
PORTUGUESE ECONOMIC GROWTH, 1818-2018: THE RELEVANCE
OF INSTITUTIONAL FACTORS

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In loving memory of my grandfather, Manuel Coelho dos Santos.

Abstract

A growing body of literature has been considering institutions as a key factor in promoting countries' economic growth. Although very long run economic growth studies are scarce, they point to different determinants of growth. Notwithstanding, they overlook the importance of institutional factors, which are considered to be of great importance when explaining the Portuguese economic growth in the last 200 years.

Thus, the present dissertation tries to fill in the above-mentioned gap by assessing the influence of institutional and other growth determinants (human capital, structural change and trade openness), resorting to cointegration analysis and the Granger causality test, on the evolution of the Portuguese GDP per capita, from 1818 to 2018.

The results of the cointegration test suggest that in the very long run, when controlled for human capital, structural change and trade openness, an increase in 1% in institutions - contract-intensive money (CIM), a measure of the enforceability of contracts and the security of property rights, is associated with a statistically significant increase of 2.1% in real GDP per capita, and when the 'institutions' variable is proxied by Polity2, a measure of a country's political regime, the corresponding increase is smaller but significant and positive, reaching 0.9%. The results of the Granger causality tests further show that there is an indirect impact of institutional dimensions on economic growth, through improvements in human capital and structural change – for Polity2 - and trade openness – for CIM. In addition, we did not find evidence of a direct Granger causality running from institutional dimensions to economic growth. Lastly, we found that real GDP per capita Granger caused institutions – Polity2, which means that in the very long run, and according to our data, economic growth favours the transition to democratic political regimes.

JEL codes: B52; O11; O43

Keywords: very long run economic growth; institutions; human capital; structural change; trade openness; Portugal

Resumo

A literatura tem vindo cada vez mais a considerar as instituições como um determinante chave na promoção do crescimento económico. Embora os estudos que versem o muito longo prazo sejam escassos, apontam diferentes determinantes de crescimento. Contudo, negligenciam a importância dos fatores institucionais, que são tidos como fundamentais na explicação do crescimento económico português dos últimos 200 anos.

Desta forma, o presente estudo tenta preencher o *gap* mencionado mensurando do impacto das instituições e outros determinantes do crescimento (capital humano, abertura ao exterior e mudança estrutural), através da análise de cointegração e teste de causalidade de Granger, no PIB per capita português de 1818 a 2018.

Os resultados dos testes de cointegração sugerem que no longo prazo, quando controlado por capital humano, mudança estrutural e abertura ao exterior, um aumento de 1% nas Instituições – “Contract-Intensive Money” (CIM) está associado a um aumento estatisticamente significativo de 2,1 % no PIB per capita real. Quanto à segunda variável utilizada: Instituições - Polity2, o aumento correspondente é menor, mas significativo e positivo, chegando a 0,9%. Os resultados do teste de causalidade de Granger mostram que há um impacto indireto das dimensões institucionais no crescimento económico, que opera através de melhorias no capital humano e mudanças estruturais - para o Polity2 - e abertura ao exterior - para a CIM. Não encontramos evidência empírica de uma causalidade de Granger direta que fosse das dimensões institucionais ao crescimento económico. Por fim, foi descoberta uma causalidade de Granger que opera do PIB per capita real para Instituições - Polity2, o que significa que, a longo prazo, e de acordo com nossos dados, o crescimento económico favorece a transição para regimes políticos democráticos.

Códigos JEL: B52; O11; O43

Palavras-chave: crescimento económico no muito longo prazo; instituições; capital humano; mudança estrutural; abertura ao exterior; Portugal

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1. Introduction

At the dawn of the 19th century, Portugal had an output per capita similar to that of Germany and Spain, and superior to that of Sweden (Palma & Reis, 2019). Fifty years later, the Portuguese GDP per capita remained nearly the same, while France and Sweden saw an increase of their GDP per capita of more than 15% and Germany of almost 50% (Palma & Reis, 2019). However, in 2018 Portugal registered a GDP per capita (in PPP) which ranked only 100 in the whole world.¹ What went wrong? Could it have been avoided? What are the true causes of the Portuguese economic growth disaster of the last 200 years? Can today's rich countries (Portugal of 1800) become tomorrow's poor countries (Portugal of 2018)? What lessons can and should we learn?

Economic growth studies that adopt a long-run perspective, that is, periods where significant changes and structural transformations take place, help understand the factors that matter the most (Wallis, Colson, & Chilosi, 2018), which can by itself be of great usefulness for policy makers (He & Xu, 2019). These very long-run (more than 100 years) studies are relatively scarce and focus on a limited set of countries, most notably England, France, Italy, Portugal, Spain and the United Kingdom, and the very long run determinants they point out include physical and human capital, trade, structural change, innovation, monetization and institutions (see Section 2.4.1).

In what regards the Portuguese economy, the studies by Costa, Palma, and Reis (2014) and Palma and Reis (2019) analyse the economic growth over a long-time span, but cover only the period before 1800s, most notably 1500s to 1800s. Other studies either deal with a relatively short time span (Lains, 2003a; Teixeira & Fortuna, 2010) or focus on a given set of factors, such as international trade (Ramos, 2001; Teixeira & Fortuna, 2010), human capital (Teixeira & Fortuna, 2010), or population growth (Costa et al., 2014).

To the best of our knowledge, there are three main very long run studies covering the Portuguese's determinants of growth during the 19th and 20th centuries: Aguiar and Figueiredo (1999) from 1870 to 1990, Ramos (2001) from 1865 to 1998, and Lains (2006b) from 1842 to 1992. However, these studies do not cover the period after the 1990s and do

¹ In <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD>, last accessed June 2020.

not focus on the impact of institutions on the Portuguese economic growth. Institutions, defined by North (1989, p. 1321) as “rules, enforcement characteristics of rules, and norms of behaviour that structure repeated human interaction”, are considered fundamental in explaining the evolution of the Portuguese economy in the very long run (Palma & Reis, 2019). Despite this relevance, the impact of institutions on economic growth lacks concrete exploration in the very long run studies.

Hence, the main objective of the present dissertation is to fill this literature gap and assess the very long run determinants of the Portuguese economic growth. Specifically, our research question is: what are the direct and indirect impacts of institutions, via human capital, structural change and trade openness, on the Portuguese economic growth, from 1818 to 2018?

We therefore seek to contribute to the literature in two dimensions. First, from an economic history point of view, we try to provide a descriptive analysis of the Portuguese economy from 1800 to 2018. Second, to empirically assess the direct and indirect impact of institutional factors on a country’s very long run economic growth.

Methodologically, and in line with studies that adopted a similar stance (Teixeira & Fortuna, 2010; Teixeira & Loureiro, 2019), we resort to the time series methods involving vector autoregressive (VAR) models, cointegration analysis, and the Granger causality test. The estimations involve time series of real GDP per capita, human capital, structural change, trade openness and institutions, from 1818 to 2018.

This dissertation is structured as follows. In Section 2 we proceed to a brief historical description of the Portuguese economic performance between 1800 and 2018, and a comprehensive literature review on the main theories and determinants of economic growth, focusing on the role of institutions. Section 3 addresses methodological considerations and data description. Section 4 presents the results. In Section 5 we draw the main conclusions.

2. Literature Review

2.1. Overview of the Portuguese economic performance 1800-2018

This subsection describes the main historical events that came about in Portugal in the 19th, 20th and 21st century in order to picture the social, political and economic transformations that occurred during this period. In Table 1, below, we present the evolution of the annual GDP per capita growth rate of France, Germany, Italy, Portugal, Spain and the United Kingdom, between 1820 and 2018.

Table 1: Average annual GDP per capita growth rate (%) of Western Europe economies, 1820-2018

Years	France	Germany	Italy	Portugal	Spain	United Kingdom
1820-1850	1.14	n/a	-0.07	-0.49	n/a	0.91
1850-1914	1.34	1.89	0.89	0.48	0.87	1.26
1914-1950	1.03	0.51	1.04	1.42	-0.04	1.10
1950-1973	4.38	5.34	5.73	5.55	4.77	2.71
1973-1985	2.10	2.30	2.86	1.77	1.54	1.92
1985-2018	1.32	1.64	0.96	2.02	1.83	1.86

Source: Own elaboration based on data from Bolt, Inklaar, de Jong, and Van Zanden (2018) for the years 1820-1961, and World Bank² from 1961-2018.

We start our descriptive analysis in the period from 1800 to 1850 which was when Portugal started to fall behind, decreasing its GDP yearly by 0.49%, as oppose to the United Kingdom and France, which grew approximately 1% annually. In the early 19th century, Portugal waged three wars against France (1795-1797; 1801; 1807-1814), was occupied by France (1807-1811) and by Britain (1807-1820), lost an important colony (Brazil), and also faced a civil war between absolutist and constitutionalist parties (1828-1834) (Nunes, Mata, & Valério, 1989). While Western European countries in general were starting the process of industrialization, by 1850 Portugal still had a major share of population employed in agriculture and a limited use of coal or other non-animal energy sources (Lains, 2006a). The society itself was underdeveloped, plagued by political instability (which ultimately lead to the civil war) and

² In <https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG>, last accessed June 2020.

in short of financial resources (Lains, 2006a). The latter bred low investments in education and infrastructures, which made the transport sector penurious, with poor roads, ports and canals (Lains, 2006a).

Between 1850 and 1890, Portugal carried out some institutional reforms such as the adoption of the gold-standard and the metric system, and the development of a network of commercial banking institutions (Nunes et al., 1989). The overall agricultural and industrial production grew at a pace of around 2.5-3%, and thus it was a virtuous time for the Portuguese economy (Nunes et al., 1989). Notwithstanding, between 1890 and 1913 the increased degree of internationalization in previous years was not sufficient to mitigate the effects of the abandonment of the gold-standard (1891), partial default from the state the following year and increased tariff protection, and so the decades before the dawn of the first world war were marked by reduced growth and a poor development of institutions (Lains, 2003b).

Although the small role played in the first world war and its non-participation in the second, between 1914 and 1950 the Portuguese economy only grew annually at a pace of 1.42%, and converged slightly towards the main Western European countries. Between 1914 and 1918, Portugal was not able to take advantage of the higher international demand caused by the war (having even increased imports) due to its weak industrial production, and also to the combination of commodity shortage and increasing money supply that generated an inflationary process (Nunes et al., 1989). The inter-wars period was characterized by alternating policy choices, government deficits and inflation, which combined with the military coup in 1926 lead to the rise of Salazar as the ministry of Finance in 1928 (Lains, 2003a). This event marked the beginning of the authoritarian regime: Estado Novo, which lasted until 1974. The 1930s and 1940s saw several institutional transformations that did not yield good results, namely the administrative control over large industrial firms and the public contributions to the initial capital of corporations that generated mixed capital enterprises (Nunes et al., 1989). On the other hand, there were structural policies aimed at education, which reduced the level of illiteracy and systematic short-term policies to fight inflation (Nunes et al., 1989).

The period between 1950 and 1973 is often dubbed “the golden years”. Portugal grew annually at a remarkable rate of 5.55%, above most countries, and therefore converged towards the richest economies. The main factors that contributed for this growth were the European integration (which started in 1960 with the EFTA) and emigrant’s remittances

which kept current accounts stable (Nunes et al., 1989). Additionally, this period was characterized by the structural transition from an agrarian to an industrialized economy, mostly due to the increase in external demand (Lains, 2003a).

Between 1973 and 1985 the Portuguese economy took a significant hit by the oil-shocks, experienced severe external financial distress and lost its colonial markets (Nunes et al., 1989). Hence, the annual growth rate decreased substantially and Portugal diverged from the Western Europe economies. In 1974 democracy, civil rights and freedoms were re-established (“Revolução dos Cravos”), and from then onwards, there were several periods of political instability and the nationalization of many enterprises (Nunes et al., 1989).

From 1985 to 2018, Portugal has experienced a timid growth of 2.04% per year, which is just a little bit higher than the richest European countries. Taking into account that Portugal joined the European community with promises of catching-up, and has had the support of the theoretically powerful EU market and institutions, this result is truly unsatisfactory since it yielded the “longest divergence period since the nineteenth century” (Amaral, 2019, p. 290). From 1985 to 2000, Portugal prospered due to the accession to European Economic Community in 1986, the structural funds that came along with it, and important institutional reforms such as economic liberalization and a privatization program (Pereira & Lains, 2011). However, from 2000 onwards Portugal has had a poor performance, due to several reasons. First, there was a reduction of productivity, mainly caused by structural change and low rates of accumulation of human capital (Pereira & Lains, 2011). Second, the dependence, even nowadays, on a low skilled labour force, which combined with the poor adjustment to the Euro and increasing exchange rates in the 1990s bred reduced export competitiveness and low job creation (Pereira & Lains, 2011). Third, there was a huge decrease in remittances, and since transfers were for a long time the instrument used to keep the current account balanced, without them came the trade deficits, which remained until 2012 (Amaral, 2019). Lastly, weak public policy that resulted in a very high and increasing level of debt (Pereira & Lains, 2011). The outcome is one of the most unequal and low-growth European countries (Amaral, 2019).

Summing up, the most significant growth/convergence periods were 1850-1890, 1950-1973 and 1986-1992. Structural change and exports, but most notably institutional reforms seem to have been decisive for growth. On the other hand, the lack of productivity, human capital and innovation seem to be retarding it. But why did it all happen this way? Why do some

factors promote/inhibit growth? It is in these scenarios of uncertainty that theories are helpful, and so the next subsection offers a contextualization of the main explaining theories of economic growth.

2.2. Main explanatory theories of economic growth

There are several theoretical approaches which attempt to explain countries' economic growth. Earlier appreciative contributions include the Mercantilism approach, which relates the wealth of a nation to the trade surpluses and the accumulation of gold, and Adam Smith's statement that the division of labour and specialization are the main causes of economic growth (Screpanti & Zamagni, 2005).

Within the neoclassical theoretical approach, the Solow-Swan growth model (Solow, 1956; Swan, 1956) postulates that both capital and labour have diminishing returns, and thus, increases in capital have limited impact on growth, which would yield in the long run a steady state with zero growth. Under these assumptions, long term equilibrium growth is attributed to the exogenous rates of technological progress (Barro & Sala-i-Martin, 2004).

For the subsequent endogenous growth theory (Lucas, 1988; Romer, 1990), improvements in human capital, knowledge and innovation result in technological progress (which is endogenized) that fosters long term economic growth.

Heterodox theoretical approaches, such as the Post-Keynesian growth theories advocate that the Demand itself has central role in long-run economic growth, or that changes in the level of investment and government policies (to stimulate demand) affect long-run growth (Dutt, 2006).

Institutional approaches³ to growth include the contributions of Acemoglu, Johnson, and Robinson (2005), who contend that empirical growth models that aim to test the significance of institutions need to encompass key variables such as corruption, political risk, property rights, democratic freedom, and other institutional development indicators which themselves shape the allocation of resources, economic outcomes and, consequently, economic growth.

³ Discussed in more detail in Section 2.3.4.

The unified growth theory by Galor (2005) provides a whole encompassing theoretical framework to attempt to account for the key stylized facts in the growth processes by highlighting several growth determinants such as human capital, technological progress, geography and institutions.

Wrapping up the above mentioned theories, we can distinguish the following groups of determinants of countries' economic growth (Acemoglu et al., 2005; Ciccone & Jarociński, 2010; Moral-Benito, 2012): 1) knowledge endowments; 2) technological change and innovation); 3) geography and natural resources; and 4) institutions.

2.3. Economic growth determinants: theoretical perspectives

2.3.1. Knowledge endowments – human capital and knowledge

Human capital encompasses skills and knowledge obtained by individuals, either by formal education or on-the-job training (Schultz, 1961; Lucas, 1988; Romer, 1990). In a broader interpretation, it may be considered as the embodiment of education, health and skill training (Azariadis & Drazen, 1990; Sehrawat & Singh, 2019).

Various authors have stressed the importance of human capital in promoting countries' economic growth (Schultz, 1961; Lucas, 1988; Romer, 1990; Muhamad, Sulaiman, & Saputra, 2018). A country with higher human capital stock is not only more prone to innovate and introduce new technologies and goods, but also to absorb technologies and goods developed by other countries (Barro, 1991; Muhamad et al., 2018). Indeed, human capital fosters economic growth through several channels: 1) innovation enhancer and technology complement (Nelson & Phelps, 1966; Muhamad et al., 2018); 2) physical capital and labour productivity enhancer (Lucas, 1988; Muhamad et al., 2018); and 3) entrepreneurship promoter (Ali, Egbetokun, & Memon, 2018).

