GLS – Generalised Least Squares method (Panel GLS) – was used in the estimation to account for the different size of the countries, and the robust variances of White due to heteroscedasticity (different variances for each country) were also used (Verbeek, 2017; Gujarati & Porter, 2008).

The results of the estimated models and the respective analysis of results are presented below, and were obtained with version 12 of the EVIEWS program.

4. Analysis and Discussion of Results

This chapter presents the empirical results of the research.

It begins by framing the EU within the global context with the description, between 2000 and 2019, of world GDP *per capita* and the trade of the main international players – USA, China and EU-28, a reflection of globalisation. In a second moment descriptive statistical measures concerning the selected sample (EU-28 from 2000 to 2019) and main variables involved in the European globalisation process are indicated and analysed. Then the results of the econometric models that aim to highlight the importance of globalisation (and other determinants) in the economic growth of the EU-28 are presented and interpreted.

4.1. Descriptive Analysis

4.1.1. Worldwide Evolution of Production and Trade

The aim is to analyse, for the period 2000-2019, whether the indicators most closely associated with globalisation show moments or periods of increase or decrease. This is done by analysing several series, such as the growth rate of world GDP *per capita*, international trade of the EU-28 countries ("Trade" variable), and KOF indicators specific to the economic, social, and political aspects associated with globalisation. Note that the analysis for GDP is carried out at the world level, i.e., the statistical unit of analysis is "World" and thus there are time series from 2000 to 2019 (as is the case for the "trade" series and the GDP *per capita* growth rate, both at the world level). For the analysis at the EU-28 country level, the KOF indicators are used, analysing the individual data for the 28 countries for the years 2000 to 2018.

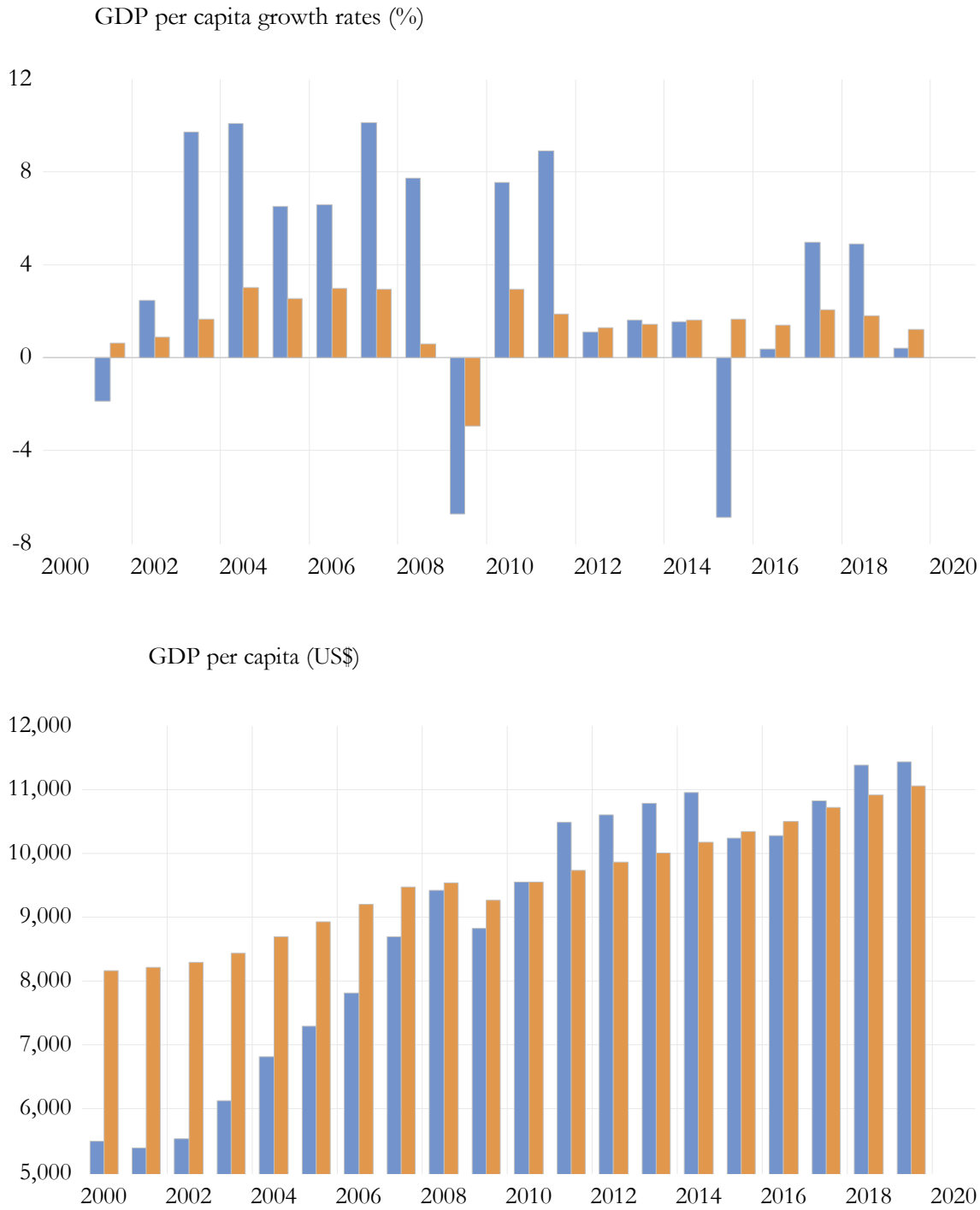
- **GDP *per capita*: World Level**

At a global level, the growth rate of GDP *per capita*, when analysed in current prices, is negative for three years – in 2001, in 2009 and in 2015, with variation rates of -1.85%, -6.29% and -6.42%, respectively; in the other years the rates were positive.

When considering (world) GDP *per capita* at constant 2010 prices, only in 2009 was there an interruption in positive growth, reaching a value of - 2.86% (Figure 1).

