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Historical roots of municipalities development: the Portuguese case

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Abstract

The development literature has pointed out some deeply rooted determinants of current economic development. We checked out the historical determinants of Portuguese municipalities' development and also if the strength of the different dominant medieval classes (nobility, clergy, and bourgeoisie) in each Portuguese municipality has some importance for current economic and social development, using some historical proxies. The results indicate that the cathedral antiquity is statistically significant in explaining the purchasing power municipal index. It is interesting to observe that the proxy for the bourgeois power does not have influence in the most robust regressions, and that the proxy for nobility power (the castle antiquity) is negatively related to current purchasing power.

Keywords | Counties; economic development; historical determinants of development; municipalities; Portugal.

JEL Classification | N93 O18 R11

As raízes históricas do desenvolvimento de municípios: o caso português

Resumo

A literatura sobre desenvolvimento refere a alguns dos determinantes, profundamente enraizados, do desenvolvimento econômico atual. Verificamos os determinantes históricos do desenvolvimento dos municípios portugueses e, também, se a força das diferentes classes medievais dominantes (nobreza, clero e burguesia), em cada município, tem importância para o desenvolvimento económico e social atual, usando alguns proxies. Os resultados apontam que a antiguidade da catedral (clero) é estatisticamente significativa na explicação do índice municipal de poder de compra. É interessante observar que a proxy do poder da burguesia (foral) não tenha influência nas regressões mais robustas, e que a proxy do poder da nobreza (antiguidade do castelo) esteja negativamente relacionada com o poder de compra atual.

Palavras-chave | Concelhos; desenvolvimento econômico; determinantes históricos de desenvolvimento; municípios; Portugal.

Classificação JEL | N93 O18 R11

Las raíces históricas del desarrollo de municipios: el caso portugués

Resumen

La literatura sobre desarrollo ha señalado algunos determinantes, profundamente arraigados, del desarrollo económico actual. Verificamos los determinantes históricos del desarrollo de los municipios portugueses y, también, si la fuerza de las diferentes clases medievales dominantes (nobleza, clero y burguesía), en cada municipio, tiene alguna importancia para el desarrollo económico y social actual, utilizando algunos apoderados. Los resultados señalan que la antigüedad de la catedral (clero) es estadísticamente significativa para explicar el índice municipal de poder adquisitivo. Es interesante destacar que el apoderado del poder de la burguesía (foral) no tiene influencia en las regresiones más robustas, y que el apoderado del poder de la nobleza (antigüedad del castillo) es relacionado negativamente con el poder adquisitivo actual.

Palabras clave | Condados; desarrollo económico; deerminantes históricos del desarrollo; muncipios; Portugal.

Clasificación JEL | N93 O18 R11

Introduction

The literature on the deep-rooted determinants of development has been greatly developed in the last decade and is eminently empiric. Hall and Jones (1999) demonstrated the importance of social infrastructure, a composite measure of law of rule and other institutional measures, which was then followed by Glaeser *et al.* (2004). Rodrick *et al.* (2004) showed evidence for the supremacy of institutions related to geography and integration as determinants of economic development. However, Olsson and Hibbs Jr. (2005) showed the strong influence of geographical and biogeographical factors in determining the current level of development. In related literature on institutions, Sokoloff and Engerman (2000) and Acemoglu *et al.* (2005) have stressed the role of colonialism and inherited institutions. It is important to note that some of the previous richer lands had lagged behind due to poor institutions linked, e.g. to land inequality. The effects of ethnolinguistic fractionalization were examined by Easterly and Levine (1997) and Alesina *et al.* (2003). The influence of genetic diversity on ethnolinguistic fractionalization has been studied by Ahlerup and Olsson (2012). Moreover, the historical impact of sociocultural factors has been highlighted by Barro and McCleary (2003), Tabellini (2008) and Guiso *et al.* (2009). Ashraf and Galor (2013a) report a significant relationship between genetic diversity determined ancestrally and economic

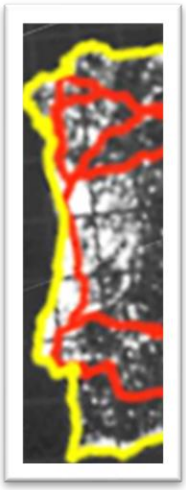
development in the present. The paper illustrates the relationship between genetic diversity and development through the positive and decreasing effect of genetic diversity on technology and a negative effect of genetic diversity on output representing inefficiency in production.