Although human capital is almost unanimously considered essential to stimulate countries' long-run economic growth, the magnitude of its effects depend on countries' distance to the technological frontier (Nelson & Phelps, 1966; Vandenbussche, Aghion, & Meghir, 2006) and institutional quality/development (Ali et al., 2018).

Whereas human capital embraces the talents, skills, and expertise of individuals, knowledge concerns tacit ideas whose conditions involve high levels of uncertainty and asymmetry

(Audretsch, 2007). The relationship between knowledge and economic growth has been explored before (Lucas, 1988; Romer, 1990; Acs, Audretsch, Braunerhjelm, & Carlsson, 2004; Carlsson, Acs, Audretsch, & Braunerhjelm, 2009). Carlsson et al. (2009) argue that knowledge creation – either developed in research departments of universities, or R&D sectors of industries – stimulates the creation or absorption of new technologies, which increase productivity and competitiveness, and generate economic growth.

In any case, the relationship between knowledge endowments and economic growth depends on the support provided by the right institutions that should: 1) grant intellectual property rights (Dias & Tebaldi, 2012); 2) foster basic research, the dissemination of ideas and grant funds to the researchers (Gersbach, Sorger, & Amon, 2018); and 3) encourage start-ups (Acs et al., 2004).

2.3.2. Technological change and innovation

Technological change and innovation are often taken as synonymous words, however, they convey distinct perspectives, respectively the North-American and the European (Godin, 2012). Fundamentally, technology is an umbrella term used by economists to describe “factors other than physical and human capital that affect economic growth and performance” (Acemoglu, 2009, p. 19). In that sense, technological change is anything that alters output and is not attributable to physical or human capital. On the other hand, innovation is linked to the successful exploitation of novel ideas, either through process innovation (in production, distribution, marketing, business, management, etc.) or product innovation (OECD & Eurostat, 2019). In this vein, not all innovations embrace technological change.

Technological change and innovation are considered to be major drivers of economic growth (Howitt & Aghion, 1998; Adrián Risso & Sánchez Carrera, 2019). They both promote the development of new ideas, ways of doing things, and ultimately, they increase productivity in production, which fosters growth (Rosenberg, 2004).

One way through which technological change and innovation may lead to growth is by promoting the structural change of the economy. In the past (or nowadays in developing countries), when industries adopted new technologies and/or innovated, they became more productive, and attracted more and more qualified workers, resources and this increased

wages (Teixeira & Queirós, 2016). Due to this process, some economies transitioned from a more agrarian, rural and less productive economy, towards an industrialized economy, through a shift of the weight of its sectors (Syrquin, 1988).

Another way is through international trade. The development of international trade facilitates the adoption of technologies and a more efficient use of resources, specialization and reinforces the competition, through the enlargement of available markets (Grossman & Helpman, 1991; Coe, Helpman, & Hoffmaister, 2009).

Independently of the channel through which innovations and technological change promote growth, they seem to be very relevant to the study of economic development. Innovative ideas and technological progress are largely dependent on the social and entrepreneurial environment, and in this sense, institutions become crucial because they “equalise opportunities to innovate and make economic agents able to engage in collective action to push for the dissemination of knowledge” (d’Agostino & Scarlato, 2019, p. 85).

2.3.3. Natural resources and geography

The role of natural resources on economic growth has been studied intensely in the last twenty years, and whether natural resources are a blessing or a curse still remains unclear (Wu, Li, & Li, 2018). However, the existing empirical evidence suggests that there is a significant effect of natural resources on economic growth, regardless of it being good or bad (Arin & Braunfels, 2018). The impact of natural resources on countries’ economic growth can be divided into direct and indirect effects (Zallé, 2019).

In what concerns the direct effects of natural resources on economic growth, we can point to the revenue earned from the exploitation of those natural resources, and also to the fact that natural resources represent a large percentage of the domestic product in resource-rich countries, which can diminish the burden of debt, and increase flexibility in allocating resources (Zallé, 2019).

Regarding the indirect impacts that can arise with natural resources abundance, they are often associated with countries’ human capital endowments and the quality of their institutions (Zallé, 2019). One known indirect impact is the “resources curse”, a term coined by Auty and Warhurst (1993), that establishes that the abundance of natural resources can lead to: i) a reallocation of resources and workers towards a resource-rich (primary) sector, which can

inhibit the growth of the secondary and tertiary sectors (Gylfason, Herbertsson, & Zoega, 1999); and ii) it can also lead to lower education spending and less schooling (Brunnschweiler, 2008). All of this can hamper growth. Notwithstanding, having good quality institutions (that determine how resources are explored and its revenues used) may help preventing the resources curse (Zallé, 2019).

Regarding geography, it is crucial for countries' economic development, as it is a major determinant of "climate, endowment of natural resources, disease burden, transport costs, and diffusion of knowledge and technology from more advanced areas" (Rodrik, Subramanian, & Trebbi, 2004, p. 132). Thus, countries located far from coasts or ocean-navigable rivers face higher transport costs - which ultimately reduce the gains that could be earned from international trade, and increase the cost of capital imported -, and tropical regions often support a large burden of disease, all of which hampers development (Gallup, Sachs, & Mellinger, 1999). Again, Rodrik et al. (2004, p. 131) who studied the contributions of geography, trade and institutions in explaining income levels around the world concluded that the quality of institutions "trumps" everything else.

2.3.4. Institutions

The vastly disseminated mainstream neoclassical economics view that technology and (human and physical) capital are the main determinants of growth is, according to some authors a rather superficial analysis, and a more holistic account will find, beneath these more superficial factors, institutions as the main propulsor of economic growth and development (Leite, Silva, & Afonso, 2014). In this subsection, we try to answer the following questions: 1) what are institutions? 2) how do institutions emerge in a society? 3) why should they matter to growth? 4) why does institutional quality differ among countries?

According to North (1990), institutions are rules and norms that shape and arrange social, political and economic relations, which can be formal (e.g., written constitution, laws, policies, rights and government regulations) or informal (e.g., social norms, customs or traditions). The emergence of the New Institutional Economics - a term coined by Williamson (1975) - was influenced by an important contribution of Coase (1937, 1960), who pointed out a major flaw in the neoclassical models: the negligence of transaction costs. In a world with transaction costs and impersonal exchange, institutions matter in constraining

the participants and minimizing the transaction costs, thus increasing the productivity associated with gains from trade (North, 1989).

How exactly do institutions emerge in a society? Acemoglu et al. (2005) put forward an encompassing theory of institutions. They start by distinguishing *de jure* political power – the official formal rules - and *de facto* political power – the actual power that different groups of society detain. They argue that political institutions determine the distribution of *de jure* political power. On the other hand, they claim that *de facto* political power will determine economic institutions. Thus, there are two types of institutions: political institutions, which allocate *de jure* political power, and economic institutions which determine the economic performance and the future distribution of resources (Acemoglu et al., 2005).

Having established some notions on institutions, one question arises: why should institutions matter for growth? Because they provide trust and reduce uncertainty between agents, in order for them to make transactions, engage in economic activity, and this promotes growth (Knack & Keefer, 1997). Trust is implied in various transactions: goods or services supplied in exchange for future payment, employment contracts in which some tasks performed by employees are tough to monitor, or even investment and savings decisions that rely on governments and banks' guarantees not to expropriate one's assets (Knack & Keefer, 1995). But exactly how can institutions help promote trust? One way is by developing a firm rule of law, which establishes peaceful mechanisms to adjudicate disputes (Knack & Keefer, 1995), reduces uncertainties, which will increase investors' confidence and trust (Nawaz, 2015), and lastly protects the resources and wealth already attained by individuals minimizing their risk of expropriation, by ways of securing and protecting property rights (Knack & Keefer, 1995; Yanovskiy & Shulgin, 2013).

The final point made above is of extreme importance. Besides promoting trust and establishing the rule of law, institutions should also protect property rights, because if property rights are not secured, and there is a real threat of expropriation, resources will be allocated either to protection from expropriation, by ways of bribes, private security services, rent-seeking activities (Knack & Keefer, 1997), or to other activities which may be more secure from expropriation, although they may be less profitable and less productive (Knack & Keefer, 1995). A classic example is given by Hall and Jones (1999): if a farm cannot be protected from theft, thievery will become an alternative to farming, and thus, a part of the labour force will become thieves, who do not contribute to output. Moreover, farmers will

need to reallocate resources to means of protection, such as fences, thus lowering their output. In the end, the lack of property rights over physical capital, patents and profits reduces the incentives to invest, acquire foreign technology, and innovate, all of which hamper growth (Mauro, 1995).

One key aspect of institutions is that, although governments are fundamental to establish some measures in order to minimize diversion, the fact they have power to elaborate and enforce rules, makes them vulnerable to engage in diversion activities themselves (Hall & Jones, 1999). Thus, having democratic institutions is fundamental to hold the government accountable (Nawaz, 2015), and avoid situations of diversion - such as bribes, rent-seeking behaviour and corruption -, more prone to happen when there is lack of bureaucratic efficiency (Knack & Keefer, 1995). This diversion may result in the allocation of public goods, infringements of property rights and reduce the quantity and quality of capital investment (Knack & Keefer, 1995).

Having concluded that institutions are fundamental to growth, we are now in a position to ask why some countries have developed better institutions. According to Shirley (2008) there are several historical based explanations, all of which share a common assumption that institutions have a path-dependant nature, and are relatively difficult to change, or in other words, past institutions have influenced highly the development of the institutions and countries today (Gagliardi, 2008).

The first explanation is that countries are poor due to bad colonial heritage, that is, in the past, some colonial countries had a favourable climate and were disease free, and colonial masters set up inclusive institutions, and other countries were rich in natural resources, densely populated and with a high mortality, and institutions were established solely for the purpose of exploration, and consequently, the latter inherited bad institutions and are poorer today (Shirley, 2008).

The second theory states that in the past, some countries had political conflict arising from fights against other countries or even between national elites, and this originated rich institutions which organized society, and other countries were stick to a ruler who established poor institutions solely for the purpose of serving selfish interests (Shirley, 2008).

The third one proposes that each nation has its proper beliefs and norms, and those who had beliefs and norms incompatible with markets or trust were not able to build institutions to promote trade and investment, and thus became poor over time (Shirley, 2008).

In short, institutions are in fact important, but the way they influence growth is unclear at the present moment. There is still a lack of a solid, comprehensive and transmittable theoretical framework that can allow further explorations. This is mainly due to the fact that “institution” is an umbrella term that means multiple things, most of them intangible. For Harari (2014), who studies the evolution of humans and their interactions, institutions are collective fictions that allow strangers to cooperate in large numbers. They are fictions in the sense that many institutions are not even physical, and depend solely on a large group of people believing in them (hence the importance of trust in institutions). Take the example of money. The actual value of money, meaning the paper in which it is printed, is virtually zero. However, all financial institutions depend exclusively on people believing that a piece of paper is worth 10\$, 100\$, etc. If a group of people sufficiently numbered and powerful stops believing this “fiction”, the financial institutions could collapse. In that vein, how could it be possible to empirically measure (financial) institutions and capture their essence in a full and satisfactory way? This will be one of the subjects explored in the next subsection.

2.4. Economic growth determinants: empirical evidence

In this section, we shift the attention towards the empirical works on the determinants of economic growth. Given that the main objective of this dissertation is to assess the impact of institutional factors on the Portuguese economic growth in the very long run, it is important to inquire what the empirical literature has produced regarding: 1) the very long run, to comprehend what has been and can be done (in terms of methodologies, variables and data available) when dealing with such a long period of time; 2) institutions, to grasp the different variables and measurement techniques applied in the literature; and 3) Portugal, to appraise what has been done, what is missing, and how our work can be of value. Only with these insights can we be fully conscious of the comprehensive state of the art and fill in the gaps left by others.

Therefore, based on the theoretical arguments presented above, the first subsection presents studies that focus on growth determinants on one or more countries, on the very long run (more than 100 years). On the second subsection, we dissect thoroughly the major empirical quantitative findings on the relationship between institutions and growth (in various countries and time spans), and accordingly, this is the most detailed subsection. We finish by analysing several of the Portuguese’s economic growth determinants found in the literature.

As it should be clear by the end of this section, each of the subsections has its own small gap, and this dissertation's mission is to fill them, in the best possible way. The gaps in each subsection are respectively:

- 1) most of the very long run studies do not cover the period between 1800s and 2000s, usually resorting to previous periods, and even when they do, they generally do not study the impact of institutions on the very long run economic growth;
- 2) the studies that focus on the institutional impact on economic growth have generally not focused either on very long run causality studies or the Portuguese case;
- 3) regarding the studies that focus on the Portuguese economy, they either deal with shorter time spans, or do not focus the role of institutions.

2.4.1. Very long run economic growth studies

In this subsection, we present empirical studies which focus on the determinants of the very long run economic growth (see Table 2). We excluded institutions-growth quantitative studies, because they are covered in the next subsection. In this subsection we separate the studies into descriptive analyses and quantitative studies.

Starting with the descriptive analysis, De La Escosura (2007) studies Spain's economic performance from 1850 to 2000, and divides it into three distinct periods: 1) 1850 to 1950, in which there was a poor performance due to tariff protection and exclusion from the gold standard; 2) 1951 to 1974, the "Golden Age", in which there was growth due to pro-market reforms, deregulation and the opening up of the economy; and 3) 1974 to 2000, where there was growth due to rise in labour productivity in agriculture, structural change and a demographic gift (larger share of working age population).

Table 2: Very long run economic growth studies

Author	Proxies for economic growth	Variables	Proxies	Methodology	Countries	Period	Results
De La Escosura (2007)	GDP per capita growth rate	Physical and human capital	Primary and secondary school enrolment	Descriptive	Spain	1850 - 1950	Tariff protection and exclusion from the gold standard as sources for bad performance in this period
		Structural change	Initial share of active population in agriculture			1951 - 1974	Growth due to pro-market reforms, deregulation and the opening up of the economy
			Average ratio of agricultural to industrial output			1975 - 2000	Growth due to rise in labour productivity in agriculture, structural change and a demographic gift - larger share of working age population
		Change in openness	Export share in GDP				
Felice and Vecchi (2015a, 2015b); Di Martino and Vasta (2015)	GDP per capita GDP per worker	Technological innovations	Several	Descriptive	Italy	1861-2011	The studies appreciatively suggest that the historical trajectory of Italy's modern economic growth is related to technological and institutional innovations.
		Institutional development	The functioning of bankruptcy law				
			The use and misuse of specific forms of governance				
			The ample role given to business consultants				
			The lack of attention toward the problem of tunnelling				
Dalko and Wang (2018)	GDP per capita	Health improvement	Life expectancy	Descriptive	United Kingdom	1541 - 2001	Economic growth supported health improvements and health improvements supported higher economic growth
Palma (2018)	GDP per capita	Monetization	Coin supply per capita	Descriptive	England	1530-1796	The increase in the monetization and liquidity levels of the economy paved the way for structural change, thicker markets and ultimately, the early growth patterns in England
Aguiar and Figueiredo (1999)	GDP per capita growth rate	Trade openness	$100 \times [(X + M)/2] / \text{GDPpc}$	2SLS	Portugal	1870 - 1990	International trade openness is a fundamental determinant of the of the evolution of the Portuguese economy
		Relative levels of physical infrastructures	Relationship between the railway distance per capita in Portugal and the average of other 7 countries				
		Human capital	Primary and middle school schooling years				
Stolz, Baten, and Reis (2013)	Height of the recruiters	Human capital	Numeracy	Fixed effects panel data	12 European countries, including Portugal	1720 - 1910	Human capital and urbanisation positively impact on countries' development.
			Literacy				
		Real wages	Self-explanatory				
		Institutions	British poor law dummy				
		Urbanisation	5,000 inhabitants and above in urban cities				
		Relative price of protein	Self-explanatory				

(...)