Figure 1 – Evolution of World GDP *per capita* (2000-2019)

Current prices (left columns), Constant prices (right columns)



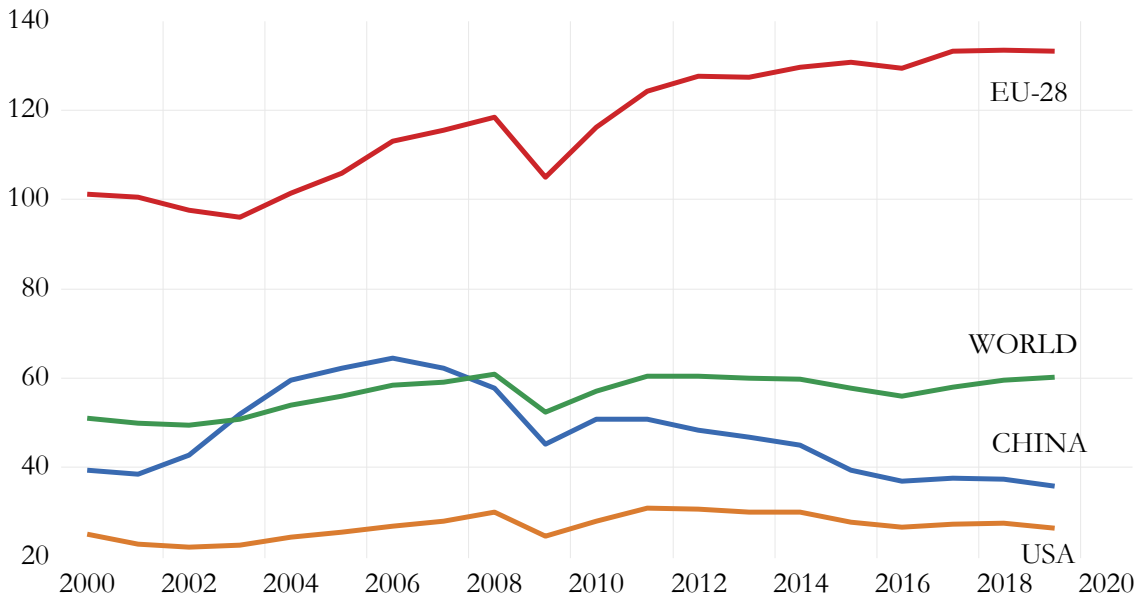
Source: Own elaboration based on WDI

➢ **Trade Evolution**

The evolution of the weight of Trade in world GDP (total trade as sum of exports and imports of goods and services measured as a share of GDP) for some of the main participants in globalisation shows that there are two distinct periods, the first up to 2008 and then a change after that date (Figure 2). The year 2009 interrupts the world growth of trade in GDP. China already starts a decreasing trend in 2006, due to the greater importance of its domestic market. The USA shows a relative stabilisation after 2009. The evolution of the EU-28 shows a slight growth in contrast to the other major participants in world trade. World trade also shows some stabilisation in this second period, after a slight growth phase during the first period broken by the international crisis of 2009.

One can conclude that the EU-28 has a higher share in this determinant of globalisation – trade in GDP – than the two big global players, the USA and China.

Figure 2 – Evolution of Trade (2000-2019)

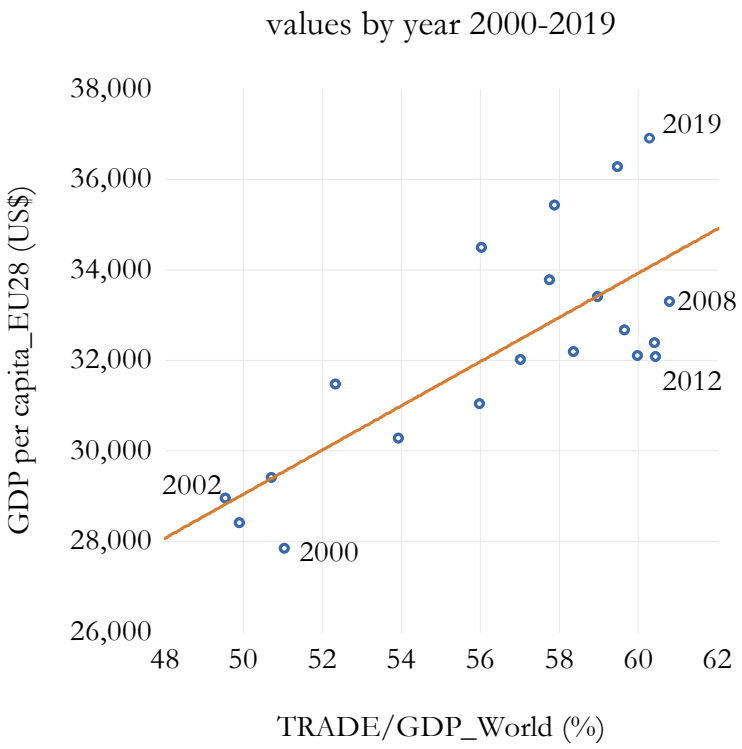


Source: Own elaboration based on WDI

➢ **Relation between World Trade and GDP *per capita* for the EU-28**

In a first step a primary globalisation variable is considered, the share of International Trade (Trade) in GDP at the world level (i.e. the ratio of world Trade to world GDP, in %), and its relationship with average GDP *per capita* for the 28 EU-28 countries over the period 2000 to 2019 is analysed. The relationship between the two variables is increasing, as shown in Figure 3 and the linear regression with the 20 annual observations from 2000 to 2019. The elasticity of GDP *per capita* of the EU-28 with respect to the world trade share of GDP shows that the EU-28 countries have a more than proportional growth in world trade.