Within the countries' borders, some differential current level of development has been explained recurring to historical episodes such as the *reconquista* (*i. e.* the progressive land conquest of the Christian kings over the Muslim territories in the Spanish Iberia) in Spain (OTO-PERALÍAS; ROMERO-AVILA, 2016) or the historical cycles of Brazilian development – sugar and gold (NARITOMI *et al.*, 2012). The arguments of both contributions are linked with the emergence of institutions which were not so prone to nowadays development. For example, in Spain, large frontier expansions may favor a political equilibrium among the colonizing agents that is biased toward the elite, creating the conditions for an inegalitarian society, with negative consequences for long-term economic development. In Brazil, governance quality, land inequality and access to justice were related to the two different colonial extractive historical institutions related to sugar and gold booms. The authors found that the sugar cane boom—characterized by an oligarchic society—is associated with more land inequality. The gold boom—characterized by a heavily inefficient presence of the Portuguese state—is associated with worse governance and access to justice. The correlation between the current provision of public goods and the same provision in antiquity was thoroughly documented in Daalgard *et al.* (2018) were the authors empirically support that current economic activity is significantly determined by the roman provision of *roads*.

Historical background: the persistence of regional development in Portugal

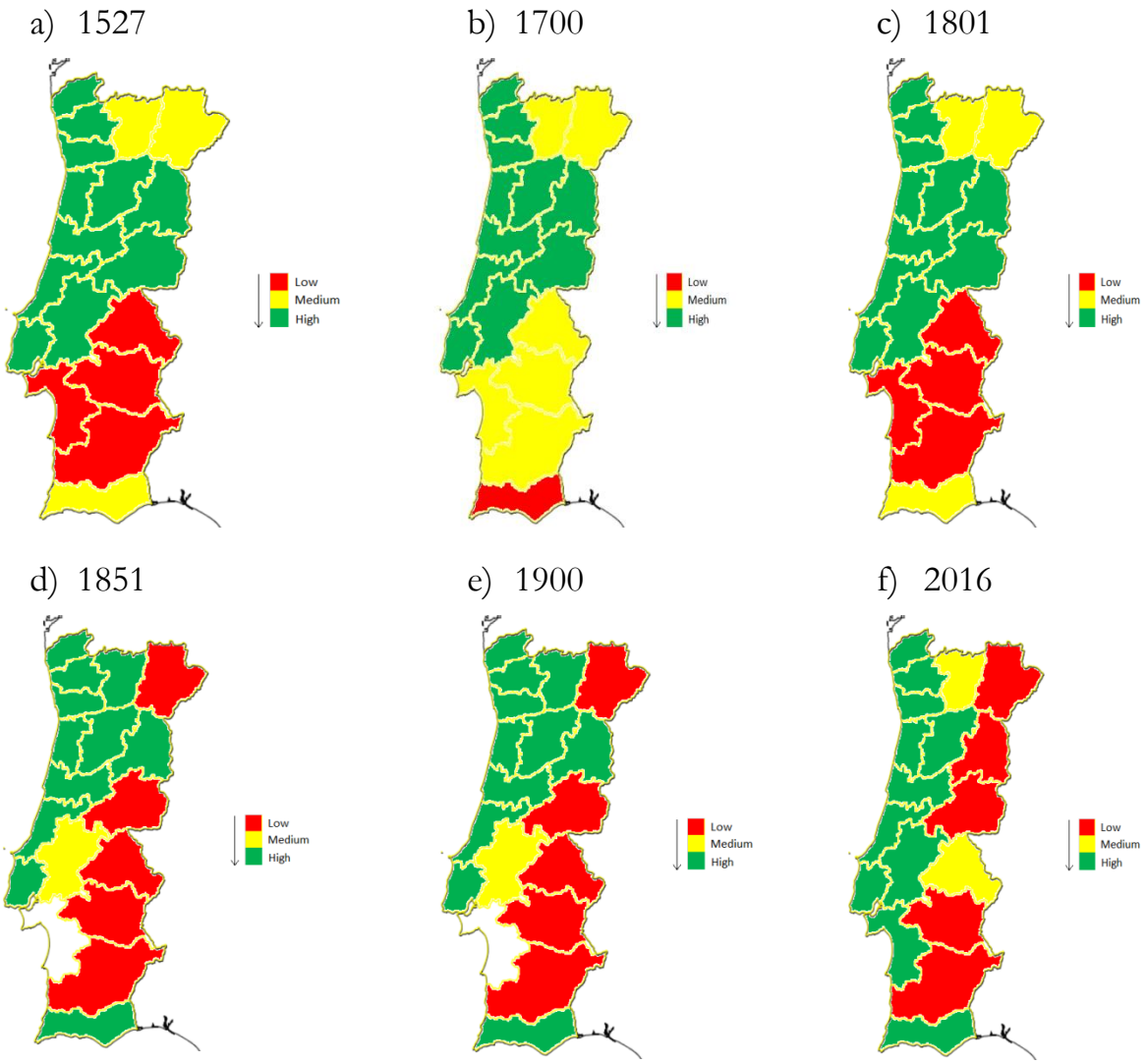
As Daalgard *et al.* (2018) supported the correlation between Roman main roads and nowadays concentration of nightlights in Europe, the persistence of development is also confirmed particularly in Portugal, as we can note in Figure 1 taken from that paper. The map in the figure seems to indicate that the provision of public goods (namely roads) by Romans in what would be the Portuguese territories are at least highly correlated to the nowadays country development disparities (see the coincidence of the Roman main road linking *Olissipo* (Lisboa) to *Bracara Augusta* (Braga) with the brightest part of the map, which is indeed the coastline region between Lisboa and Braga).