Author	Proxies for economic growth	Variables	Proxies	Methodology	Countries	Period	Results
Costa et al. (2014)	Wage levels	Contribution of the empire	Intercontinental trade	Dynamic panel data model (system GMM)	5 colonial nations, including Portugal	1500 - 1800	Colonies were consistently beneficial to the home country (namely Portugal). Despite this positive contribution, the empire did not prevent Portugal's sustained long run economic decline.
			Agriculture productivity				
			Industrial labour share				
			Institutions – Dummy PRINCE				
			Enclosure				
			Urbanisation				
Ramos (2001)	GDP	Trade	Real imports	Co-integration Granger Causality	Portugal	1865 - 1998	Imports ↔ GDP Exports ↔ GDP
			Real exports				
Pistoresi and Rinaldi (2012)	GDP	Trade	Real imports	Co-integration Granger Causality test	Italy	1863–1913	GDP → Export; Import → GDP
			Real exports			1951–2004	Export → GDP; GDP → Import
Díaz-Fuentes and Revuelta (2013)	Various (EG)	Public expenditure (PE)	Various	Co-integration Granger causality test	Spain	1850 - 2000	EG → PE
Felice, Andreu, and D'Ippoliti (2016)	GDP growth (GDP)	Life expectancy (LE)	Self-explanatory	Co-integration Granger Causality test	France	1861 - 2008	No causality
						1861-1941	LE → GDP
						1941-2008	GDP → LE
					Italy	1861 - 2008	LE → GDP
						1861-1941	GDP ↔ LE
						1941-2008	GDP ↔ LE
					Spain	1861 - 2008	GDP → LE
						1861-1941	GDP → LE
						1941-2008	GDP ↔ LE

Source: Own elaboration

The descriptive studies performed by Di Martino and Vasta (2015) and by Felice and Vecchi (2015a, 2015b) focus on the Italian's economic performance from its unification in 1861 until 2011, and relate it to technological and innovations and institutional factors. Di Martino and Vasta (2015) argue that institutional failure in Italy is due to four main causes, namely: i) the functioning of bankruptcy law, which does not give incentives for firms to restart; ii) the artificial protection of specific forms of governance, such as small artisan firms, which do not have incentives to innovate and be more productive, as they would lose the protection due to the increase in size; iii) the ample role given to business consultants, who set up as managers of small firms, and do not contribute to their growth, but rather only focus on their position and profit; and iv) the problem of tunnelling of resources, for example from firms to their owners.

Dalko and Wang (2018) study the United Kingdom between 1541 and 2001 and suggest that not only increases in life expectancy fostered economic growth, but also economic growth promoted higher levels of life expectancy.

Palma (2018) studies the English economy's monetization from 1530 to 1796, through a descriptive analysis of the coin supply per capita, and its influence on the real GDP per capita. The main conclusion drawn is that monetization facilitated structural change, thicker markets, modernization and the early growth patterns in England.

In what regards the quantitative studies on Italy's economic performance, Pistoresi and Rinaldi (2012) analyse the relationship between imports, exports and economic growth from 1863 to 2004. Using Granger causality and cointegration tests, they find that between 1863 and 1913, increases in GDP Granger caused increases in exports, and increments in imports Granger caused higher levels of GDP. As for the period comprised between 1951 and 2004, they conclude that increases in exports Granger caused increases in GDP and higher levels of GDP Granger caused increases of imports.

Felice et al. (2016) study the impact of life expectancy on long run economic growth for France, Italy and Spain, through Granger causality and cointegration tests, for the period between 1861 and 2008, and find that in general, both increases in GDP Granger cause improvements in life expectancy, as the other way around.

Díaz-Fuentes and Revuelta (2013) hold that in Spain, in the very long run, from 1850 to 2000, there is evidence of a Granger causality running from economic growth to public

expenditure, but when they use a shorter time span, from 1960 to 2000, they find evidence of a Granger causality also running from public expenditure to economic growth.

Regarding the Portuguese long run economic growth and its factors, there are four main studies. Aguiar and Figueiredo (1999) study the Portuguese economic growth from 1870 to 1990, and regress the GDP per capita growth rate using 2SLS, considering the following explanatory variables: i) trade openness; ii) relative levels of physical infrastructures, measured as the relationship between the railway distance per capita in Portugal and the average of other 7 countries; and iii) human capital, proxied by primary and middle school schooling years. The authors conclude that trade openness was a fundamental determinant of the evolution of the Portuguese economy.

Ramos (2001) studies, for the period between 1865 and 1998, the influence of imports and exports on economic growth and assessed that higher levels of both imports and exports Granger cause increases in GDP and the other way around as well.

Stolz et al. (2013) study the period from 1720 to 1910, looking at 12 countries, including Portugal. The proxy for economic growth used was the biological standard of living, measured as heights of the recruiters. The reasoning behind this is that countries with more economic development assure better health care and nutrients to its population, and so the normal height of people will be higher. They assess the impact on the biological standard of living of: i) human capital, proxied by numeracy and literacy; ii) real wages; iii) institutions – proxied by a dummy of the British poor law; iv) urbanization; v) relative price of protein. The main conclusion is that human capital and urbanisation had a positive impact on countries' development.

Lastly, Costa et al. (2014) study five colonial countries, including Portugal, between 1500 and 1800, inspecting whether gains from trade impacted real wages. Gains from trade included i) intercontinental trade; ii) agriculture productivity; iii) industrial labour share; iv) urbanisation; v) enclosure; and vi) institutions. The latter variable was proxied by De Long and Shleifer (1993) dummy variable 'Prince', which evaluates the effect of having absolute prince's regimes on regions' economic growth, as opposed to a free regime, like a republic. The institutions dummy was not statistically significant to explain Portuguese's real wages. It was further concluded that in spite the colonies were advantageous to home countries, namely Portugal, they did not prevent the deterioration of Portuguese economic growth.

2.4.2. Institutions-growth quantitative studies

In this overview of the institutions-growth empirical literature, we divide the analysis into three main dimensions: 1) variables and proxies used for institutions; 2) methodologies applied for analysing the data; and 3) main results obtained for each variable. A synthesis of the key information regarding the selected studies is presented in Table 3.

Variables and proxies used for institutions

Most of the empirical studies which analyse and test the impact of institutions on economic growth deal with large sample of countries over a relatively small period of time, resorting to proxies for institutions that consist in composite indexes of a myriad of institutional dimensions, such as: 1) Institutional Quality (Tavares, 2004; Ang, 2013; Nawaz, 2015); 2) Institutional Efficiency (Mauro, 1995; Shaw, Katsaiti, & Jurgilas, 2011); 3) Property Rights (Knack & Keefer, 1995; Acemoglu, Johnson, & Robinson, 2001); 4) Social Capital (Knack & Keefer, 1997); 5) Social Infrastructure (Hall & Jones, 1999); 6) Rule of Law (Rodrik et al., 2004); 7) Democracy (Corujo & Simões, 2012); and 8) Political Institutions (Yanovskiy & Shulgin, 2013; Spruk, 2016); 9) Enforcement of Contracts and Property Rights (Clague, Keefer, Knack, & Olson, 1999).

Institutional Quality is formed by Tavares (2004) through three proxies: i) legal system; ii) corporate governance; and iii) financial system. The legal system proxy has multiple indicators, ranging from aggregate performance of the legal system to specific characteristics of tenant eviction and bounced check collection procedures. As for the proxy for corporate governance, it is formed by indicators of power relations between firm stakeholders and the opening and closing of firms. Lastly, the financial system was analysed through indicators of the role of financial market depth and bank versus stock market bias, indicators of bank regulation and of firm financial health.

Nawaz (2015) uses, for the same variable (Institutional Quality), the International Country Risk Guide's (ICRG) indices of i) Government Stability – the degree to which the government is able to stay in office and carry out its program; ii) Investment Profile - assessment of risk factors to investment such as expropriation and contract viability; iii) Control over Corruption - degree of corruption within the political system; iv) Law and Order - strength and impartiality of the legal system; v) Democratic Accountability – the degree to which the government is responsive to its citizens; and vi) Bureaucracy Quality - extent of rent-seeking behaviour.

Table 3: Institutions-growth quantitative studies

Author	Proxies EC	Institutions variables	Institutions proxies		Indicators/measures	Methodology	Countries	Period	Results	Sources for the institutional indicators
Mauro (1995)	GDP per capita growth	Bureaucratic Efficiency	Legal System, Judiciary		Efficiency and integrity of the legal system	2SLS	68	1960 - 1985	+	Business International Corporation (1984)
			Bureaucracy and Red Tape		The degree to which the regulatory environment conditions foreign firms					
			Corruption		The degree of corruption or questionable payments present in business transactions					
Shaw et al. (2011)	GDP per capita growth	Bureaucratic Efficiency	See Mauro (1995)		See Mauro (1995)	2SLS/IV	68	1960 - 1985	+++	Business International Corporation (1984)
Knack and Keefer (1995)	GDP per capita growth rate	Property Rights	ICRG 82	Expropriation Risk	Assessment of risk of “outright confiscation” or “forced nationalization	OLS	38	1974 - 1989	+++	International Country Risk Guide (ICRG)
				Rule of Law	Measures the existence, or not of peaceful mechanisms to resolve disputes					
				Repudiation of Contracts by Government	Degree to which the government modifies or repudiates contracts					
				Corruption in Government	Degree of government efficiency or the lack thereof					
				Quality of Bureaucracy	Extent of rent-seeking behaviour					
			BERI 72	Contract Enforceability	Degree of enforceability of contracts				+++	Business Environments Risk Intelligence (BERI)
				Infrastructure Quality	Degree of efficiency in public goods' allocation					
				Nationalization Potential	Similar to Expropriation Risk					
				Bureaucratic Delays	Similar to Quality of Bureaucracy					
Hall and Jones (1999)	Level of output per worker	Social Infrastructure	Government Andiversion Policies (GADP)	Law and Order	see Knacks & Keefer (1995)	2SLS	127	1988	+++	ICRG
				Quality of Bureaucracy						
				Corruption						
				Expropriation Risk						
				Repudiation of Contracts by Government						
			Trade Openness	Sachs-Warner index	Degree to which a country is open to international trade					Sachs and Warner (1995)
Acemoglu et al. (2001)	GDP per capita	Property Rights	Protection Against Expropriation Risk		see Knacks & Keefer (1995)	2SLS	64	1995	+++	Coplin, O’Leary, and Sealy (1991)
Knack and Keefer (1997)	GDP per capita growth	Social capital	Trust		Degree to which citizens can be trusted	2SLS	29	1980 - 1992	+++	World Values Surveys
			Civic Cooperation		Degree to which behaviours such as keeping money found or cheating taxes are frequent				+++	

(...)

Author	Proxies EC	Institutions variables	Institutions proxies	Indicators/measures	Methodology	Countries	Period	Results	Sources for the institutional indicators
Rodrik et al. (2004)	GDP per capita	Rule of Law	Rule of Law index	Perceptions of the incidence of both violent and non-violent crime	2SLS	79	1995	+++	Kaufmann, Kraay, and Zoido (2002)
				Effectiveness and predictability of the judiciary					
				Enforceability of contracts					
Tavares (2004)	GDP per capita	Institutional quality	Legal system	Multiple, ranging from aggregate performance of the legal system to specific characteristics of tenant eviction and bounced check collection procedures	OLS	Several, including Portugal	1960 - 1995	There is only evidence linking the legal system to growth	Multiple for each proxy
			Corporate governance	1. Power relations between firm stakeholders 2- Opening and closing of firms					
			Financial system	Role of financial market depth and bank versus stock market bias, indicators of bank regulation and of firm financial health					
Ang (2013)	GDP per capita	Institutional quality	Voice and Accountability	The degree to which citizens have freedom and can elect their government	2SLS	99	1820 - 2000	+++	Kaufmann, Kraay, and Mastruzzi (2010)
			Political Stability	Probability of the government being overthrown					
			Government Effectiveness	Quality of public services, policies and government's commitment					
			Regulatory Quality	Degree to which the government produces policies which permit and promote the private sector's development					
			Rule of Law	Degree to which agents abide by the rules of the society					
			Control for Corruption	Degree to which public power is used for private advantages					
Spruk (2016)	GDP per capita growth rate	<i>de jure</i> Political Institutions	Voice and Accountability	see Ang (2013)	Fixed-effects 2SLS	16	1810 - 2000	0	Polity IV (Bolt et al., 2018)
			Political Stability						
			Rule of Law						
			Control for Corruption						
			Regulatory Quality						
			Government Effectiveness						

(...)

Author	Proxies EC	Institutions variables	Institutions proxies		Indicators/measures	Methodology	Countries	Period	Results	Sources for the institutional indicators
Spruk (2016)		<i>de facto</i> Political Institutions	Political Competition		Percentage share of smaller political parties' and independents' present on parliamentary elections or in the parliament	Fixed-effects 2SLS	16	1810 - 2000	+++	Vanhanen Polyarchy Dataset (Vanhanen, 2019)
			Electoral Participation		% of the population who voted					
Nawaz (2015)	GDP per capita growth rate	Institutional quality	Government Stability		Degree to which the government can stay in office and carry out its program	Fixed-effects Dynamic panel (system GMM)	56	1981 - 2010	+	International Country Risk Guide
			Investment Profile		Assessment of risk factors to investment such as expropriation and contract viability				++	
			Control over Corruption		Degree of corruption within the political system				+	
			Law and Order		see Knacks & Keefer (1995)				++	
			Democratic Accountability		Degree to which the government is responsive to its citizens				++	
			Bureaucracy Quality		see Knacks & Keefer (1995)				+	
Corujo and Simões (2012)	GDP per capita	Democracy	Polity2	Democracy	i) Citizens express preferences about leaders; ii) existence of constraints on the executive; iii) guarantee of civil liberties	Cointegration Granger causality test	Portugal	1960 - 2001	Democracy ↔ GDP	Polity IV (Bolt et al., 2018)
				Autocracy	Suppression of competitive political participation					
Yanovskiy and Shulgin (2013)	GDP per capita growth rate	Political institutions	Taxpayer Democracy		Duration of Taxpayer Democracy Period	Cointegration Granger causality test	145	1820 - 2000	-	Several for each proxy
			Rule of Law Democracy (RoL)		If the government respects: i) election results; ii) the decisions made by the courts; iii) opposition's public critique				RoL → Growth	
			Restricted Government (RG)		If one of the conditions above is not true				RG → Growth	
			Polity2	Democracy	i) Citizens express preferences about leaders; ii) existence of constraints on the executive; iii) guarantee of civil liberties				-	Polity IV (Bolt et al., 2018)
				Autocracy	Suppression of competitive political participation				-	
Clague et al. (1999)	Annual per capita GDP growth	Contract Enforcement	Contract-Intensive Money (CIM)		Based on citizens' decisions regarding the form in which they choose to hold their financial assets[(M ₂ -C)/M ₂]	OLS	95	1969-1990	+++	Clague et al. (1999)
		Property Rights								

Notes: +++(++)[+] statistically significant at 1%(5%)[10%]

Source: Own elaboration

Ang (2013) proxies Institutional Quality with the World Bank's Worldwide Governance Indicators of i) Voice and Accountability - the degree to which citizens have freedom and can elect their government; ii) Political Stability – probability of the government being overthrown; iii) Government Effectiveness - quality of public services, policies and government's commitment; iv) Regulatory Quality - degree to which the government produces policies which permit and promote the private sector's development; v) Rule of Law – quality of public services, policies and government's commitment; iv) Control of Corruption – the degree to which public power is used for private advantages. The six indicators are scaled presented in percentile rank, ranging from 0 to 100, meaning that the higher the value is, the better the institutional index, following the methodology proposed by Kaufmann et al. (2010). Institutional Quality is, then, the average of all these six indicators, and ranges between 0 and 1, and a better score means better institutions or greater institutional development.

The second variable is Bureaucratic Efficiency (Mauro, 1995; Shaw et al., 2011), and its purpose is to evaluate the degree of corruption or the lack thereof. The data is from Business International Corporation (1984), all of the indices are integers between 0 and 10, and a high value of an index means that the country in question has better institutions. Bureaucratic Efficiency index is the average score of i) Legal System, Judiciary - efficiency and integrity of the legal system; ii) Bureaucracy and Red Tape - the degree to which the regulatory environment conditions foreign firms; iii) Corruption - the degree of corruption or questionable payments present in business transactions. Bureaucratic Efficiency is compared throughout the article with the use of only the Corruption index, and Mauro (1995) states that the former is a better proxy for corruption, than the Corruption index itself.

The third variable, Property Rights, is proxied by Knack and Keefer (1995) using the International Country Risk Guide's (ICRG) indices of i) Expropriation Risk – measures the risk of “outright confiscation” or “forced nationalization ; ii) Rule of Law - measures the existence, or not, of peaceful mechanisms to resolve disputes; iii) Repudiation of Contracts by Government- the degree to which the government modifies or repudiates contracts; iv) Corruption in Government – the degree of government efficiency or the lack thereof; v) Quality of Bureaucracy - extent of rent-seeking behaviour. Alternatively, they measure it using the Business Environments Risk Intelligence's (BERI) indices of i) Contract Enforceability – the degree of enforceability of contracts; ii) Infrastructure Quality – the

degree of efficiency in public goods' allocation; iii) Nationalization Potential – similar to Expropriation Risk; iv) Bureaucratic Delays – similar to Quality of Bureaucracy. Both the ICRG and BERI's indices are constructed through simple addition of the proxies. On the other hand, Acemoglu et al. (2001) use as proxy for Property Rights solely the Political Risk Services' (PRS) Expropriation Risk index (Coplin et al., 1991).