Figure 3 – Relation between GDP *per capita* of EU-28 and Trade/GDP World (2000-2019)



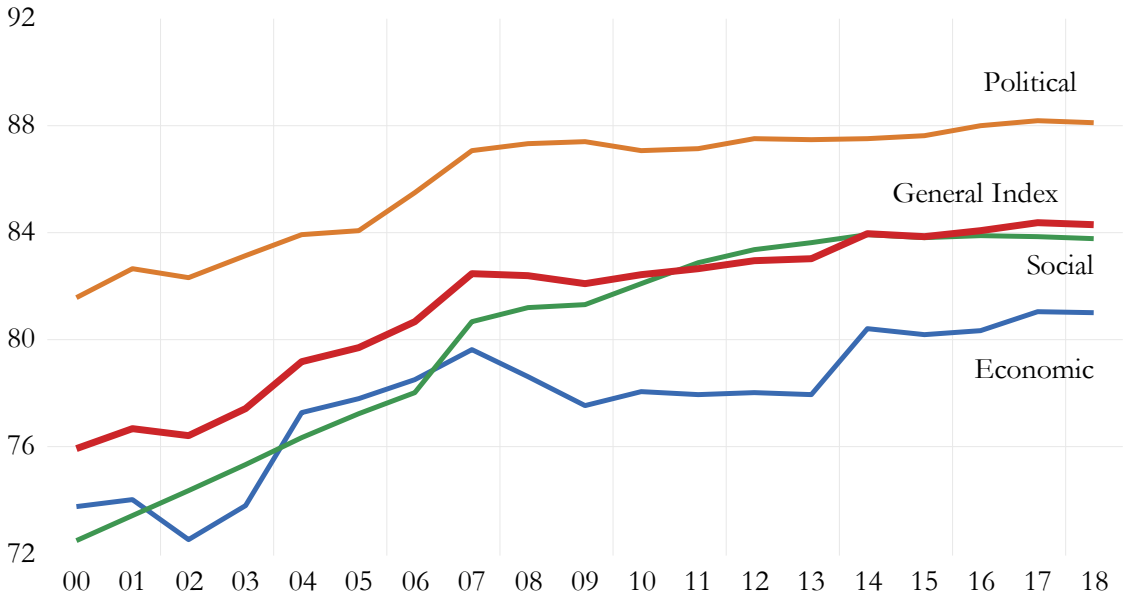
Source: Own elaboration based on WDI

Developments in GDP *per capita* in the EU countries can be seen to correlate closely with changes in world trade – 97.3 % of changes in GDP *per capita* in the EU-28 are explained by changes in the share of world trade in world GDP. Using EU-28 data for the period 2000 to 2019, it is estimated that when the share of trade in world GDP increases by 1%, EU-28 GDP *per capita* increases by approximately 1.25% (Appendix I).

4.1.2. Descriptive Statistical Measures of the Main Variables involved in the EU Globalisation Process

➢ **Evolution of Globalisation and its Economic, Social and Political Determinants (KOF Globalisation Index) in the EU-28**

Figure 4 – Evolution of KOF Globalisation Indices in the EU-28 (2000-2018)



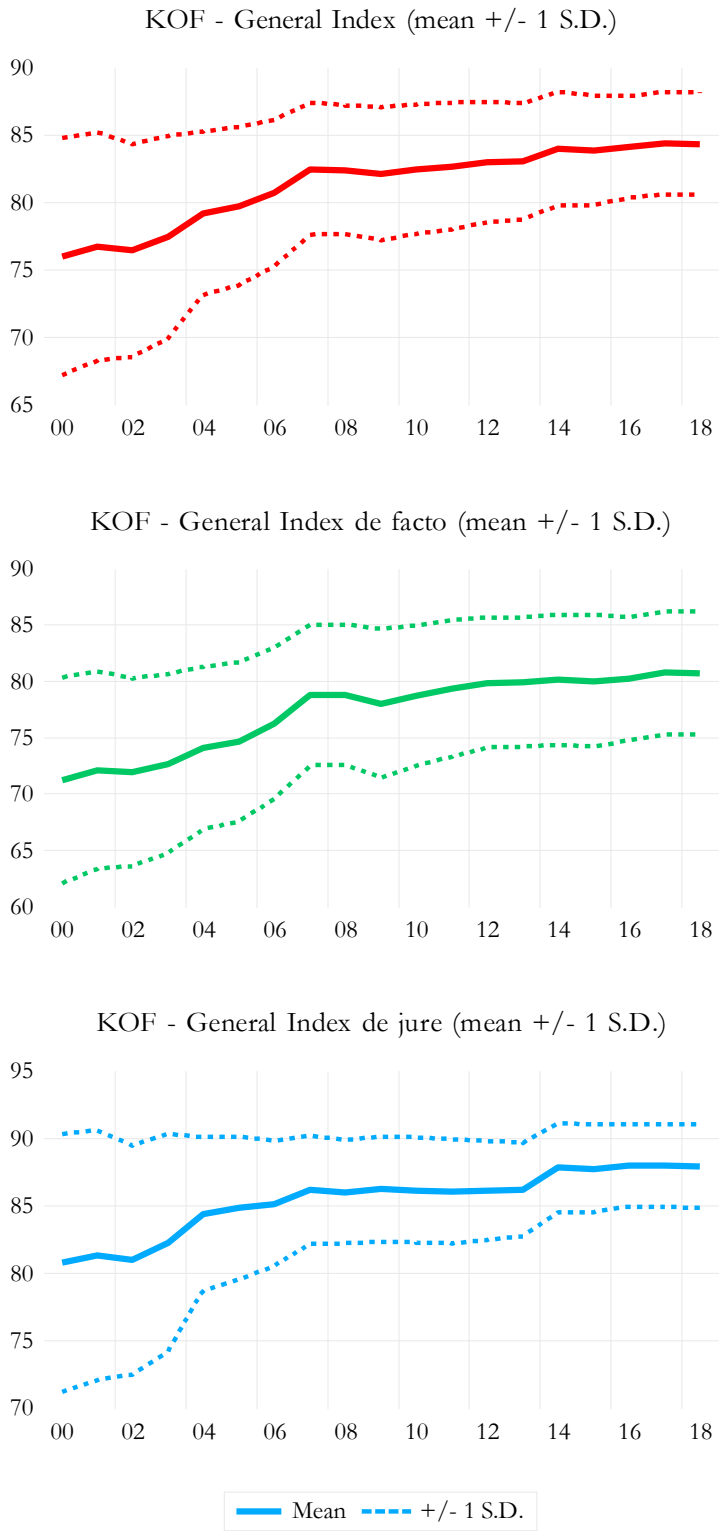
Source: Own elaboration based on KOF Institute

Although all indicators have an increasing trajectory, there are two phases in the growth of the overall KOF indicator (Figure 4). After a clear growth phase until 2007, the KOF indicator grew more slowly, showing a change in the evolutionary logic of globalisation. The political KOF indicator followed a similar path to the general indicator, with the social indicator being the most dynamic and strongest, but also showing a slowdown in recent years. The economic indicator shows some variability, with significant decreases in 2002 and in the period 2007-2014.