Figure 1 – Zooming of the nowadays Portuguese mainland of the map presented by Daalgard *et al.* (2018) supporting the correlation between Roman main roads and nowadays concentrations of nightlights



It is also important to note that the population density (the historical proxy for development) has been also very persistent across centuries with the most important and populous cities (and regions) being those of the coast of Portugal (SILVA, 1997). This can be noted in figure 2.

Figure 2 – Population Density in different Portuguese Regions across history since there are historical sources



Fonte: Rodrigues (2004a) for 1527 and 1700; Rodrigues (2004b) for 1801, 1851 and 1900; PORDATA for 2016.

Note that as the classification in the different sources was not the same across years. Except for the currently named districts of Castelo Branco and Guarda (in the inner center of the map) which decreased the population density throughout centuries, the most remarkable fact is that districts in the coastline were always the most populated (and developed) since the XVIth century (the first recorded estimation is from 1527).

Lisboa has a high degree of centralization in the Portuguese urban network, and this has been also persistent over centuries. Besides Lisboa, the second major city, Porto, has also been the second major city over centuries. Santarém, Coimbra, Setúbal,

Braga, Leiria and Aveiro, all near the coastline were always belong to the next major cities in Portugal.

The persistence of economic development differences across regions in Portugal is the main reason that it may seek to determine historically rooted development determinants.

A theory for the roots of Portuguese regional institutions

The literature had emphasized the land inequality, and social (and ethnic and genetic) fractionalization as well as geographic features as determinants of the quality of institutions that determine nowadays development. Portugal is one of the countries with the oldest border delimitations in whole Europe, which shape is very similar to what it was in the independence treaty of Zamora (1143).

The (mainland) Portugal has been divided into counties (*municípios*) since medieval times although its creation was carried out at different speeds. However, the consolidation of this level of governance occurred in 1832 with the administrative reform of Mouzinho de Oliveira.

In order to promote occupation of newly conquered lands from the muslins, Portuguese kings used to determine a set of written duties and rights to populations of a given village or town (those bill of rights were called *forais*). These were a type of kings' guarantees to people that lived in some towns or villages in the medieval era which protected those 'urbanized' populations from the arbitrariness of the feudal lords (which could be civil or clergy landlords). *Forais* favored the appearance and rise of villages or cities and the main privileged class inside the urbanized lands was the burgess (see e.g. GERLI, 2013; REIS, 2007).