The fourth variable, Social Capital, is proxied by Trust and Civic Cooperation (Knack & Keefer, 1997) indices which are elaborated on the basis of answers to surveys by World Values Surveys. Trust index is constructed by the percentage of respondents in each nation replying that most people can be trusted. As for Civic Cooperation index, it tries to encapsulate civic/non civic behaviours such as returning/keeping money that you have found or paying/cheating taxes.

The fifth variable, Social infrastructure (Hall & Jones, 1999) is a composite index formed by the average of two indices: the ICRG's Government Antidiversion policies (GADP) index, and the Sachs and Warner (1995) index of trade openness. The GADP index is comprised in the same way as Knack and Keefer (1995): i) Rule of Law; ii) Bureaucratic Quality; iii) Corruption; iv) Risk of Expropriation; v) Government Repudiation of Contracts.

The sixth variable, Rule of Law (Rodrik et al., 2004), is measured by a rule of law index deriving from the Governance Matters II Project (Kaufmann et al., 2002), which assesses i) perceptions of incidence of both violent and non-violent crime; ii) effectiveness and predictability of the judiciary; iii) enforceability of contracts.

The seventh variable, Democracy (Corujo & Simões, 2012) is proxied by the Polity IV's index Polity2 (Bolt et al., 2018), which captures the degree to which a country is considered either a democracy, if there are i) citizens express preferences about leaders; ii) existence of constraints on the executive; iii) guarantee of civil liberties – or an autocracy, if there is suppression of competitive political participation (see more in Section 3.2.5.).

Political Institutions are proxied by Yanovskiy and Shulgin (2013) as the indices of i) Taxpayer Democracy - duration of taxpayer democracy period; ii) Rule of Law Democracy - if the government respects: election results, the decisions made by the courts and opposition's public critique; iii) Restricted Government - if one of the conditions above is not confirmed; iv) Polity2, from the Polity IV Dataset (Bolt et al., 2018).

Spruk (2016) splits the concept of Political Institutions into *de jure* political institutions and *de facto* political institutions. The former proxied by Polity IV's indices (Bolt et al., 2018) already explained of i) Voice and Accountability; ii) Political Stability; iii) Rule of Law; iv) Control of Corruption; v) Regulatory Quality; vi) Government Effectiveness. The latter is proxied by the Vanhanen Polyarchy's (Vanhanen, 2019) indices of i) Political Competition - percentage share of smaller political parties' and independents' present on parliamentary elections or in the parliament; ii) Electoral Participation - percentage of the population who voted.

Lastly, Clague et al. (1999) propose a new measurement for contract enforcement and the security of property rights called: Contract-Intensive Money. This index is constructed with the following formula:⁴ $(M_2 - C) / M_2$. Fundamentally, it measures the proportion of money in circulation out of a broader definition of money encompassing, besides money in circulation, for instance deposits and loans with maturities less than two years. This measure aims to analyse peoples' choices concerning the form in which they choose to hold their financial assets. Higher values imply more trust in banking/financial institutions, which theoretically should mean that their quality is superior.

Methodology and instruments for analysing data

Not only coexist multiple variables and proxies of institutions, but the methodology applied is fairly different among studies, depending if the variables are analysed at one point of time – either using the growth over one year or the average of many years –, or measured over time.

Regarding the first type of studies, there are two methodologies applied: OLS and 2SLS. The majority of the selected literature dealing with cross-country analyses applies the 2SLS methodology (Mauro, 1995; Knack & Keefer, 1997; Hall & Jones, 1999; Acemoglu et al., 2001; Rodrik et al., 2004; Shaw et al., 2011; Ang, 2013), instrumenting the institutional variable (thus abandoning OLS) due to two main problems: i) reverse causality – countries with high income are more capable of implementing better quality institutions –, and ii) unobserved omitted determinants of income (Ang, 2013). On the other hand, Knack and

⁴ C is currency held outside banks and M_2 corresponds to a broad definition of the money supply, including cash, checking deposits, and easily convertible near-money (Clague et al., 1999).

Keefer (1995, p. 215) use OLS estimation because they argue that “the problem of omitted variables is not serious enough”. Clague et al. (1999) and Tavares (2004) also use OLS.

The main instruments in the literature, when using 2SLS, are:

- a) ethnolinguistic fractionalization (Mauro, 1995) and ethnolinguistic homogeneity (Knack & Keefer, 1997), the reason being that ethnolinguistic fractionalization (homogeneity) is related to lower (higher) quality institutions, due to more (less) disputes over the resources and corruption;
- b) settler mortality rates (Acemoglu et al., 2001; Rodrik et al., 2004), because they are correlated with the implementation of extractive and worse institutions in the past, which persist today;
- c) characteristics of the geography - which can be viewed as distinctive initial conditions that can dictate the quality of institutions established – such as distance from equator (Hall & Jones, 1999), geographical proximity to the regional frontier (Ang, 2013);
- d) trade openness (Hall & Jones, 1999), and the Frankel and Romer (1996) predicted trade share;
- e) legal origins (Shaw et al., 2011), or the fraction of the population speaking any Western language, or solely English (Hall & Jones, 1999), to capture the effects of European influence, whether it is technological, ideal or in terms of laws, on the world;
- f) institutional development instruments such as timing of agricultural transition, state history, technology adoption, genetic proximity to the global frontier, population density (Ang, 2013), and lags in reconstructed institutional indices (Spruk, 2016).

In regards to studies which focus the evolution of institutional and economic growth variables over time, Spruk (2016) utilizes both the 2SLS and the fixed-effects model, Nawaz (2015) applies the fixed-effect model and the dynamic panel (system GMM) and lastly Corujo and Simões (2012) and Yanovskiy and Shulgin (2013) use cointegration and Granger causality tests.

Main results obtained

Economic growth is empirically associated with the protection of property rights (Knack & Keefer, 1995; Clague et al., 1999; Acemoglu et al., 2001), effective rule of law (Rodrik et al.,

2004), institutional efficiency (Mauro, 1995; Shaw et al., 2011), trust and civil cooperation (Knack & Keefer, 1997), a presence of a consistent social infrastructure (Hall & Jones, 1999), higher quality political institutions (Tavares, 2004; Yanovski & Shulgin, 2013; Spruk, 2016), and other measures of institutional quality, such as control for corruption, enforcement of contracts and democracy (Clague et al., 1999; Corujo & Simões, 2012; Ang, 2013; Nawaz, 2015).

Tavares (2004) studies the impact of Institutional Quality in the Portuguese economic growth from 1960 to 1995, applying OLS estimations, through three dimensions: legal system, corporate governance and financial system. There is only evidence linking the legal system to growth. Ang (2013) finds that, in the period between 1820 and 2000, and for 99 countries, rule of law and government effectiveness are the most important components of Institutional Quality, and that institutions established in the past are related to current institutions and current economic outcomes. The same evidence for a path-dependent nature of institutions is found in Acemoglu et al. (2001). For the same variable, the period from 1981 and 2010, and 56 countries, Nawaz (2015) concludes that Institutional Quality is important in determining the long-run economic growth, but different countries require different sets of institutions.

Regarding Bureaucratic Efficiency, Mauro (1995) argues it is negatively connected to corruption, and that the latter lowers investment and economic growth. Shaw et al. (2011) revisits this study, but with a larger set of instruments, and validates the results.

In what concerns Property Rights, Knack and Keefer (1995) and Acemoglu et al. (2001) infer that institutions that protect property rights are crucial to economic growth and to investment.

In regards to Social Capital, Knack and Keefer (1997) find that for 29 countries, trust and civic cooperation, thus Social Capital, are connected to growth. Moreover, they divide the sample according to countries' level of income and find that trust's relationship to growth is especially large in poor countries.

Hall and Jones (1999) find that Social Infrastructure is fundamental in the explanation of output per worker, due to better institutional quality and government policies which promote capital accumulation and productivity enhances.

Rodrik et al. (2004), using a sample of 79 countries, explain that Rule of Law is fundamental to countries' economic performance, and that institutions trump geography and openness in explaining growth.

Corujo and Simões (2012) study the impact of Democracy on the Portuguese economic growth between 1960 and 2001, and find a (Granger) bidirectional causality between democracy and GDP.

Regarding Political Institutions, Yanovskiy and Shulgin (2013) argue that Rule of Law democracies were fundamental to growth of 145 countries between 1820 and 2000, and Spruk (2016), finds evidence that *de facto* political institutions were important to very long run economic growth.

Lastly, in what concerns Contract Enforcement and Property Rights, Clague et al. (1999) analyse the impact of CIM in 95 countries between 1969 and 1990, and assess that CIM produces increments in investment, the size of the capital stock, total factor productivity and the overall level of output per capita.

2.4.3. Portuguese economic growth studies

In this subsection we present various relevant studies regarding the Portuguese economic growth determinants (see Table 4). We present again the studies that focused on Portugal, referred in the previous sections, so as to provide a clear picture of the empirical literature concerning the Portuguese economy.

Regarding **knowledge endowments**, all of the studies reveal that human capital promotes growth in output and productivity in the Portuguese economy (Amaral & Cabral, 1998; Teixeira & Fortuna, 2004; Pereira & St. Aubyn, 2009; Stolz et al., 2013). Moreover, Pereira and St. Aubyn (2009) argue that for the period between 1960 and 2001, increasing education at all levels except tertiary had a positive and significant effect on growth.

Defence spending and its impact on growth between 1980 and 2009 was studied by Shahbaz, Leitão, Uddin, Arouri, and Teulon (2013), who found that GDP Granger causes increases in defence spending.

Table 4: Portuguese economic growth studies

Author	Proxies for economic growth	Explanatory variables	Proxies	Methodology	Countries	Period	Results
Amaral and Cabral (1998)	GDP growth rate	Physical capital	Self-explanatory	Descriptive	Portugal	1951 - 1973	Portuguese GDP grew closer to the rich countries, and the main motors of that growth were physical and human capital, and total factor productivity
		Human capital	Mean years of schooling				
		Technological progress	Total Factor Productivity				
Aguiar and Figueiredo (1999)	GDP per capita growth rate	Trade openness	$100 \times [(X + M) / 2] / \text{GDPpc}$	2SLS	Portugal	1870 - 1990	International trade openness is a fundamental determinant of the of the evolution of the Portuguese economy
		Relative levels of physical infrastructures	Relationship between the railway distance per capita in Portugal and the average of other 7 countries				
		Human capital	Primary and middle school schooling years				
Ramos (2001)	GDP	Trade	Real imports	Co-integration Granger Causality test	Portugal	1865 - 1998	Imports ↔ GDP Exports ↔ GDP
			Real exports				
Teixeira and Fortuna (2004)	Total factor productivity	Human capital	Average years of schooling of the working age population	Cointegration	Portugal	1960 - 2001	Human capital and innovation are important in explaining Portuguese productivity
		Innovation	Internal expenditures on research and development of firms				
Tavares (2004)	GDP per capita	Institutional development	Legal system (see Table 3)	OLS	Several, including Portugal	1960 - 1995	There is only evidence linking the legal system to growth
			Corporate governance (see Table 3)				
			Financial system (see Table 3)				
Lains (2008)	Labour productivity	Structural change	Intra-industry effect - changes of productivity within each sector	Descriptive	Portugal	1979 - 2002	The dynamic effect impacted negatively labour productivity growth
			Static effect - circumstances in which resources shift towards sectors with productivity levels above the average				
			Dynamic effect - circumstances in which resources shift to sectors with productivity growth rates above the average				
Mata and Love (2008)	GDP per capita	Protectionism	Average tariff (AT)	OLS	Portugal	1860 - 1913	AT & MPAT → +++; DIST → ++
			Main partners' average tariff (MPAT)			1919 - 1938	AT, MPAT & DIST → +++
			Effective average distance from a given country's capital to the main partners' capital cities (DIST)		Brazil	1860 - 1913	AT & MPAT → ++; DIST → 0
						1919 - 1938	AT, MPAT & DIST → +++
Pereira and St. Aubyn (2009)	GDP per worker	Human capital	Concluded primary school	Cointegration Granger causality test	Portugal	1960 - 2001	Increasing education at all levels except tertiary have a positive and significant effect on growth
			Concluded basic 2nd cycle				
			Concluded basic 3rd cycle				
			Concluded upper secondary (11th year)				
			Concluded upper secondary (12th year)				
			Concluded lower higher education (ensino médio)				
			Concluded higher education				

(...)

Author	Proxies for economic growth	Explanatory variables	Proxies	Methodology	Countries	Period	Results
Andraz and Rodrigues (2010)	GDP	Exports (EXP)	Self-explanatory	Cointegration Granger Causality	Portugal	1977 - 2004	Long-run: EXP → GDP; FDI → GDP Short-run: FDI ↔ GDP; FDI → EXP
		Inward FDI (FDI)	Self-explanatory				
Fuinhas and Marques (2012)	GDP	Oil consumption	Self-explanatory	Cointegration Granger Causality	Portugal	1965 - 2009	Oil consumption ↔ GDP
Corujo and Simões (2012)	GDP per capita	Democracy	Polity2 (see Table 3)	Cointegration Granger causality test	Portugal	1960 - 2001	Democracy ↔ GDP
Marques, Fuinhas, and Marques (2013)	GDP (LY)	Stock market capitalization ratio (LS)	Ratio of the total value of listed shares (market capitalization) to GDP, both in nominal values and aims to measure the development of stock markets	Co-integration Granger Causality	Portugal	1993 - 2011	DLS ↔ DLY; DLY → DLB
		Domestic credit ratio (LB)	Ratio between the total domestic credit and the nominal GDP, and it is used to capture the development of the banking system				
Tang, Shahbaz, and Arouri (2013)	GDP per capita (GDP)	Electricity consumption (EC)	Self-explanatory	Cointegration Granger causality test	Portugal	1974 - 2009	EC ↔ GDP
Shahbaz et al. (2013)	GDP per capita (GDP)	Defence spending (DS)	Real defence spending per capita	ARDL bounds test Granger causality test	Portugal	1980 - 2009	DS → GDP
Stolz et al. (2013)	Height of the recruiters	Human capital	Numeracy	Fixed effects panel data	12 European countries, including Portugal	1720 - 1910	Human capital and urbanisation positively impact on countries' development.
			Literacy				
		Real wages	Self-explanatory				
		Institutions	British poor law dummy				
		Urbanisation	5,000 inhabitants and above in urban cities				
		Relative price of protein	Self-explanatory				
Costa et al. (2014)	Wage levels	Contribution of the empire	Intercontinental trade	Dynamic panel data model (system GMM)	5 colonial nations, including Portugal	1500 - 1800	Colonies were consistently beneficial to the home country (namely Portugal). Despite this positive contribution, the empire did not prevent Portugal's sustained long run economic decline.
			Agriculture productivity				
			Industrial labour share				
			Institutions – Dummy PRINCE				
			Enclosure				
			Urbanisation				
Rebelo and Silva (2017)	Labour productivity	Export variety	Related variety - variety between complementary sectors	Cointegration	Portugal	1967 - 2010	Both related and unrelated variety positively impacted employment, but negatively impacted labour productivity growth
	Employment		Unrelated variety - variety between unrelated sectors				

Notes: +++(++)[+] statistically significant at 1%(5%)[10%]

Source: Own elaboration

Energy consumption, either through oil consumption, between 1965 and 2009 (Fuinhas & Marques, 2012), or electricity consumption, between 1974 and 2009 (Tang et al., 2013), was found to have a bidirectional Granger causality with the GDP on the former, and GDP per capita on the latter.

Technological change and innovation is argued to be responsible for the Portuguese economic growth through; i) total factor productivity increase, in the period between 1951 and 1973 (Amaral & Cabral, 1998); ii) innovation enhancement, between 1960-1995 (Teixeira & Fortuna, 2004); and iii) structural change, between 1720 and 1910 in a positive way, specially through the increased urbanization (Stolz et al., 2013), but between 1979 and 2002, in a negative way, since the dynamic effect impacted negatively labour productivity growth (Lains, 2008).