The KOF indicators by type of information – *de facto* and *de jure* – also show the two distinct phases of evolution, with growth after 2007 being slower (Figure 5). KOF indicators converge across the 28 countries as their variability (measured by the standard deviation)

decreases over time.

Figure 5 – Variability in the EU-28 of KOF Globalisation Indicators



Source: Own elaboration based on KOF Institute

To assess the increase in participation in globalisation, or its decrease, 28 countries over the 19 years of available data (2000 to 2018) were analysed, when there was an increase or decrease in each of the four globalisation indicators. The general indicator shows that there were decreases in 145 country/year observations out of 504 possible. Also, the number of times there were decreases in any of the three KOF plot indicators (in 504 country/year observations) was 210 observations, 133 and 160, respectively for the economic, social and political pillars. It can therefore be concluded that there are periods when globalisation increases, but others when it decreases (according to the KOF Institute's analysis methodology).

Table 3 – Decreases of KOF Globalisation Index by country/year

KOF	General	Economic	Social	Political
%	0.29	0.42	0.26	0.32
Sum	145	210	133	160
Observations	504	504	504	504

Source: Own elaboration based on KOF Institute

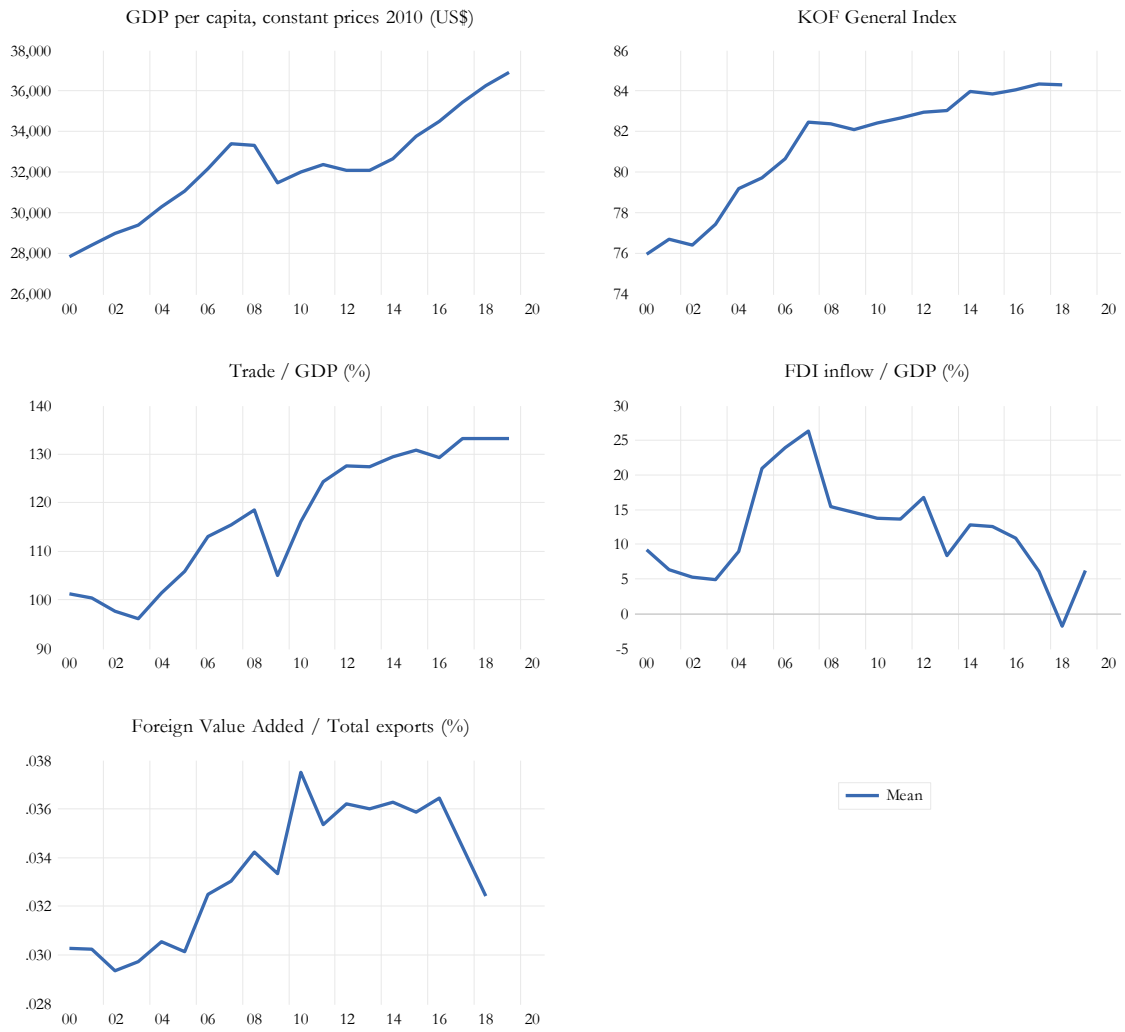
- **Descriptive Statistical Measures**

The evolution of GDP *per capita* and the main globalisation variables will be analysed using Figure 6.

GDP *per capita* in the EU-28 shows, between 2000 and 2019, three phases in its evolution: the first increasing until the international crisis in 2009; the second corresponding to the international crisis of 2009 and the years of the EU sovereign crisis (2011-2014) with a slight decrease; and the third phase that presents an important growth, from 2015 to 2019.

This evolution is related to the dynamics of globalisation, where it is visible that the KOF indicator displays a first phase of strong growth until 2009 and a second phase of more moderate growth from that date until 2019.

Figure 6 – Evolution of GDP *per capita* and Globalisation in EU-28 (2000-2019)



Source: Own elaboration based on WDI, KOF Institute and UN Eora

The share of trade in GDP for the EU-28 also shows these phases, but with important declines in 2003 and 2009, showing the importance of international trade and globalisation in the economic growth of the EU-28. The median value of the trade share of GDP with country/year data is close to 100%, which is high at the international level.

In terms of the importance of international value chains and their role in the intense phase of globalisation, the time series of FVA (as a ratio of Exports) allows us to reflect different phases, where after a growing importance of foreign value chains until 2010, and after a break in the 2009 crisis, there is a change in the behaviour of this variable. After some stabilisation after 2010, in the last two years (2017 and 2018) there has been a significant drop

in this ratio, leaving open the question of whether in the future there will be a structural change in the behaviour of production and use of GVC, with the redirection of part of the content of exports resorting increasingly to more local production.