Medieval epoch cannot be characterized without mentioning the other two distinct and crucial elites: nobility and clergy. The first social group was essentially landlords with military training and capacity. They were vassals of the king and acted as cavalry in military campaigns. They were usually rewarded by the king with noble titles and lands due to the military services they offered to the reign. Henriques (2014) argues that Portugal has erected a tax state in the late XIVth century as part of a king's centralization effort arguably to face warfare. The author argues that a type of permanent fiscal tax system targeting trade, named as *sisas*, has been erected in those times. Taxes were collected by municipalities, but most were made the Crown's revenue who argued that their revenue is to be used to face military expenditures[1].

[1] In the middle-ages, the institution of trade taxes (that substituted older municipal revenues through e.g. tools) were to be municipal revenues and other types of tax revenues received by the municipalities should be given to the Crown as *direitos reais*. However, since the reigns of Fernando I and João I, *sisas* revenues were mostly given as Crown revenue.

It is known that both nobles and scribes were rewarded by the Crown for the war efforts (the first with a type of subsidy named as *contias* and the second with wages).

The second group comprises the church hierarchy inside the kingdom. Both members of religious orders and secular clergy (mostly priests and bishops) belong to that group but have quite different roles in the society. While the first acted mostly as the nobility (as landlords and military), the second group lived in villages and towns and ruled churches and cathedrals, acting and spiritual guides of the people, but also as instructors. Also, cathedrals may have acted as the first schools inside cities and some of them were the birthplace of the first medieval universities across Europe (see e.g. CLARK, 2006; SARAIVA, 2012). The modern economic history attributes to the organization of guilds the faster knowledge transmission in medieval Europe than in other parts of the globe (even in those which accumulated a similar of higher knowledge stock until then) – e.g. De la Croix *et al.* (2018). Nevertheless, in Portugal it is difficult to attribute and quantify the role of guilds for different cities. There are several references to the role of guilds in the cities' government (SILVA, 2012; MELO, 2013), but without specific reference to its influence in the whole cities' society or economy. To our knowledge it is impossible to access the diversity and intensity of trades in each city or town as well as the number of craftsmen for each city. However, there are historical studies that point out for the linkages between the guilds and the cities' church authorities (MARTINS, 2012).

If we could think as the *forais* as the first bills of rights that established the rule of law and property rights inside the *municípios*, we can also think of the castles as the representative of the tributary power of the nobility (including the king) and of cathedrals as the beginning school or the medieval institution for the accumulation of knowledge and of castles as the military presence (of the nobles or the king) imposing the extracting tributary presence of the medieval sources of government.

Data

Nowadays, including Madeira and Azores, Portugal has 308 *municípios*. Those administrative subdivisions have a great heterogeneity with regard production, human capital, land area, urban and rural population, sectoral specializations, etc. There are not much available data for municipalities in Portugal as national statistical authorities prefer to emphasize the NUT II territorial dimension as a uniform procedure within the Eurostat statistical framework. Thus, data by municipality is often available for very sparse years and the municipality coverage differs a lot along those years for which there are available data. Thanks to a private initiative that interacts with the national statistical authorities and with universities and researchers, PORDATA (2019) is nowadays the main source of municipalities' data in Portugal, gathering information from different sources. Because of this scarcity

of municipal data by several years it is virtually impossible to build a panel data to study determinants of development in Portuguese municipalities. Moreover, it is also virtually impossible to test the relationships we are studying in this paper for various years.

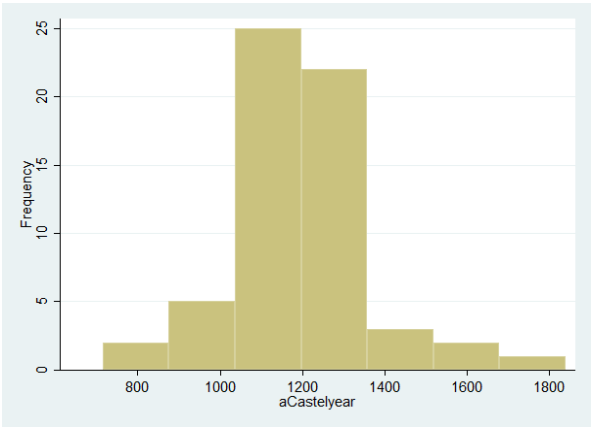
Historical data

In line with the theory proposed to measure the importance of the medieval historically rooted determinants of current Portuguese development, we defined the three following historical variables:

- The year of construction of the castles. When the county does not have a castle, we attributed the value 2020 representing the fact that it does not have one until nowadays.
- The year of construction of the cathedral. When the county does not have a castle, we attributed the value 2020 representing the fact that it does not have one until nowadays.
- The year of issue of *foral*. The year of the first *foral* or the year of institution of the *município* (*forais* were abolished by the monarchic liberal regime in the 1820s).

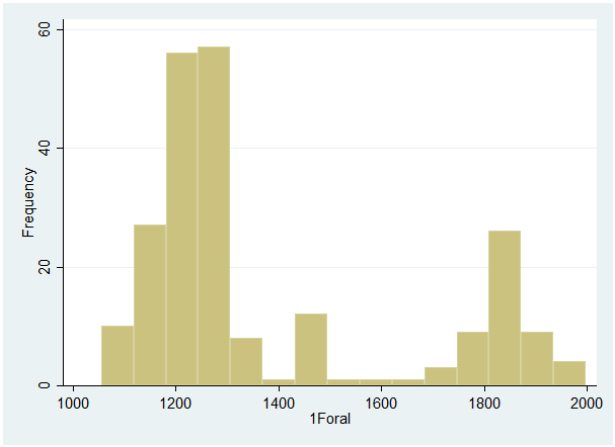
figure 3 presents the histograms for the distribution of the historical variables across years. While the distribution of Castles (figure 3a) regards a normal one with more frequencies just before and after the independence of the kingdom of Portugal from the kingdom of Leon. There is also the influence of Portuguese-Castillian wars (usually inserted by historians in the 100 years European medieval wars, named in Portugal as *Guerras Fernandinas*) in the XIVth century in the construction of several Castles intended to defend the border between both countries. The distribution of Cathedrals (figure 2b), despite attaining lower values than in Castles, is more evenly distributed between 1100 and 1600. The relative increase in the construction of Cathedrals after the XVth century may be attributed to the colonial income that also enriched the church and the increase of the church power in Portugal after the reign of King Manuel I, when Inquisition was instituted in the country by the pressure of the Pope and the *"Catholic Spanish Kings"*. Lastly, the distribution of *Forais* (figure 2c) presents three higher densities. The first was during the consolidation of national mainland territories after the *reconquista* (1100 to nearly 1400). The second was during the centralization of royal power due to Manuel I (in a process called *forais manuelinos*) in which the king renewed most earlier medieval *forais* (renewals does not count) but also issued some new *forais*. Finally, the third epoch with high issuing activity was near and after the liberal revolution, after which new municipalities were created.

Figure 3 – Distribution of the years construction of Castles, Cathedrals and "Forais" by *municípios*



a) Distribution of the Castles construction year

b) Distribution of the Cathedrals construction year



c) Distribution of the 'foral' years

Current data

Current data are mainly from the PORDATA municipalities' database and include purchasing power index, education and gross value added. To this and to control to the church institutional historical channel, we also include in some regressions the current number of parishes inside each municipality. Descriptive statistics are presented in Table 1.

Table 1 – Descriptive statistics

Variable	Average	StandardDeviation	Min.	Max.	Number of Observations
Purchasing Power Index	77.36	20.81	49.8	216.9	308
Education	13.38	3.05	7.9	21.5	308
Gross Value Added	257594.6	1220487	447	20100000	308
Number of Parishes	11.47	16.64	0	91	308
Castle Year of Construction	1190.5	179.65	715	1841	60
Cathedral Year of Construction	1369	187.12	1089	1672	20
"Foral" issue year	1379.50	267.29	1055	1998	225

Source: Drafting by the authors themselves.