International trade was proxied by both imports and exports, between 1865 and 1998, and was found to have a bidirectional Granger causality with the GDP (Ramos, 2001). It was also proxied by protectionism, in terms of tariffs, between 1860 and 1938, and was found to have a positive impact on the growth of both Portugal and Brazil (Mata & Love, 2008). International trade, when proxied by exports and inward FDI, between 1977 and 2004, was found to Granger cause GDP in the long run, while inward FDI, on the short run, was found to have a bidirectional causality with GDP (Andraz & Rodrigues, 2010). When proxied by contribution of the empire for five colonial nations, between 1500 and 1800, was found to be consistently beneficial to the home country, namely Portugal (Costa et al., 2014). Rebelo and Silva (2017) used export variety, proxied by related variety - variety between complementary sectors -, and unrelated variety - variety between unrelated sectors -, for the period of 1967 to 2010. They found that both related and unrelated variety positively impacted employment, but negatively impacted labour productivity growth (Rebelo & Silva, 2017). Aguiar and Figueiredo (1999) demonstrate that between 1870 and 1990, international trade (proxied by the sum of imports and exports as a percentage of GDP) was fundamental to the Portuguese economic growth, even when comparing it with human capital and infrastructure construction.

The impact of **stock market** and **bank financing** on growth was studied by Marques et al. (2013) from 1993 to 2011. They find Granger bidirectional causality between the stock market and economic growth and no evidence of causality running from bank financing to economic growth.

Lastly, **institutions** was evaluated in the literature through a compound index of institutional quality, from 1960 to 1995 (Tavares, 2004), and democracy, from 1960 to 2001 (Corujo & Simões, 2012). The institutional quality index was already explained (see Section 2.4.2.), and the conclusion of the study was that there is only evidence linking the legal system to growth. As for democracy, it was proxied with the usage of the Polity2 variable (Bolt et al., 2018), which asserts the degree to which a country has democratic institutions, procedures, and assures civil liberties or, on the other hand, there is suppression of the political participation. For the period between 1960 and 2001, Corujo & Simões (2012) demonstrated that there is evidence of a bidirectional Granger causality between democracy and Portugal's economic growth.

3. Methodology

3.1. Model specification and selection of the estimation technique

The main objective of this study is to evaluate the extent to which in the very long run, that is from 1818 to 2018, there is a stable relation between institutions and economic growth (controlling for other key growth determinants such as human capital, structural change and trade openness), and if that it is the case, whether the causality runs from institutions to economic growth or otherwise.

Existing research on the determinants of long run economic growth uses four main methodologies (see Section 2.4.1 and Table 2). First, descriptive analysis focusing on one country (De La Escosura, 2007; Di Martino & Vasta, 2015; Felice & Vecchi, 2015a, 2015b; Dalko & Wang, 2018; Palma, 2018). Second, 2SLS regressions (Aguiar & Figueiredo, 1999). Third, fixed effects panel data, in order to focus on multiple countries over a long period of time (Stolz et al., 2013), or a dynamic panel data model (system GMM) (Costa et al., 2014). Lastly, cointegration models and the Granger causality test, in order to study one country (Ramos, 2001; Pistoresi & Rinaldi, 2012; Díaz-Fuentes & Revuelta, 2013) or multiple countries (Felice et al., 2016), in the very long run.

Given that the relevant variables involved in the analysis are non-stationary (as we will demonstrate in the next subsection), their means and variances change with time, and the use of conventional estimation methods would lead to incorrect statistical inference (Teixeira & Fortuna, 2010). Hence, we resort to cointegration techniques, most notably Johansen (1988) methodology. However, in order to apply Johansen cointegration technique, all variables must be integrated of order one. To check the order of integration, and in line with Marques et al. (2013), we resort to graphical analyses of the variables in levels and in their first differences, complemented by the Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1981) and Phillips Perron (PP) (Phillips & Perron, 1988) tests.

After this first stage, we test the presence of cointegration and uncover the number of cointegration vectors carrying out the Johansen procedure (Johansen, 1988). If there is not even one cointegration vector, we can continue to estimate a first differences VAR, however, if there are one or more vectors, we should estimate a cointegrated VAR (Corujo & Simões, 2012). If we find that one or more time-series are cointegrated, then there must exist a Granger causality between them, either one-way or both directions (Granger, 1969). Lastly,

having confirmed, through a Johansen test, the existence of cointegration between institutions and economic growth, we apply the Granger causality test (Granger, 1969).

Summarizing, the main steps undertaken include:

- i) analyse the order of integration of the series;
- ii) test for cointegration through the Johansen Trace test, which involves the transformation of a VAR in levels to a Vector Error Correction Model (VECM);
- iii) interpret long run normalized cointegration vector;
- iv) apply the Granger causality test on the differences of the relevant variables.

The following multi-linear equation captures the relationship between the variables under analysis:

$$y_t = \beta_1 + \beta_2 HC_t + \beta_3 SC_t + \beta_4 TO_t + \beta_5 INST_t + u_t \quad (1)$$

where:

t represents time

y - Proxy for economic growth

HC – Proxy for human capital

SC - Proxy for structural change

TO – Proxy for trade openness

INS – Proxy for institutions

u_t - Random perturbation term

3.2. Description of the variable proxies and data sources

3.2.1. Economic growth

There are two main ways to operationalize economic growth: in levels or growth rates. Hall and Jones (1999) argue that the use of levels is much more effective when studying the very long run economic growth because on the one hand, it gives a more realistic notion of differences in welfare, such as the consumption of goods and services, and on the other hand, if the neoclassical theory is correct, and based on empirical evidence such as provided

by Sala-i-Martin and Barro (1995), in the very long run, countries will grow in an equal rate, and thus, disparities in levels show much better differences between countries. Accordingly, we use the Portuguese GDP per capita level as proxy for economy growth. Long run GDP per capita series for Portugal can be gathered from several sources (see Figures 1 and 2).

The Maddison Project Database 2018 (Bolt et al., 2018) offers a series for the Portuguese real GDP per capita from 1800 to 2016, in 2011US\$. Between 1852-1854, 1856-1860 and 1862-1864 data is missing on the series.

The time series from Valério (2008) provides the estimation of the real GDP per capita of the Portuguese economy in 1914 escudos, for the period between 1800 and 2003. Notwithstanding, before 1865 several years were missing data, respectively between 1803-1811, 1803-1817, 1818-1820, 1822-1826, 1828-1841, 1844-1854, 1857-1860 and 1862-1864.

Nunes et al. (1989) offer estimations for the GDP per capita, from 1833 to 1986, in 1914 escudos. Lains (2006b) offers two estimates for the GDP per capita. The first is from 1865 to 1958, in 1958 escudos. The second is from 1953 to 1992, in 1953 escudos.

In the World Bank Indicators,⁵ we find data of real GDP per capita in 2010US\$, between 1960 and 2018. The resultant of all series is portrayed in Figure 1 and Figure 2.

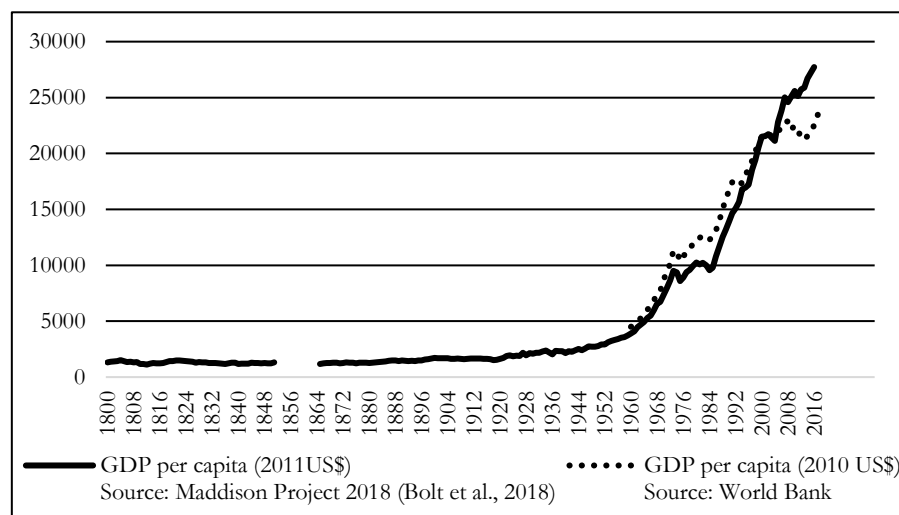


Figure 1: Evolution of the Portuguese real GDP per capita (in US\$)

Source: Own elaboration based on data from Bolt et al. (2018) and World Bank

⁵ In <https://data.worldbank.org/indicator/NY.GDP.PCAP.KD>, last accessed June 2020.

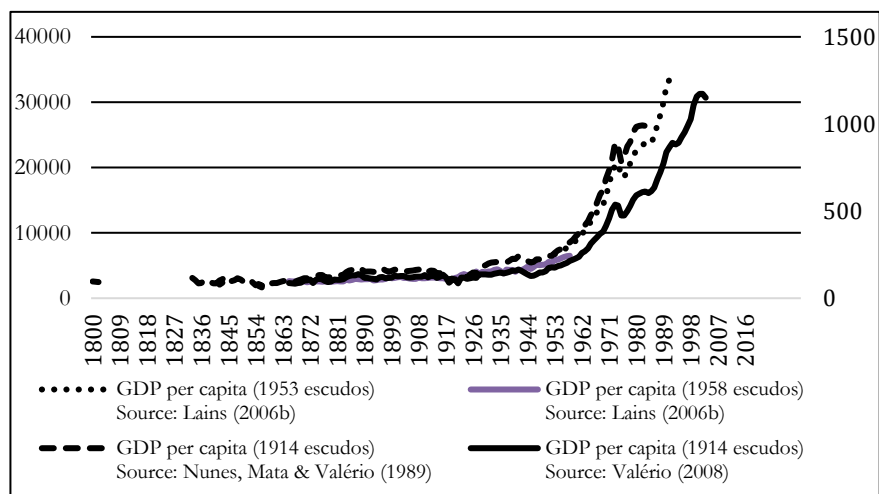


Figure 2: Evolution of the Portuguese real GDP per capita (in escudos)

Source: Own elaboration based on data from Nunes et al. (1989), Lains (2006b) and Valério (2008)

Albeit in Figures 1 and 2 GDP per capita presents an upward trend, it is important to recall that, as it was previously noted, the years of 1850-1890, 1950-1973 and 1986-1992 were the years that Portugal grew the most, while in the rest of the period, growth has been almost anaemic.

Since the Maddison Project Database has the series covering the longest period, we resort to this series, filling in the missing values with linear interpolation, and using the World Bank series to extend it to 2018. Specifically, for the years 1852-1854, 1856-1860 and 1862-1864 we used the annual average growth rate between years of available data and interpolated the missing values. Regarding the years 2016-2018, we used the annual growth rate of the GDP per capita provided by World Bank and fill in the missing values. The resultant series is depicted in Figure 3.

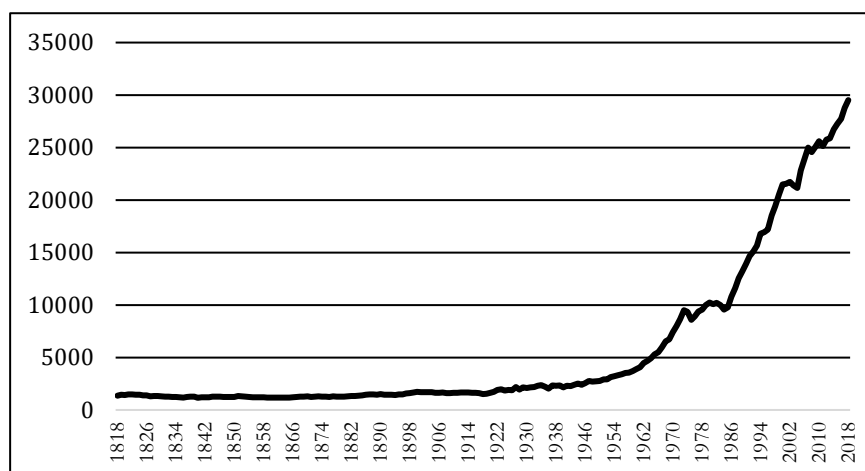


Figure 3: Real GDP per capita in 2011US\$, Portugal, 1818-2018

Note: Missing values were calculated using linear interpolation

Source: Own elaboration based on data from Bolt et al. (2018) and World Bank

3.2.2. Human capital

There are several proxies of human capital present in the literature, such as school enrolment ratios, adult literacy rates, levels of educational attainment, average years of schooling, monetary value of human capital stock and students' international test scores (Teixeira, 2005). However, education attainment is viewed as the best measure, because it is a stock variable, and it contemplates the total amount of the labour force's formal education (Teixeira & Fortuna, 2010). Therefore, average/mean years of schooling will be our measure of the human capital stock.

Three studies/sources provide estimations for the average years of schooling of the working age population for Portugal: Teixeira (2005), from 1960 to 2001; Lee and Lee (2016), from 1870 to 2010; and United Nations Development Programme (2019)⁶, from 1990 to 2018.

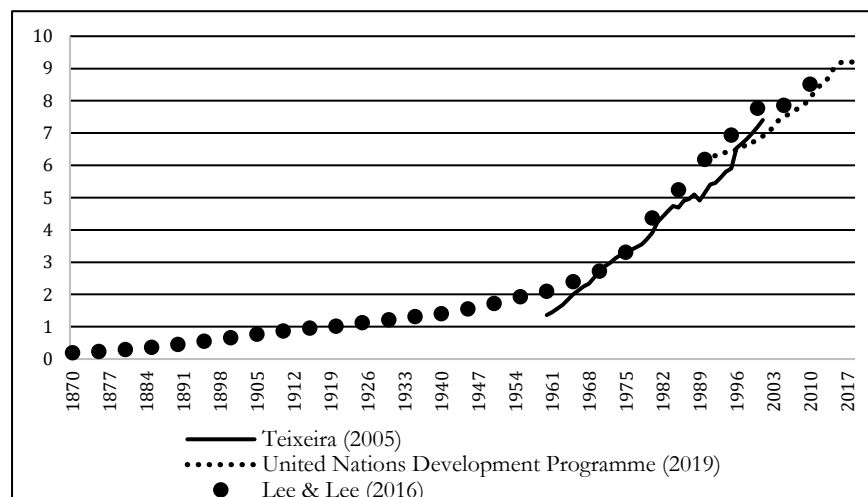


Figure 4: Evolution of the average years of schooling of the working age population, Portugal

Source: Own elaboration based on data from Teixeira (2005), United Nations Development Programme (2019) and Lee & Lee (2016)

All series follow a similar trend (see Figure 4), indicating that the average years of schooling only really took off in the late 1960s. In terms of education, Portugal has always been at the tail of Europe. While in France in 1863, 78% of children aged between 7 and 13 years old attended school, in Portugal that only happened in the 1950s (Candeias, 2005). Only in the 1930/1940s, were the first serious and broad education policies implemented (such as hiring teachers and building schools), and they only started bearing fruits several years later (Nunes et al., 1989). Nevertheless, since the 1980s, Portugal has had a superb evolution in the average

⁶ In <http://hdr.undp.org/en/indicators/103006>, last accessed June 2020.

years of schooling of the working population, which rose from 3 years in 1974, to 9 years in 2018. This result is a consequence of more decisive public investment in education, teacher hiring and the increase of the compulsory years of schooling (Amaral, 2019).

In order to obtain a time series for the whole period in analysis, we combined the Lee and Lee (2016) series (until 1990) with that from the United Nations Development Programme (2019) (from 1990 to 2018), using linear interpolation.

We completed the Lee and Lee (2016) series (which only presented values every five years) from 1870 to 1990, using linear interpolation, by calculating the average annual growth rate between the available data periods. From 1818 to 1870, we used backwards interpolation by calculating the variation growth between 1870 and 1922 (52 years). Finally, from 1990 onwards, we have data from the United Nations Development Programme (2019), from which we retrieved the annual growth rates and filled in the missing values. The result is present in Figure 5.