Also of note is the uncertain behaviour of FDI inflows, reflecting the nature of this variable with capital inflows (of a positive sign), but also flows of an opposite sign (negative) aimed essentially at remunerating the capital invested. In 2018 the average value for the 28 countries is even negative. In terms of countries/year, the minimum of the weight of FDI inflows on GDP is -58.32 while the maximum value is 449.08. The difference between these two values highlights the wide range of the variable, and there is also an important difference between the average and median value which reflects the great asymmetry and variability of this variable for the 28 countries and 20 years of observations. The evolution of the series also shows this uncertainty as there is a decrease in the first years from 2000 to 2003, followed by a sharp increase from 2004 to 2008 and a downward trend until 2019.

Table 4 presents the descriptive measures of the variables included in the models that are explained in the following section (4.2.).

Table 4 – Univariate Descriptive Analysis (2000-2019)

	GDP *pc*	**KOFGI**	**FDI in**	**Trade**	**FVA**
Mean	32216.69	81.29206	11.77853	116.9484	0.033362
Median	28305.16	81.98470	3.479322	100.6150	0.034020
Maximum	111968.3	90.68347	449.0828	408.3620	0.090103
Minimum	3984.666	60.13766	-58.32288	45.41876	0.004158
Std. Dev.	21056.09	6.187489	38.20183	64.95756	0.015619
Observations	560	532	558	560	532
	ICT	**Taxes**	**GFCF**	**Labour**	**Deflator**
Mean	7.9125	0.22775	22.125	57.838	0.97081
Median	4.6694	0	21.781	58.72	0.9999
Maximum	63.636	4.3077	43.44	66.45	1.4248
Minimum	0.79342	-0.056012	11.074	47.72	0.23145
Std. Dev.	8.3899	0.67804	4.0477	4.4237	0.1464
Observations	560	534	560	588	560

Source: Own elaboration based on WDI, KOF Institute and UN Eora

➢ **Evolution of GDP *per capita* for the EU-28 and of the Globalisation Indicators**

To assess the importance for EU-28 countries of the share of economic, social, and political globalisation in the evolution of GDP *per capita*, we consider the KOF indicators from 2000 to 2018 for the mentioned three pillars of globalisation and the following regression with correction for country structural diversity through sectional fixed effects, as explained in econometric model presented on section 3.3, of model and estimation methods.

Table 5 – GDP *per capita* and the Dimensions of Globalisation (2000-2018)

Variable	Coefficient
C	7.752159 (85.08885)
KOFECGI	0.008562*** (7.34956)
KOFSOGI	0.017738*** (15,59890)
KOFPOGI	0.003695*** (2,765216)
Total panel (balanced) observations 532	
Adjusted R-squared 0.985816	
F-statistic 1231.191	
Prob (F-statistic) 0.000000	

(***) significant at the 1% level

Source: Own elaboration based on WDI and KOF Institute

The three KOF indicators are statistically significant and jointly explain 98.6% of the variation in GDP *per capita* (in logarithm). The social globalisation indicators are particularly relevant as for each 1-point increase in the aggregate social indicator, GDP *per capita* for the EU-28 increases by 1.77%, while the increase under the same conditions is 0.86 % and 0.37 % for the economic and political indicators, respectively. It should be noted that each of the KOF variables is also found to be statistically significant (at the 1% significance level). It can be concluded that the three indicator variables of a country's participation in globalisation are of interest in proposing a more complete model of the explanation of the wealth of the EU-28 countries.

From the descriptive analysis, and as far as the EU is concerned, it can be determined that

the evolution of the weight of trade in GDP between 2000 and 2019 (Figure 2) is increasing (with a sharp fall in the year of the crisis), although with a slowdown in the last decade under study. Likewise, the evolution of the KOF Globalisation Index shows an upward trend between 2000 and 2018, but the economic dimension of the KOF Globalisation Index is, in fact, the same as the KOF Globalisation Index. The economic dimension of globalisation seems to be the most important contributor to the slowdown of globalisation (Figure 4 and Table 3) in the post-crisis EU. A more pronounced evolution of globalisation up to the 2009 crisis and signs of a slowdown after that year are observed. It should be noted that variables such as FDI inflow in GDP (from 2007 onwards) and FVA in Exports (with a sharp drop from 2016) have accentuated this deceleration of globalisation in the post-crisis period (Figure 6). The evolution of these variables seems to suggest that in the period under analysis the globalisation process continues to characterise the evolution of the EU's economy, with only a "slowbalisation" following the 2008 crisis (H1).

4.2. Explanatory Analysis – Econometric Modelling of the Importance of Globalisation Variables in Economic Growth

For the econometric models developed from the main variables mentioned in the literature and panel data for the 28 countries for the period 2000 to 2018, the econometric specification defined in the previous chapter was used and the estimation considering sectional fixed effects (the 28 countries) and the generalised least squares method with White's robust variances was performed. The results are presented in the following tables (Tables 7 and 8) and are analysed. It should be stressed that the analysis is essentially intended to answer the question of whether the explanatory variables proposed are statistically relevant (empirical evidence manifested by the data) in explaining economic growth (Research Hypotheses H2, H3, H4 and H5 – section 3.1.). However, for the main variables the estimates of the regression coefficients and their effect on economic growth for the EU as a whole are also interpreted, using in the interpretation directly the estimated regression coefficients (i.e. instantaneous changes) and the *ceteris paribus* condition. To account for temporal developments, five mutually exclusive moments or periods are considered. Thus the period before the international crisis (2000-2008), the year of the international crisis in Europe

(2009), 2010 (post-crisis year), the period of sovereign crises in Europe (2011-2014) and the post-sovereign crisis period (2015-2018) are defined. In the tables, only the moments/periods that proved to be significant are presented (which were the year 2010 and the period 2015-2018) and, in the remaining estimated models, these periods were maintained for comparability reasons. The reference period considered for the estimation with the corresponding dummy variables is the period from 2000 to 2008. The estimated models start in 2000 and end in 2018 since the KOF explanatory variables only have data available until 2018.