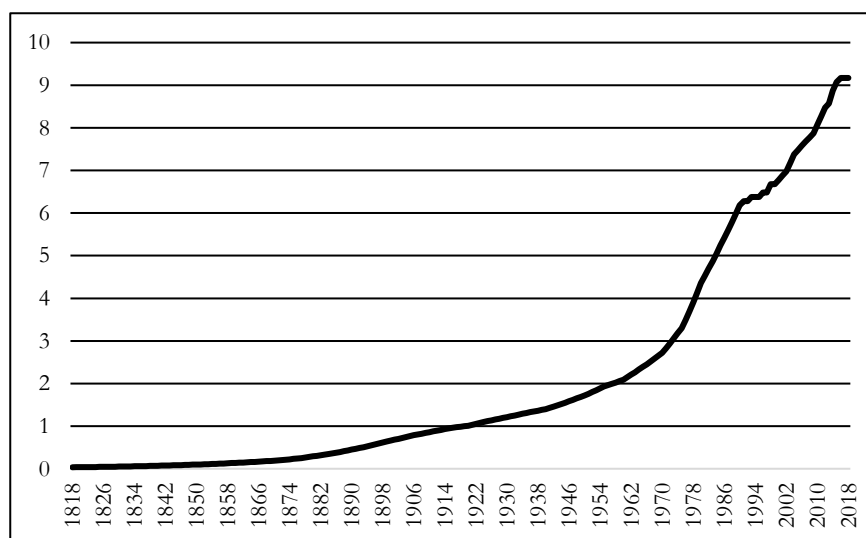


Figure 5: Human capital stock, Portugal, 1818-2018

Note: Missing values were calculated using linear interpolation

Source: Own elaboration based on data from Lee & Lee (2016) and United Nations Development Programme (2019)

3.2.3. Structural change

Structural change refers to shifts in the composition of sectors of an economy, where some industries gain weight, to the detriment of an agrarian rural economy (Syrquin, 1988). To compute these changes, we will resort to the weight of the output of each sector (primary, secondary and tertiary) on the total output of the economy (GDP).

In Lains (2006b), we can find the weight of each sector's output (in % of GDP), between 1851-1992, with missing values between the years 1852-1853, 1857-1860 and 1862-1864. We complete the series with data from Pordata⁷ for the primary sector, which covers the period between 1995 and 2018. The series are depicted in Figures 6,7 and 8.

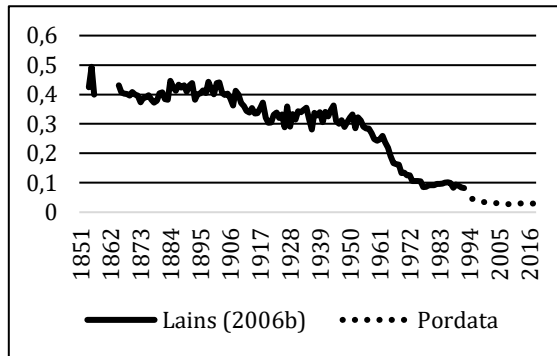


Figure 6: Evolution of the weight of the primary sector (% of GDP), Portugal

Source: Own elaboration based on data from Lains (2006b) and Pordata

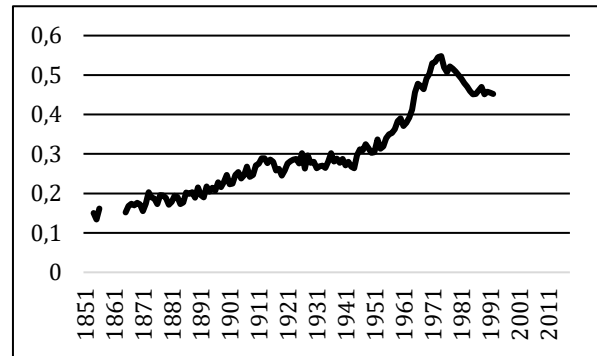


Figure 7: Evolution of the weight of the secondary sector (% of GDP), Portugal

Source: Own elaboration based on data from Lains (2006b)

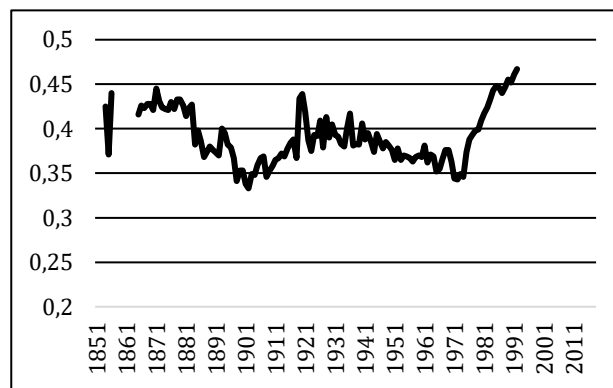


Figure 8: Evolution of the weight of the tertiary sector (% of GDP), Portugal

Source: Own elaboration based on data from Lains (2006b)

The figures show that the Portuguese structural change, that is, the transition from an agrarian and rural to an industrialized society, only started occurring in the 1950s. This happened due to the implementation of policies affecting the growth of the industrial sector, namely the administrative control over large industrial firms and the public contributions to the initial capital of corporations, generating mixed capital enterprises (Nunes et al., 1989).

⁷ In <https://www.pordata.pt/DB/Portugal/Ambiente+de+Consulta/Tabela/5812214>, last accessed June 2020.

In order to obtain a time series for the whole period in analysis, we combine the series from Lains (2006b) with that provided by Pordata. From 1818 to 1851, we have used backwards interpolation by calculating the average annual growth between 1851 and 1884 (33 years). From 1992 to 1995 we used interpolation by calculating the average growth between 1989 to 1992 (3 years). From 1995 to 2018, the growth rates of the weight of the employment in primary sector were extracted from the Pordata and applied into the series from Lains (2006b), in order to fill the missing values. The result is depicted in Figure 9.

Even though the availability of the series for each sector's share on GDP, we opted to resort only to the primary sector's weight on the GDP in our estimations. Given that the three series add up to 100% and that structural change is often assessed by the evolution of the weight (in terms of GDP) of the primary sector we opted to depict only the series from Pordata for the primary sector.

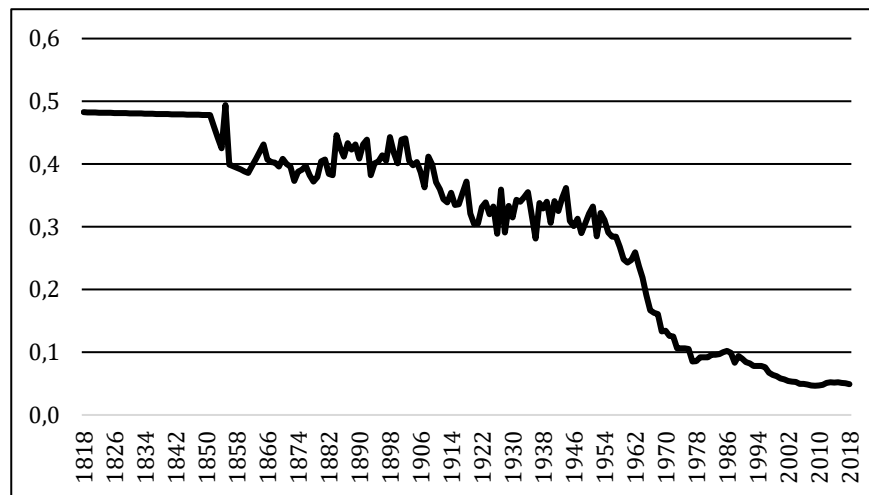


Figure 9: Structural change - weight of primary sector output (in % GDP), Portugal, 1818-2018

Note: Missing values were calculated using linear interpolation

Source: Own elaboration based on data from Lains (2006b) and Pordata

3.2.4. Trade openness

Regarding trade openness, Valério (2008) provides a series for imports and exports in total GDP encompassing the period 1821-2006, with missing values in 1828-1841, 1844-1854, 1857-1860, and 1862-1864. Based on that series we compute the indicator of trade openness, the ratio of exports plus imports to GDP. From 1970 to 2018 we can also find data from

the World bank Indicators⁸ that, albeit being a smaller series (it only covers 48 years), it is useful for extending the Valério (2008) time series.

The resultant series is present in Figure 10. The Portuguese economy remained closed in terms of trade throughout the 19th century, and only began to open to international trade from the 1920s onwards. In fact, Aguiar and Figueiredo (1999) contend that the progressive openness of the economy that happened since the 1920s - with the reduction of import barriers/tariffs and the consequent integration in the European initiatives (EFTA in 1960, and EEC in 1986) - was one of the most important growth factors of Portugal. Hence, from 1800 to 1914 the economy remained closed to international trade, and since then it has been progressively more open to international trade, which has boosted economic growth.

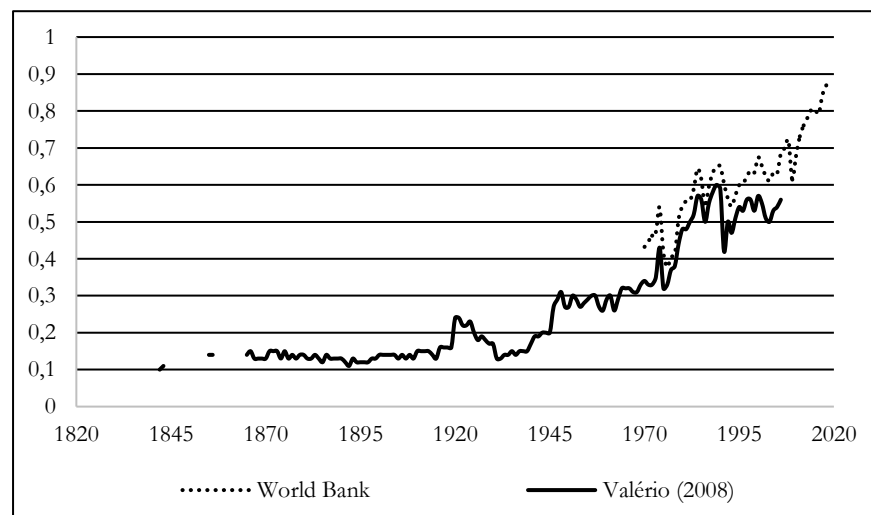


Figure 10: Evolution of trade openness [(exports+imports)/GDP], Portugal

Source: Own elaboration based on data from Valério (2008) and World Bank

In order to obtain a time series for the whole period, from 1818 to 1821 we resorted to backwards interpolation by calculating the variation growth between 1821 and 1824 (3 years). From 1821 to 2006 we used linear interpolation, by calculating the average annual growth rate between the available data periods. From 2006 to 2018, we have used the series from World Bank, which provides the trade openness growth rate, and used it to insert the missing values in the data form Valério (2008). The final time series is represented in Figure 11.

⁸ In <https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS>, last accessed June 2020.

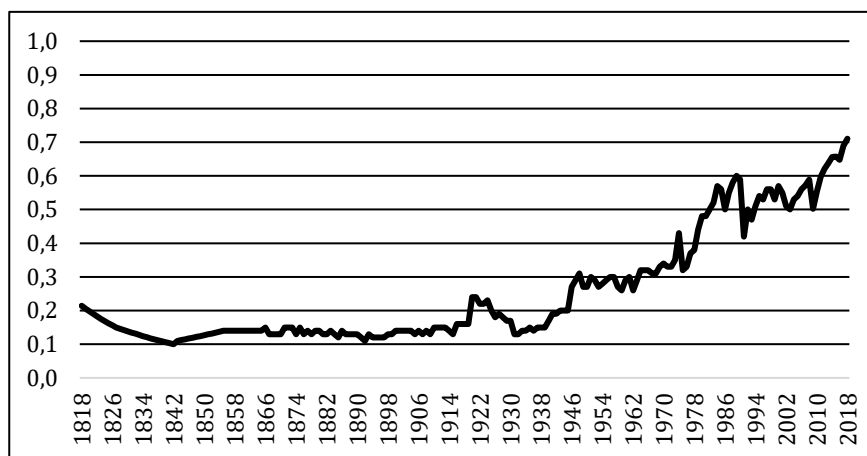


Figure 11: Trade openness, Portugal, 1818-2018

Note: Missing values were calculated using linear interpolation

Source: Own elaboration based on data from Valério (2008) and World Bank

3.2.5. Institutions

Not only is ‘institutions’ a complex concept, but also its measurement encompasses an intricate task, due to the lack of a solid theoretical framework and limited amount of data. Notwithstanding, we found six different series that capture three dimensions of institutions: a) enforcement of contracts and property rights; b) political regimes and authority; c) executive constraints. We only show a graph for the first variable because the graphical interpretation of the other two variables is somewhat nonsensical.

Having three variables allows us to estimate three potentially different models and assess which dimension of institutions emerges as significantly correlated and/or impacts greatly the Portuguese long run economic growth.

Enforcement of contracts and property rights

We resort to a series containing a proxy called “Contract-Intensive Money” (CIM) index (Clague et al., 1999), already explained in Section 2.4.2. Clague et al. (1999) argue that in societies with inferior institutions, there is less protection of property rights and enforcement of contracts, which makes the financial intermediaries seem less safe to people, leading them to prefer currency over deposits or bank transfers (M_2) – and therefore lowering the ratio of CIM: $(M_2 - C)/M_2$. On the other hand, the authors hold that if institutions do not guarantee the enforceability of contracts, banks might impose higher charges, which can result in the creation of black markets, and again, lower the ratio of CIM. In short, higher levels of CIM

translate into the increasing ability of institutions and governments to enforce contracts and secure property rights.

The specific data used for CIM is from Madsen, Wang, and Steiner (2017) who present a series for CIM for the Portuguese economy, from 1870 to 2011. This series was completed with the series for M_2 and C from Banco de Portugal,⁹ available from 1997 to 2018, with subsequent calculation through the formula proposed by Clague et al. (1999).

In Figure 12 we present both series, which show an upper trend, consonant with the increasing complexity of the banking system in Portugal (which started in the 1850-1890 period), and the progressive institutional improvements of the 20th century (Nunes et al., 1989).

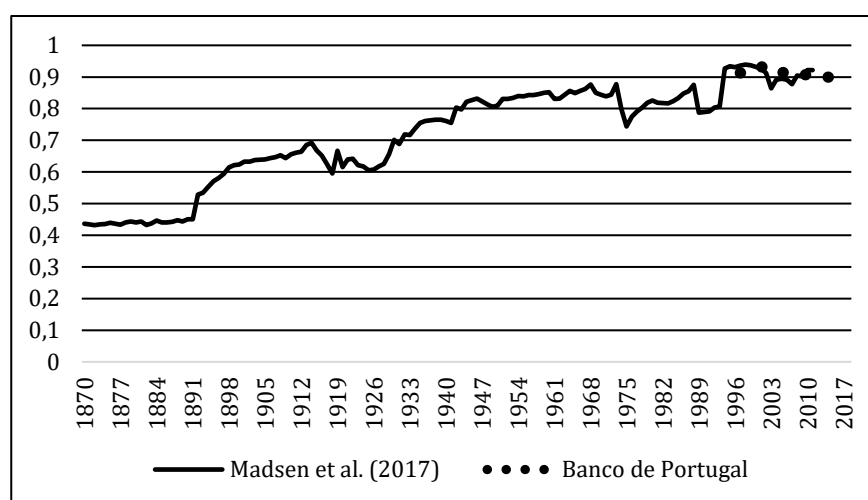


Figure 12: Evolution of the Institutions - contract-intensive money (proxy for enforcement of contracts and property rights), Portugal

Source: Own elaboration based on data from Banco de Portugal and Madsen et al. (2017)

We had to proceed with the interpolating of the series from Madsen et al. (2017), as the series was only available from 1870 to 2011. From 1818 to 1870, we have used backwards interpolation by calculating the variation growth between 1870 and 1922 (52 years). From 2011 to 2018, the growth rates of both M_2 and C were extracted from the Banco de Portugal series, and CIM was computed according to the formula proposed by Clague et al. (1999). The complete time series is present in Figure 13, below.

⁹ In <https://www.bportugal.pt/sites/default/files/anexos/b01.csv>, last accessed June 2020.

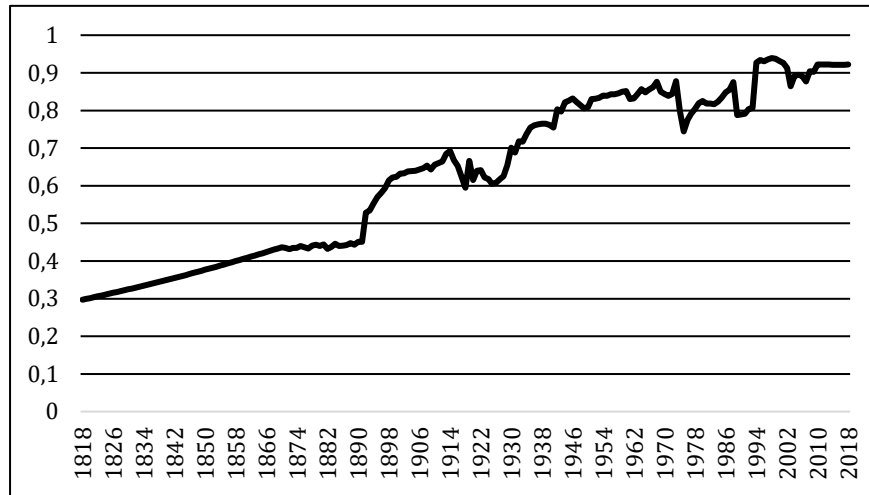


Figure 13: Institutions - contract-intensive money (proxy for enforcement of contracts and property rights), Portugal, 1818-2018

Note: Missing values were calculated using linear interpolation

Source: Own elaboration based on data from Banco de Portugal and Madsen et al. (2017)

Political regimes and authority

In regard to political regimes and authority types, we have four different series (see Table 5): Polity2 (the 2020 updated version of the Polity5 Dataset by Marshall, Gurr, and Jaggers (2020); Democratization; BMR dichotomous index of Democracy; and Lexical index of electoral democracy.