As a criterion in assessing the statistical significance of the variables it is generally considered the significance level of 5%, being the significance levels of 1% and of 10% also marked in the table.

As the sample is composed of EU countries, with common characteristics, the most appropriate estimation model is the fixed effects model (Gujarati & Porter, 2008). The fixed effects estimation was carried out in this model and in those presented below, after applying the Hausman test in which the alternative hypothesis of estimation with random effects was tested and rejected (at 1% significance level) — Table 6.

Table 6 – Hausman Test – Random Effect

Test Summary	Chi-Sq.Stastitic	Chi-sq.d.f.	Prob.
Cross-section random	132.059371	10	0.0000

Source: Own elaboration based on WDI and KOF Institute

Next, the main results of the four estimated models from this study are presented. Taking the initial model as basis, as explained in section 3.3, Models 1 and 2 were constructed – the difference between them is only the inclusion of FDI inflow in Model 2 (which has shown to be non-significant). The further addition of Models 3 and 4 corresponds to the segmentation of the economic, social and political dimensions of globalisation from the KOF Globalisation Index (Model 3) and to the segmentation between *de facto* and *de jure* dimensions of globalisation of the same index (Model 4).

Table 7 – Results of the Estimation – *Per capita* GDP Growth and Globalisation in the EU (2000-2018)

	Model 1	**Model 2**
C	3.889545 (6.328514)	4.034464 (6.578275)
KOFGI	0.014714 *** (5.846646)	0.014931*** (5.926801)
FDI in		-9.65E-05 (-1.589339)
LOG(Trade)	0.204913*** (5.224049)	0.202330*** (5.069967)
LOG(FVA)	-0.150340*** (-3.897750)	-0.140353*** (-3.435630)
LOG(ICT)	0.017160* (2.006299)	0.018182** (2.061060)
Taxes	0.021940*** (3.595586)	0.020825*** (3.177100)
LOG(GFCF)	0.207677*** (7.865654)	0.211497*** (7.963228)
LOG(Labour)	0.553320*** (3.927081)	0.532152*** (3.985149)
LOG(Deflator)	0.365076*** (6.411365)	0.360502*** (6.469186)
YEAR=2010	0.018185*** (2.895761)	0.017059** (2.582260)
YEAR>=2015	0.015803** (2.107822)	0.015354* (2.038187)
Dependent Variable: Log (GDP *per capita*, constant 2010 US$)		
Method	Panel EGLS (Cross-section weights)	Panel EGLS (Cross-section weights)
White period (cross-section cluster) std errors & cov. (d.f. corrected)		
Cross-sections included	28	28
Total panel (unbalanced) observations	507	505
Adjusted R-squared	0.996488	0.996508
F-statistic	3881.775	3786.269
Prob (F-statistic)	0.000000	0.000000

(***) significant at the 1% level; (**) significant at the 5% level; (*) significant at the 10% level

Source: Own elaboration based on WDI, KOF Institute and UN Eora

The estimation results of Table 7 for Model 1 conclude that the countries' effort to cope with globalisation, summarised in the KOF Global Index variable, is statistically significant. The economic, social and political aspects of globalisation, both *de facto* and *de jure*, aggregated by the index, are important for economic growth.

The Trade variable, which represents the degree of openness to the exterior, is of great importance due in large part to access to demanding markets (sometimes of large dimensions), to the competitiveness and quality of the inputs used in the production processes, and to access to products incorporating new techniques and knowledge of suppliers from other countries.

Exported goods nowadays go through optimisation processes in which value chains are very important and in which exports have a good part of added value in foreign countries. The importance of this variable is confirmed empirically since it is statistically significant (even at a 1% significance level; so are the two variables already analysed – KOF and Trade).

Considering the importance of the ICT sector in globalisation, the ICT share in exported goods induces an increase in economic growth (the variable is statistically significant at 10%), thus the 1% increase in the relative weight of ICT implies an estimated 0.017% increase in GDP *per capita*.

Taxes levied on international transactions are levied on goods and services traded, the consequences of which also depend on the levels of competition and product differentiation and constitute a revenue for countries. In the case of the EU-28, it is estimated that increasing tax revenue by 1 percentage point has a positive effect on GDP *per capita*, which increases by around 2.2%.

The four factors linked to international trade, Trade, FVA, ICT, Taxes are all statistically significant (with the ICT variable being significant only at 10%, while the others are significant at 1%) and show the importance of globalisation in international trade and its effect in determining the economic growth of the EU-28 countries. Although the share of FVA in exports is relatively low, it should not be overlooked that production and other factors (notably labour) suffer a negative effect: EU wealth and employment declines.

Supply-side variables were also considered, such as investment, the available labour factor in

the economy (resource supply), and the price level that can stimulate supply. These three variables proved to be statistically significant (at 1% significance level) and the estimates of their coefficients indicate that:

- increasing the share of fixed capital investment in GDP by 1 % implies an increase in GDP *per capita* by approximately 0.21%;

- increasing the available labour force relative to population by 1% induces an increase in GDP *per capita* of about 0.55%;

- the increase in prices (measured by the GDP deflator) by 1%, induces an increase in GDP *per capita* of about 0.37%.

In terms of the temporal effects captured by dummy variables, in a first moment, it can be concluded that the 2009 crisis and the sovereign crisis period (2011-2014) do not have statistically significant effects. In a second moment, only the two significant variables were used, which means that the year 2010 (between the 2009 crisis and the European sovereign crisis of 2011-2014) shows a significant and specific economic growth of about 1.82% (in relation to the years omitted for the two dummies). In the 4-year period from 2015 to 2018 (significant at the 5% level) after the two moments of crisis, GDP *per capita* grew on average by 1.58% per year (in relation to the period from 2000 to 2014, excluding the year 2010 already evidenced).

Finally, the overall significance of the model presented (at 1% significance level) and the very high determination coefficient demonstrate that the adjustment is very precise (of the values estimated by the model for the dependent variable in relation to the respective observed values).

Considering the more complete model (Table 7 – Model 2), in which the explanatory variable of FDI inflow (as a percentage of GDP) is additionally considered, this variable is not statistically significant (at the 10% significance level), having however a p-value of 0.1236, relatively close to the threshold of statistical significance of the variable, and the estimated coefficient (-9.65E-05) has the opposite sign to the expected one. Possible reasons for the opposite sign are the fact that FDI inflow is included in part in the explanatory variables already considered, KOFGI and gross investment. Also, the specificity of this variable, which

has several observations with negative values in addition to the more common positive values, leads to a difficulty in determining the sign of the coefficient. There are 44 observations of FDI inflow with negative value in the total of 558 country/year observations (about 7.9 %).

Disaggregating the overall KOF indicator into its three components, Model 3 was estimated (Table 8), in which the KOF variables are statistically significant (the variable concerning politics is significant only at 10%), which shows the stability of the model and the importance of the three determinants of globalisation – economic, social, and political. Regarding the remaining explanatory variables there is a great stability of the estimated coefficients, and all the remaining variables are statistically significant, at the previously defined significance level of 5% apart from the dummy variable concerning the period 2015-2018 only significant at 10% significance.

Table 8 – Estimation results – *Per capita* GDP Growth and Globalisation in EU (2000-2018) – Breakdown of KOF Globalisation Index – Models 3 and 4

	Model 3	**Model 4**
C	3.234839 (3.558153)	3.889934 (6.382401)
KOFECGI	0.005472** (2.506805)	
KOFSOGI	0.010097*** (3.353500)	
KOFPOGI	0.003717* (1.999600)	
KOFGIDF		0.006635*** (3.084216)
KOFGIDJ		0.007998*** (4.783891)
LOG(Trade)	0.177671*** (4.107735)	0.213912*** (4.836162)
LOG(FVA)	-0.192551*** (-3.938241)	-0.141311*** (-3.216111)
LOG(ICT)	0.019053** (2.202117)	0.017630** (2.056210)
Taxes	0.024537** (2.744944)	0.023841*** (3.576225)

Table 8 – Estimation results (continuation)

	Model 3	**Model 4**
LOG(GFCF)	0.226058*** (6.616376)	0.207615*** (7.974714)
LOG(Labour)	0.556600*** (2.845424)	0.561032*** (4.028815)
LOG(Deflator)	0.291615*** (3.549471)	0.367107*** (6.512569)
YEAR=2010	0.020796*** (2.996429)	0.017645*** (2.769514)
YEAR>=2015	0.018688* (2.021667)	0.015111* (2.032652)
Dependent Variable: Log (GDP *per capita*, constant 2010 US$)		
Method	Panel EGLS (Cross-section weights)	Panel EGLS (Cross-section weights)
White period (cross-section cluster) std errors & cov (d.f. corrected)		
Cross-sections included	28	28
Total panel (unbalanced) observations	507	507
Adjusted R-squared	0.995819	0.996418
F-statisctic	3091.533	3705.497
Prob (F-statistic)	0.000000	0.000000

(***) significant at the 1% level; (**); significant at the 5% level (*); significant at the 10% level

Source: Own elaboration based on WDI, KOF Institute and UN Eora

Model 4 (Table 8) considers the breakdown of the general globalisation index into its *de facto* and *de jure* components.

Note that the variables are statistically significant (including at the 1% significance level) which shows the importance of both types of information in defining the globalisation indicator, both *de facto* and *de jure* information are relevant in explaining globalisation and the impact on GDP *per capita* in the EU-28. It should be noted that the remaining variables are also significant, at 5%, except for the dummy variable referring to the period 2015-2018, which is significant at 10%.

5. Conclusions

The main goal of this work was to understand how the recent globalisation process influenced the dynamics of economic growth within the EU. The decades-long process of increasing globalisation was affected by the 2008 crisis, and it is debatable whether this disruption is a true de-globalisation phenomenon or whether it should only be seen as a "slowglobalisation" cycle.

A comprehensive theoretical and empirical literature review on globalisation and the relationship between globalisation and economic growth was undertaken (first research objective). From the literature review it was found that: there is no consensus as to the extent of the changes in the dynamics of the globalisation/de-globalisation process (section 2.1.); there are alternative ways of measuring globalisation, with the increasing use of composite indices to do so (section 2.2.); and globalisation is, as a rule, a driver of economic growth, although some dimensions of globalisation (namely the social and political dimensions) may have perverse effects on this growth (section 2.3.).

After the presentation of methodological issues (section 3.) the empirical analysis based on a sample of 28 countries belonging to the EU between the years 2000 and 2019 was done.

This analysis was divided into two approaches, one descriptive (section 4.1.) and the other econometric (section 4.2.). The descriptive analysis focused on the main variables characterising economic growth (measured by *per capita* production) and globalisation (focusing on the evolution of international trade, FDI, FVA and the KOF Globalisation Index). The results of the analysis of the time trends of the different series point to the maintenance of a globalisation process in the period under analysis from 2000 to 2019, but with a deceleration of this process from the 2009 crisis on. Regarding the globalisation dimensions of the KOF Indices, the economic indicator is the one that shows more instability between 2000 and 2018, while the social and political dimensions show a less erratic evolution and are closer to the evolution of the global indicator. It is worth mentioning the decrease in 2017 and 2018 of the weight of value chains in exports, seeming to point to a change in the content of exports originating in more local productions. Overall, the evolution of the indicators seems to point, to date, to a "slowbalisation" within the EU (rather than de-globalisation).

The empirical application makes use of panel data along sectional (28 EU countries) and temporal (19 years, from 2000 to 2018) dimensions. The proposed models relate economic growth (variable to explain) – measured by GDP *per capita* of the EU countries – and the variables related to globalisation (explanatory variables) – KOF indices, Trade, FDI, FVA, ICT's export of goods, and Taxes on international trade.

The main estimation results lead to the conclusion that globalisation is important in explaining the economic growth of the EU between 2000 and 2018.

The investigation made it possible to fulfill the two last main research objectives. The way in which globalisation, in its several dimensions (besides the traditional variables of trade and FDI), influences economic growth in the EU-28 was depicted (second objective). The third objective was also achieved, given the importance of new ICT and the development of international GVC as determinants of economic growth in the EU.