We opted for Polity2 measure since it is the most holistic measure of political regimes and democratic institutions, and does not focus only on one factor, contrarily to the index of Skaaning, John, and Henrikas (2015). Moreover, the index does not come from a dubious multiplication, like the one from Vanhanen (2019), allowing for better validation. Lastly, it is not dichotomous, like the one from Boix, Miller, and Rosato (2018), which facilitates the capture of more subtle differences in the very long run.

Polity2 is a composite variable originated from the subtraction of the Autocracy variable score from the Democracy variable score. It ranges from -10 (full autocracy) to 10 (full democracy), and higher values of Polity2 represent better institutions. The Democracy variable assesses democratic components of a political regime and the presence of an institutional democracy, and it is composed by four sub-indices: 1) competitiveness of executive recruitment; 2) openness of the executive recruitment; 3) constraints on chief executive; 4) competitiveness of political participation. As for Autocracy, it measures autocracy components of a political regime and includes the first three sub-indices, with the

inclusion of two more: 1) regulation of participation; 2) competitiveness of participation (which has more to do with repression).

Table 5: Comparison of alternative political regimes proxies

Source	Proxy	Range	Description	Advantages	Disadvantages
Polity5 (Marshall et al., 2020)	Polity2	From -10 (full autocracy) to 10 (full democracy)	If there exist: 1. Institutions and civic procedures 2. Institutionalized executive constraints 3. Civil liberties and political participation	Complexity and presence of different measures of institutional democracies	Different regimes might have the same overall score (due to the fact of being a simple subtraction)
Vanhanen Polyarchy Dataset (Vanhanen, 2019)	Democratization	From 0 (full autocracy) to 1 (full democracy)	Degree of political competition and electoral participation	It ranges from 0 to 1 allows for accounting the long run changes in regimes	Dubious calculations that make the final value questionable
Boix et al. (2018)	BMR dichotomous index of Democracy	0 (non-democratic) 1 (democratic)	Degree of contestation and participation	Simplicity	It may not capture regime changes throughout time, and its complexity
Skaaning et al. (2015)	Lexical index of electoral democracy	From 0 (no elections) to 6 (minimally competitive, multiparty elections with universal suffrage for legislature and executive)	Six different levels of democracy, each coding a different regime type	Complexity and encapsulation of subtle changes in regimes	Only focuses on the electoral component of democracy, missing out other important features

Source: Own elaboration

Evidently, Polity2 has its limitations, and the biggest one is the lack of explication for the final score of a given country. We do not know exactly what makes a country with a Polity2 index score of 3, better than the one with a 1, since it can be various things, for instance it might have a Democracy score of 5 (8) and an Autocracy score of 2 (5) (Skaaning et al., 2015). Nonetheless, it is the most used measure of political regime/authority, and it may be useful to assess the impact of institutionalized democracy on growth.

In regard to the Portuguese economy, it presents almost always a negative Polity2 score (representing an autocratic regime) from 1820s until the democratic revolution of 1910. After that, it remains on the democratic side until the dictatorship of “Estado Novo”, which lasted until 1974. From that moment on, it remained with either score 9 or 10 (highest scores

possible of institutionalized democracy), which is an indicator that according to Marshall et al. (2020) Portugal has been a full democracy for many years.

One final note is due. Before 1820, there are some missing values which represent the years when Portugal was occupied by France and Britain. In our analysis we compute the value 0 for those two years (1818 and 1819).

Executive constraints

The series for the executive constraints, “Execonst” (originally named “xconst”), also comes from the Polity5 Dataset (Marshall et al., 2020). It reflects the existence of rules and institutionalized constraints on power that provide criteria under which decisions should be made. It is coded from 1 (unlimited authority) to 7 (executive parity or subordination), and higher values represent better institutions. There are three standardized authority scores: a) -66, in cases of foreign interruption, when for instance the country is invaded; b) -77, in cases of interregnum or anarchy, which yield a Polity2 score of 0; c) -88, in cases of transition of democratic regimes.

The series is available yearly for the period between 1800 and 2018. Portugal has a score of -66 during the French and British invasions, until 1819, and then a score of -88 in the transition years. After that, Portugal has had almost always a score of 7 in the democratic periods (1911-1925; 1976-2018), and low scores on the periods of dictatorship. Again, according to Marshall et al. (2020), Portugal has been a full democracy, with executive parity or subordination for many years.

The descriptive statistics present in Table 6 show us that the average Portuguese GDP per capita is very low, being much closer to the minimum value, than the maximum. This means that, as already discussed, for a very long time Portuguese output remained stagnant and low. The most impressive descriptive statistic is the mean of human capital, which is only 2. This means that in Portugal, from 1818 to 2018, in average, a person studied 2 years! As for structural change, the mean is much closer to the maximum than to the minimum, which shows the Portuguese late sector transition and consequent overdue structural change. Trade openness also has a very low average, revealing the consequences of the constant barriers to international trade in the 19th and most of the 20th centuries. As for institutions, it is

complicated to classify the average of CIM due to the fact that the widespread use of the banking system is somewhat a recent phenomenon. As for Polity2, it shows alarming signals that were previously announced. Throughout these 200 years, Portugal has not showed a democratic system most times, with an average of -1.229, that is, Portugal is on the autocracy side. Finally, we cannot make sound interpretations for Execonst from the descriptive statistics - in a scale from 1 to 7 the mean is negative due to the existence of the standardized negative values already explained.

Table 6: Variables description and source of data

Variable		Description	Source of data	Mean	Min	Max
GDP per capita		Gross domestic product at constant 2011 prices per inhabitant (in dollars).	Maddison Project 2018 (Bolt et al., 2018); World Bank	5615.388	1160	29518
Human capital		Average years of schooling (ISCED 1 or higher), population 25+ years, both sexes	Lee and Lee (2016); United Nations Development Programme (2019)	2.070	0.034	9.170
Structural change		Shifts in the composition of sectors of an economy, measured by weight of the primary sector's output in total GDP	Lains (2006b); Pordata	0.308	0.047	0.494
Trade openness		(Imports+Exports)/GDP	Valério (2008); World Bank	0.254	0.100	0.710
Institutions	CIM - Contract-intensive money	Proxy for enforcement of contracts and property rights through the formula: $(M_2 - C)/M_2$	Clague et al. (1999)	0.632	0.297	0.939
	Polity2	If there exist: 1. Institutions and civic procedures 2. Institutionalized executive constraints 3. Civil liberties and political participation	Polity5 Dataset (Marshall et al., 2020)	-1.229	-9	10
	Execonst	Limitation of power by institutions	Polity5 Dataset (Marshall et al., 2020)	-1.711	-88	7

Source: Own elaboration

4. Empirical Results

4.1. Unit root tests

We begin the analysis by assessing whether the relevant variables are stationary or not and their order of integration (that, is, the number of unit roots they have).

A visual analysis (see Figure A1 in the Appendix) suggests that the variables in levels present a trend, implying that their means and/or variances change over time, and thus, they are not stationary. Nonetheless, they do not seem to present a trend in their first differences. In other words, they have one unit root or are integrated of order one, $I(1)$.

Table 7: Non-stationarity tests of the series under study

	Augmented Dickey-Fuller test (p-value)	Phillips-Perron test (p-value)
Levels		
GDP per capita	-1.169 (0.917)	-0.925 (0.953)
Human capital	-1.418 (0.856)	-0.574 (0.980)
Structural change	-0.841 (0.962)	-0.975 (0.947)
Trade openness	-2.835 (0.185)	-2.973 (0.140)
Institutions – CIM	-1.418 (0.856)	-1.507 (0.827)
Institutions – Execonst	-7.071*** (0.000)	-7.696*** (0.000)
Institutions – Polity2	-1.847 (0.682)	-1.908 (0.651)
First differences		
GDP per capita	-4.305*** (0.000)	-13.482*** (0.000)
Human capital	-2.395 (0.382)	-3.354* (0.058)
Structural change	-4.962*** (0.000)	-18.517*** (0.000)
Trade openness	-11.632*** (0.000)	-16.658*** (0.000)
Institutions – CIM	-9.539*** (0.000)	-15.103*** (0.000)
Institutions – Execonst	-9.331*** (0.000)	-19.059*** (0.000)
Institutions – Polity2	-7.453*** (0.000)	-16.594*** (0.000)

Note: ***(**) statistically significant at 1% (5%); all variables are in logarithm; for each variable the lag-length selection in ADF test was based on the information criteria provided in varsoc command (Stata): final prediction error (FPE), Akaike's information criterion (AIC), Schwarz's Bayesian information criterion (SIC), and the Hannan and Quinn information criterion (HQIC).

Source: Own computation using Stata 14.2.

The Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1981) and the Phillips-Perron (Phillips & Perron, 1988) tests confirm that, excluding the variable ‘Institutions – Execonst’, all the remaining variables are non-stationary in levels. For both tests the null hypothesis that there is one-unit root cannot be rejected when we consider the variables in levels but are rejected when we consider the variables in their first differences. In the case of ‘Institutions – Execonst’ ADF and PP tests reject the null hypothesis that the series in level has one unit root, that is, is non-stationary in levels. Thus, this series is integrated of order zero, $I(0)$.

Hence, excluding the variable ‘Institutions – Execonst’, all the remaining variables are $I(1)$, and therefore the series may be cointegrated in the long run. This means that the series can have one or more stationary linear combinations, and the variables can have a stable long-term relationship between them. In the next step, and for the $I(1)$ variables, we investigate how many cointegration vectors exist and estimate their normalized specification resorting to the methodology proposed by Johansen (1988).

4.2. Johansen cointegration test

Having assessed that all series (excluding Institutions – Execonst’) are integrated of the same order, $I(1)$, we now proceed to the Johansen cointegration test (Johansen, 1988), to identify the number of cointegration vectors (see Table 8).

Table 8: Johansen cointegration test with the variable

	Number of cointegration vectors (r)	Trace statistic	5% critical value
Model 1 Institutions - CIM	None	101.838***	87.310
	At least 1	59.554	62.990
Model 2 Institutions - Polity2	None	74.546***	68.520
	At least 1	43.826	47.210

Notes: ***(**)[*] statistically significant at 1%(5%)[10%]. Trace test is a Johansen cointegration test for the null hypothesis that, among GDPpc (ln) and Institutions (ln) [plus Human capital (ln), Structural Change (ln), and trade openness (ln)], there are r linearly independent cointegration relations, that is, the 5 variables share $5-r$ stochastic tendencies;

** represents the rejection of the null hypothesis that among the 5 variables there are r linearly independent cointegration relations (compared to the alternative that there are $r+1$ linearly independent cointegration relations) with a 5% statistical significance.

Source: Own computation using Stata 14.2.

For both VAR models (Model 1: including the real GDP pc, institutions - contract-intensive money (CIM), human capital, structural change and trade openness; and Model 2: including

GDP pc, institutions - polity2, human capital, structural change and trade openness), the Johansen test assumes a trend in the series with an intercept in the cointegration relation and uses two lags in levels (as suggested by the *varsoc* command). In Stata 14.2 we use *vecrank* command to determine the number of cointegrating equations using Johansen's multiple-trace test method. To determine the number of cointegrating relations r conditional on the assumptions made about the trend, we can proceed sequentially from $r=0$ to $r=k-1$ until we fail to reject. The result of this sequential testing procedure is reported in Table 8. The trace statistic reported tests the null hypothesis of r cointegrating relations against the alternative of k cointegrating relations, where k is the number of endogenous variables, for $r=0, 1, ..k-1$. The alternative of k cointegrating relations corresponds to the case where none of the series has a unit root and a stationary VAR may be specified in terms of the levels of all of the series.

Because in VAR Model 1 the trace statistic at $r=0$ of 101.838 exceeds its critical value of 87.310, we reject the null hypothesis of no cointegrating equations. In contrast, because the trace statistic at $r=1$ of 59.554 is less than its critical value of 62.990, we cannot reject the null hypothesis that there are one or fewer cointegrating equations. Because Johansen's method for estimating r is to accept as $\hat{r}$ the first r for which the null hypothesis is not rejected, we accept $r=1$ as our estimate of the number of cointegrating equations between the five variables. For the VAR Model 2, the outcome is similar, with one cointegration equation.

The structural regression to be estimated involves a relationship (in logarithms) between real GDP per capita (gdp pc), institutions (inst), human capital stock (hc), structural change (sc) and trade openness (to) for the Portuguese economy over a two hundred period (1818-2018), expressed by

$$gdp\ pc_t = \beta_1 + \beta_2 inst + \beta_3 hc + \beta_4 sc + \beta_5 to + \mu_t \quad (2)$$

In cointegration notation, using (2), the vectors of potentially endogenous variables z_t and the normalized cointegrating vector β can be represented as

$$z_t = (gdp\ pc_t\ inst_t\ hc_t\ sc_t\ to_t); \beta = (1 - \beta_2 - \beta_3 - \beta_4 - \beta_5); \quad (3)$$

Specifically, we estimate two regressions, one in which the 'Institutions' variable is proxied by Contract-Intensive Money (CIM) and the other in which 'Institutions' variable is proxied by Polity2.

Table 9 reports the estimates of the parameters in the cointegrating equations, along with their standard errors. Overall, the output indicates that the models fit well. The coefficient on institutions in the cointegrating equation is statistically significant.

Table 9: Normalized cointegration coefficients/long-term relations between GDP per capita and institutions, human capital, structural change and trade openness, Portugal, 1818-2018

	VECM 1 [Intitutions=CIM]		VECM 2 [Institutions=Polity2]	
Institutions	2.059*** (0.568)		0.901*** (0.203)	
Human capital	-0.410* (0.206)		-4.880*** (1.175)	
Structural change	-1.403*** (0.168)		0.856 (0.667)	
Trade openness	0.305* (0.179)		-2.457*** (0.684)	
Lags	2		3	
Number of cointegrating vectors	1		1	
Cointegration vector	Trend		Trend	
No. observations	199		198	
Log Likelihood	2109.164		1637.696	
Equation	R ²	Chi (p-value)	R ²	Chi (p-value)
D_GDP per capita	0.308	85.188 (0.000)	0.310	83.112 (0.000)
D_Institutions	0.132	41.382 (0.000)	0.147	31.984 (0.002)
D_Human Capital	0.967	5583.562 (0.000)	0.972	6367.164 (0.000)
D_Structural Change	0.153	49.982 (0.000)	0.250	61.510 (0.000)
D_Trade Openness	0.102	25.621 (0.001)	0.167	36.860 (0.000)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. All variables are in logarithm; The number of lags was established according to the Schwarz's Bayesian information criterion (SIC).

Source: Own computation using Stata 14.2.

The results support the fact that each cointegrating equation (for Model 1 and 2) should be a stationary series. As referred, the identification of the parameters in the cointegrating equations is achieved by constraining the GDP per capita to be normalized to 1.

The results show that improved institutions (proxied by the Contract-intensive money or Polity2) are associated with increased real GDP per capita, when we control for human capital, structural change and trade openness. Specifically, according to the long run cointegration of VECM 1, an increase in 1% in institutions, most notably in Contract-Intensive Money (CIM), is associated with a statistically significant increase of 2.1% in real

GDP per capita. When the ‘institutions’ variable is proxied by Polity 2 (Model 2), the corresponding increase is smaller but significant and positive, reaching 0.9%. Both results are in line with the theoretical and empirical studies.

On the theoretical side, better enforcement of contracts and security of property rights lead to higher levels of CIM (Clague et al., 1999), and better and more independent institutions and an overall democratic system yield better Polity2 scores, and both should lead to economic growth. On the empirical side, Corujo and Simões (2012) study through cointegration and Granger causality tests the relationship between Polity2 and growth in Portugal, between 1960 and 2001, and reach to the same results. Yanovski and Shulgin (2013) also assess that democracy – using several proxies including Polity2 - leads to economic growth of multiple countries in the very long run (1820-2000). As for CIM, we reach to similar results as Clague et al. (1999), who study 96 countries between 1960 and 1990 through OLS estimation, and argue that each standard deviation increase in CIM would be associated with an increase in GDP per capita growth of one percentage point. Our results, albeit not referring to GDP growth but levels, show an effect of CIM on GDP per capita even higher.