Indeed, globalisation as measured by KOF indices is a driver of economic growth. In fact, a 1-point increase in the overall KOF index determines economic growth by 1.47% (Model 1). Segmenting the KOF indicator by dimensions, it can be concluded that the social dimension is the most influential on economic growth in the EU – a 1-point growth of the KOFSOGI index corresponds to an economic growth of about 1.01% (Model 3). Looking at the *de facto* and *de jure* strands (Model 4) there is a relative prevalence of the latter, corresponding to an increase of close to 0.8% in economic growth in response to a 1-point increase in the KOFGIDJ index (compared to a 0.67% increase in economic growth when the *de facto* KOFGIDF index has a 1-point increase). It seems that it can be concluded that globalisation is positively associated with economic growth (H2).

In Model 1, in the case of the degree of openness, measured by the sum of exports and imports (Trade variable), a 1% increase in the share of international trade in GDP generates a 0.2% growth in GDP *per capita* (H3). Also, a 1% increase in the relative weight of ICT has a positive effect of 0.017% on GDP *per capita* (H5).

Value chains, represented in the models by the share of FVA in exports, by increasing by 1% imply a decrease in GDP *per capita* by 0.15% (H4) – Model 1. It is suggested that the recent shift of production embodied in exports to more local markets (demonstrated by the fall in

2017 and 2018 of FVA – Figure 6) may enhance economic growth in EU countries. Also the increase in revenue from taxes on international trade translates into an increase in economic growth: a 1 percentage point increase in revenue corresponds to an economic growth of 2.2% – Model 1. These last two effects suggest that moderately protectionist policies may have an enhancing effect on economic growth in areas that are economically more open to the outside world such as the EU.

Regarding the time effects captured by dummy variables, the 2008 crisis (with more significant effects in 2009 in the EU – WDI, 2021) and the 2011-2014 sovereign crises, which affected mainly southern European countries, do not appear to be statistically significant. Their effects may already be incorporated in the various explanatory variables included in the models. The years 2010 and the period 2015-2018 have a positive effect on economic growth.

For the three control variables (GFCF, % of GDP; Labour force participation rate, total, % of total population aged 15+; GDP deflator) the expected signs of the effects on economic growth were found. A 1% increase in the share of fixed capital investment in GDP implied a 0.21% increase in GDP *per capita*; a 1% increase in the availability of labour force as a function of population translates into a 0.55% increase in GDP *per capita*; and a 1% increase in prices implies a 0.37% increase in economic growth.

In summary, the results suggest the central role of globalisation in the EU's economic growth. The slowdown of globalisation in the last decade, the recent decline in the contribution of value chains to exports, and the decrease in FDI inflow may be signs of a new phase of global economic integration of EU countries, which should be studied as new data becomes available. Furthermore, the current Covid-19 pandemic compounded and accentuated decisively this volatility and uncertainty. The analysis of the effects of the globalisation process on the different countries of the EU, with tendentially different effects depending on the degree of openness of each country, may also be studied in the future. Although using a different methodology (time series models), it can be interesting to study globalisation and de-globalisation, in order to evaluate the eventual breakdown of globalisation variables.

6. Appendix

Appendix I – GDP *per capita* of the EU and International World Trade (2000-2019)

Dependent Variable: LOG(GDPpc)
Method: Panel Least Squares
Sample (adjusted): 2000 2019
Periods included: 20
Cross-sections included: 28
Total panel (balanced) observations: 560

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.123482	0.285058	17.97344	0.0000
LOG(Trade_GDPpcWLD)	1.250591	0.070683	17.69285	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.972835	Mean dependent var	10.16624
Adjusted R-squared	0.971403	S.D. dependent var	0.681244
S.E. of regression	0.115203	Akaike info criterion	-1.433841
Sum squared resid	7.047319	Schwarz criterion	-1.209716
Log likelihood	430.4755	Hannan-Quinn criter.	-1.346326
F-statistic	679.1554	Durbin-Watson stat	0.253635
Prob(F-statistic)	0.000000		

Source: Own elaboration based on WDI

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8. Annex

Annex I – KOF Index: Structure

2020 Globalisation Index: Structure, variables and weights

Globalisation Index, de facto	Weights	Globalisation Index, de jure	Weights
Economic Globalisation, de facto	***33.3***	***Economic Globalisation, de jure***	***33.3***
Trade Globalisation, de facto	*50.0*	*Trade Globalisation, de jure*	*50.0*
Trade in goods	37.1	Trade regulations	26.2
Trade in services	43.4	Trade taxes	27.9
Trade partner diversity	19.5	Tariffs	27.5
		Trade agreements	18.4
Financial Globalisation, de facto	*50.0*	*Financial Globalisation, de jure*	*50.0*
Foreign direct investment	26.4	Investment restrictions	30.6
Portfolio investment	16.8	Capital account openness	39.0
International debt	28.1	International Investment Agreements	30.4
International reserves	1.3		
International income payments	27.3		
Social Globalisation, de facto	***33.3***	***Social Globalisation, de jure***	***33.3***
Interpersonal Globalisation, de facto	*33.3*	*Interpersonal Globalisation, de jure*	*33.3*
International voice traffic	20.5	Telephone subscriptions	39.4
Transfers	22.0	Freedom to visit	32.3
International tourism	21.5	International airports	28.4
International students	18.9		
Migration	17.1		
Informational Globalisation, de facto	*33.3*	*Informational Globalisation, de jure*	*33.3*
Used internet bandwidth	41.4	Television access	37.5
International patents	29.2	Internet access	42.6
High technology exports	29.4	Press freedom	19.9
Cultural Globalisation, de facto	*33.3*	*Cultural Globalisation, de jure*	*33.3*
Trade in cultural goods	28.6	Gender parity	23.1
Trade in personal services	24.7	Human capital	41.6
International trademarks	8.2	Civil liberties	35.2
McDonald's restaurant	21.9		
IKEA stores	16.5		
Political Globalisation, de facto	***33.3***	***Political Globalisation, de jure***	***33.3***
Embassies	37.1	International organisations	36.5
UN peace keeping missions	24.7	International treaties	32.6
International NGOs	38.2	Treaty partner diversity	30.9

Notes: Weights in percent for the year 2018. Weights for the individual variables are time variant.
Overall indices for each aggregation level are calculated by the average of the respective de facto and de jure indices.

Source: KOF Swiss Economic Institute, in https://ethz.ch/content/dam/ethz/special-interest/dual/kof-dam/documents/Medienmitteilungen/Globalisierungsindex/KOFGI_2020_structure.pdf (accessed on June 2021)