As for human capital, despite being statistically significant in both models, it has an opposite sign to the one expected. This result goes against the vast literature on the subject, and the conclusions of Amaral and Cabral (1998) and Teixeira and Fortuna (2004) – the latter even apply the same cointegration technique as we do - who study the Portuguese economy respectively between 1951-1973 and 1960-2001, and assess that increases in human capital stock were fundamental to the increase in productivity and growth. According to our results, an increase in 1% in the average years of schooling is associated with a decrease of 0.4% in GDP in Model 1, and 4.9% in Model 2. One possible justification for this result is the human capital mismatch. In transition economies (such as the Portuguese in the 19th and most of the 20th centuries), there might be a mismatch between qualifications (supply side) and job offers (demand side) which can generate an inefficient allocation of workers in functions other than the ones they studied for (Druska, Jeong, Kejak, & Vinogradov, 2002). This mismatch can be in terms of levels (people are overqualified for the jobs available) or in terms of types (for instance if there is a large demand for teachers, but only engineers are being formed). The consequences are lower productivity and output, and thus, this could explain our results.

In what concerns structural change, it is only significant in Model 1, and has the expected negative sign. According to our results, a decrease of 1% in the weight of the primary sector's output is associated with an increase of 1.4% in GDP per capita over the period in analysis (1818-2018). That is expected, as a decrease in the output of the primary sector (in % of GDP) tends to promote growth due to the higher productivity associated with the industrial sector (Teixeira & Queirós, 2016).

Lastly, regarding trade openness, it is statistically significant in both Models, but the expected positive sign is only present in Model 1. Increased trade openness should promote growth by facilitating the adoption of technologies, a more efficient use of resources, increase in specialization and enlargement of available markets (Grossman & Helpman, 1991; Coe et al., 2009). According to the results of Model 1, an increase of 1% in trade openness is associated with an increase of 0.31% of the GDP per capita. This is aligned with the results obtained by Ramos (2001), who resorting to cointegration and Granger causality tests finds that increased trade is associated with a higher Portuguese GDP between 1865 and 1998. According to the results of Model 2, an increase of 1% in trade openness is associated with a decrease of 2.5% of the GDP per capita. One possible explanation might be due to the effects that must have been captured by other variables.

These results obtained provide a picture of the long run association between the selected series for the Portuguese economy between 1818 and 2018. From that we cannot explicitly infer about causality between the variables. In order to assess the existence and direction of causality, we perform the Granger causality test (Granger, 1969).

4.3. Granger causality test

Granger (1981) put forward that when we find one or more time-series cointegrated, then there must exist a Granger causality between them, either one-way or both directions. Thus, in order to assess the causality of the long run relations between the variables, we proceed to a Granger causality test (Granger, 1969).

For the case of our core time series, real GDP per capita (*gdp pc*) and institutions (*inst*), *inst* is said to Granger-cause *gdp pc* if the latter can be better predicted using the histories of both *inst* and *gdp pc*. Accordingly, we can test for the absence of Granger causality by estimating the following vector autoregressive model (VAR) with p lags:

$$gdp\ pc_t = \alpha_0 + \alpha_1 gdp\ pc_{t-1} + \dots + \alpha_p gdp\ pc_{t-p} + \gamma_1 inst_{t-1} + \dots + \gamma_p inst_{t-p} + \mu_t \quad (4)$$

$$inst_t = \delta_0 + \delta_1 inst_{t-1} + \dots + \delta_p inst_{t-p} + \theta_1 gdp\ pc_{t-1} + \dots + \theta_p gdp\ pc_{t-p} + \omega_t \quad (5)$$

Thus, testing $H_0: \gamma_1 = \gamma_2 = \dots = \gamma_p = 0$ against H_1 : ‘Not H_0 ’, is a test that *inst* does not Granger cause *gdp pc*. Likewise, testing $H_0: \theta_1 = \theta_2 = \dots = \theta_p = 0$ against H_1 : ‘Not H_0 ’, is a test that *gdp pc* does not Granger cause *inst*. In each case, a rejection of the null hypothesis implies there is Granger causality. The results are present in Table 10. For each column, and from left to right, institutions were proxied by CIM (Model 1), and polity2 (Model 2).

Table 10: Granger causality test

Null hypothesis	Model 1 CIM	Model 2 Polity2
Inst does not Granger cause GDP pc	3.333 (0.189)	0.115 (0.944)
Inst does not Granger cause HC	2.662 (0.264)	5.274* (0.072)
Inst does not Granger cause SC	2.436 (0.296)	10.745*** (0.005)
Inst does not Granger cause TO	4.899* (0.086)	3.912 (0.141)
HC does not Granger cause GDP pc	1.720 (0.423)	1.807 (0.405)
SC does not Granger cause GDP pc	21.907*** (0.000)	20.542*** (0.000)
TO does not Granger cause GDP pc	2.675 (0.262)	3.221 (0.200)
GDP pc does not Granger cause Inst	3.705 (0.157)	5.273* (0.072)
HC does not Granger cause Inst	2.195 (0.334)	3.961 (0.138)
SC does not Granger cause Inst	4.220 (0.121)	1.719 (0.423)
TO does not Granger cause Inst	5.864* (0.053)	0.681 (0.712)

Note. *** (**) [*] statistically significant at 1% (5%) [10%]; p-values in brackets.

Source: Own computation using Stata 14.2.

Results evidence that in the very long run, institutions do not Granger cause directly GDP per capita, for any of the two different proxies used for institutions. Nonetheless, we have a confirmation of the indirect impact of institutional dimensions on economic growth, through improvements in human capital and structural change – for Polity2 - and trade openness – for CIM. This validates the argument made by several authors that beneath the more traditional growth factors (human capital, physical capital and technological

change/innovation), institutions surface as the main propulsors of growth. Accordingly, we find that institutions (proxied by Polity2) Granger cause human capital and structural change. Without democratic institutions and the protection of property rights, there are no incentives to invest in human capital, or adopt more efficient technologies that permit the transition of agriculture to industry (Acemoglu et al., 2005). We further find that there is a bi-directional Granger causality between institutions (proxied by CIM) and trade openness. This is aligned with the theory, since increasing trade openness leads to the enlargement of markets (Grossman & Helpman, 1991), which means that increasing agents participate in trade, creating a need for the enforcement of contracts and security of property rights that guarantee trust and predictability, which in turn will foster trade activities and gains from trade (Clague et al., 1999).

In terms of the direct causality between institutions and GDP per capita, the lack of evidence is not a shocking result. First, institutionalists do not hold that the influence of institutions on growth is direct (and they sometimes even disagree on the channel through which they operate), but rather that better institutions are associated with higher growth and development (Leite et al., 2014), and that was confirmed in our cointegration test results. Secondly, if institutions are indeed the “rules of the game”, then it is expected that they promote growth indirectly, by allowing players of the game (the other determinants, agents and their interactions) to play, rather than rules playing the game themselves.

Regarding the inverse relationship, we find that GDP per capita Granger causes institutions (proxied by Polity2). This is consistent with the theory, since in developed countries, people with higher/better education tend to resolve disputes in a more democratic way and engage in civic activities, all of which can yield to the emergence of democratic institutions (Glaeser, La Porta, Lopez-de-Silanes, & Shleifer, 2004). Albeit this, we cannot verify empirically this view, as we find that human capital (proxied by mean years of schooling) does not Granger cause any dimension of institutions considered. Our results are different from those achieved by Corujo and Simões (2012), who found a bi-directional Granger causality running between Polity2 and GDP in Portugal, between 1960 and 2001, but the longer time period might explain this fact.

We did not find evidence of human capital and trade openness to have Granger caused GDP per capita. We can only offer an explication for human capital, which can be due to the lack of available data and the consequent numerous interpolations performed that can lead to

econometric problems, such as size distortions (Ghysels & Miller, 2014) or to the late investment in the Portuguese's education levels, that remained low until the late 19th century (Teixeira & Fortuna, 2004), contributing little in the totality of the 200 years considered.

Lastly, in the very long run, structural change Granger causes GDP. This is coherent with the study done by Stolz et al. (2013) who argue that urbanization positively impacted the Portuguese GDP from 1720 to 1910. In addition, Lains (2003b) put forward that structural change was also fundamental to the Portuguese economic growth after 1920.

Summing up, the results support the argument made by Acemoglu et al. (2001, p. 1369) that “institutions matter”, as they are correlated with economic growth. Moreover, we find that institutions promote development indirectly, operating through the channels of structural change, trade openness and human capital.

5. Conclusion

Human and physical capital, technological change and innovation are essential to promote growth. However, they do not appear out of nowhere. Without freedom, security of property rights, enforcement of contracts, democracy, executive constraints and rule of law, all of which are institutional dimensions, people do not have enough security to carry out economic transactions. Institutions are the “rules of the game” that we as a society play, and in which we can interact, invest, innovate and foster economic growth (North, 1989, p. 1321).

The present dissertation had as its main objective to assess the impact of institutional factors on the Portuguese economic growth from 1818 to 2018. We started by undertaking a brief historical overview of the Portuguese economy from 1800 to 2018. Then, we carried on a detailed revision of the determinants of economic growth, both theoretical and empirical, and assembled them together in four categories: 1) knowledge endowments – human capital and knowledge; 2) technological change and innovation; 3) natural resources and geography; 4) institutions. We then proceeded to the estimations, using the Johansen cointegration test and the Granger causality test. Institutions were measured by two distinct dimensions of institutions: enforcement of contracts and security of property rights, proxied by Contract-Intensive Money (CIM), and political regimes/authority, proxied by Polity2.

The results of the cointegration tests suggest that in the very long run, when controlled for human capital, structural change and trade openness, an increase in 1% in institutions - contract-intensive money (CIM) is associated with a statistically significant increase of 2.1% in real GDP per capita, and when the ‘institutions’ variable is proxied by Polity2, the corresponding increase is smaller but significant and positive, reaching 0.9%. The results of the Granger causality tests further show that there is an indirect impact of institutional dimensions on economic growth, through improvements in human capital and structural change – for Polity2 - and trade openness – for CIM. We also found that real GDP per capita Granger caused institutions – Polity2, which means that in the very long run, and according to our data, economic growth favours the transition to democratic political regimes. Lastly, we did not find evidence of a direct Granger causality running from institutional dimensions to economic growth.

The results of this study contribute to the existing literature by evidencing that, in the very long run (200 years considered), institutions foster economic growth through improvements

in human capital, structural change and trade openness. Additionally, we are able to put forward that in the very long run economic growth promotes the development of democratic institutions and political regimes.

Our results have some important implications for economic policy and economic research. The correlation between institutions and economic growth in the long run implies that better institutional quality, in this case more democratic regimes and better enforcement of contracts and security of property rights, should be a top priority in developing countries, for the reason that it can lead to structural change, higher human capital stock and increasing trade openness, all of which can yield economic development. Albeit having already understood this connection, institutionalists have not yet been capable of producing a crystal-clear institutional framework that can provide a theoretical baseline to develop ever increasing measurements of institutions. It is this lack of clarification of a conceptual framework that hinders empirical results. Lastly, having found that institutions mattered for the Portuguese growth in the last 200 years, it would be interesting to do comparative studies with other nations, for the same time period, and assess what exactly explains why some countries are able to create better institutions than others.

Notwithstanding the contribution to the literature, this dissertation has some limitations. First, the data for most variables does not have continuous series, which means that we had to resort to interpolation techniques to fill in the missing values. This can lead to econometric problems such as size distortion (Ghysels & Miller, 2014). Second, we analyse the whole period, which was the aim of the study. However, further studies could separate the series into smaller periods and assess the robustness of our results. Third, one of the proxies for institutions, executive constraints, was stationary in the levels and therefore excluded from the cointegration analysis. Alternative methods, namely the use of ARDL models could be implemented to account for series with distinct order of integration in order to verify if the results would remain the same. Finally, despite proving that institutions matter for growth, we are not in position to state which institutions matter the most for economic growth, and how they should be developed. We cannot even start by discerning why some countries have better institutions than others. This is, in fact, the most important task ahead if we want to understand how to promote institutions, in order to reduce the ever-growing inequalities, and encourage sustainable and lasting economic growth.

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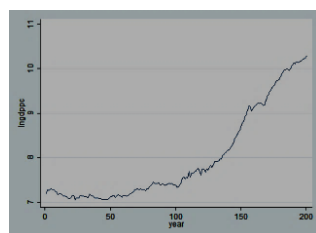
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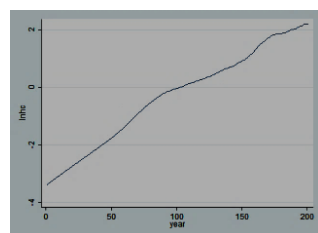
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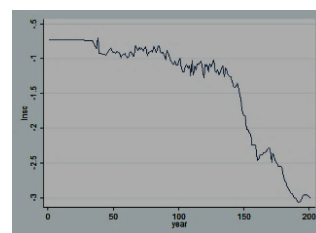
Appendix



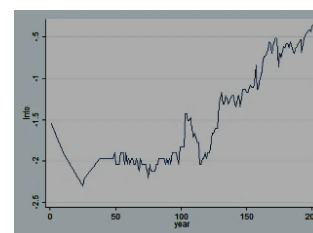
GDP per capita - levels



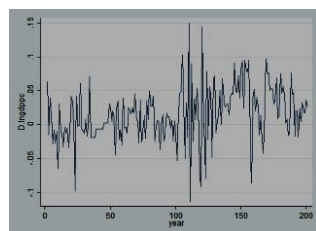
Human capital - levels



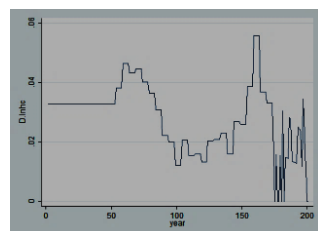
Structural change - levels



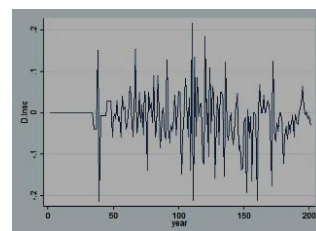
Trade openness - levels



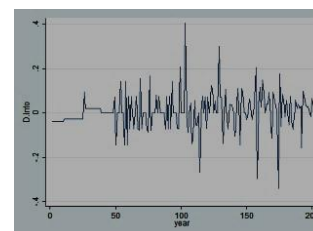
GDP per capita - first differences



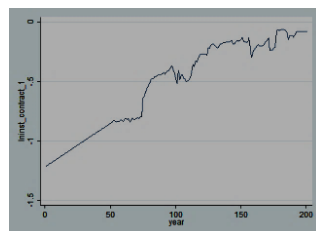
Human capital - first differences



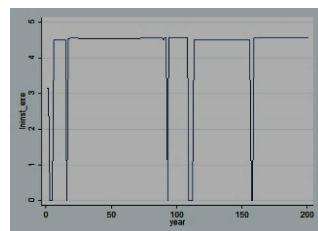
Structural change - first differences



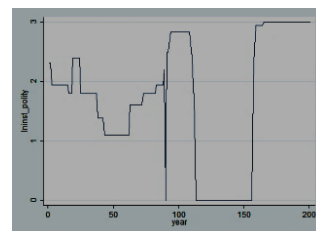
Trade openness - first differences



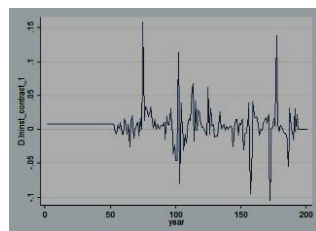
Contract-intensive money - levels



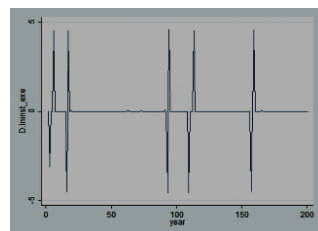
Executive constraints - levels



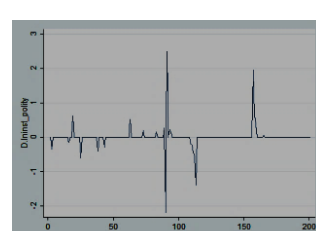
Polity2 levels



Contract-intensive money - first differences



Executive constraints - first differences



Polity2 - first differences

Figure A 1: Time series of the relevant variables in levels and differences

Note: The images were drawn from Stata 14.2. All variables are in logarithms.