Regression

In this paper we estimate the following equation:

$$y_{2011} = c + \beta_1 foral + \beta_2 castle + \beta_3 cathedral + Z'\gamma$$

where the dependent variable $y_{2011}$is the purchasing power index by municipality in 2011[2] in the baseline analysis but is substituted by Education or Gross Value Added in robustness checks to give insights about the channels according to which historical factors influence current development. Historical variables *foral*, castle and cathedral were described above. Variable Z is a matrix of controls which in the baseline analysis are composed by two to four possible proximate determinants of development: firms gross value added (which is lagged two years to account for adjustment costs in investment) and a proxy for education (the percentage of population with secondary level of education). In some regressions, we have also included a variable that measures the share of public employment in the municipality. This is done to account for the possible effect of government departments (decentralized government departments and town councils and their departments) as employers and thus sources of income for municipalities' inhabitants. In some Portuguese less developed municipalities, public employment represents a high share of total employment. This also wants to mimic some possible *Keynesian multiplier*, *crowding-out* or *Ricardian* effects of the government presence in the municipality economy, despite the fact that some of these effects may be not present in such small and dependent territorial entities. In some other regressions to control to the possible current influence of the church we include the current number of parishes in each municipality. This is to control for the fact that

[2] The year 2011 is selected as it maximizes the availability of data.

the historical effect of the church measured by the influence of the cathedral year of construction can be a misleading proxy of the possible current effect of the church in each municipality. Due to the high dependence of the Portuguese urban structure from the country capital and major city (see e.g. SILVA, 1997), we also include the distance to Lisbon as an additional control in some of the regressions. In an alternative analysis and following the development literature cited above, we also introduced some geographical variables such as municipality area, mean elevation, latitude and longitude as possible geographical determinants of development (as in e.g. OLSSON; HIBBS Jr., 2005 and related literature). Due to a necessarily small sample of at most 308 observations and suspecting of non-normal residuals as the data suggest, we use bootstrapped standard-errors to evaluate the variables' statistical significance.

Results: baseline regressions

First, we present regressions for purchasing power index, using current controls such as the added value of firms in the municipality and education of resident population to proxy the effects of investment and human capital in the municipality development. As explained before the percentage of public employment, number of parishes and distance to Lisbon are included as controls in some of the regressions. Results are presented in Table 2.

In all the regressions the effects of added value and education present the expected positive and statistically significant sign. Specifically, education is significance at the 1% level which is a remarkable result, meaning that more educated inhabitants in Portuguese municipalities contributes to an increase in the purchasing power index. This can be associated to the wage premium that positively affects more educated residents. However, as we will see later in discussion of alternative specifications this cannot be solely attributed to a wage premium but also to a human capital productivity effect. Quantitatively, one additional year of education would correlate with more nearly 4 points in the purchasing power, representing 1/5 of a standard-deviation of the dependent variable (see Table 1). One additional standard-deviation in the added value (nearly 1.200.000€) would correlate with nearly more 8.4 points in the purchasing power index, nearly 40% of a standard-deviation in the dependent variable (see again Table 1).

When included, the percentage of public employment (in columns 2, 4 and 5) is always negatively signed with a statistically significant sign, resembling the negative effect the government share usually shown in growth regressions, which also indicates that this effect may be also acting through a productivity channel.

When included, the number of parishes (columns 1, 2 and 5) is always non-significant, meaning that there is not any current effect of the religiosity or the church presence in the purchasing power of the municipality.

Finally, as expected the distance to Lisbon (column 5) has a negative and significant when explaining purchasing power in municipalities.

Regarding the historical variables we obtain non-significant effects of the *foral* year. This means that the historical bills of rights kings issued to municipalities or more recently the creation of municipalities have not an effect that influence current *institutions* promoting development.

However, the Castle year of construction variable presents a positive and significant effect (except when the distance to Lisbon variable is included). This can be interpreted as a negative effect of the Castle antiquity, meaning that as ancient is the Nobility or Kings' presence in the municipality the worse is its current purchasing power. This may be intuitively explained as a negative influence of the central power in municipality, represented e.g. as the emergence of extractive tax institutions, as has been argued e.g. by Henriques (2014). This is also consistent with the insignificant result when the distance to Lisbon variable is included in the regression. Another possible explanation is a negative effect of the centralization or of central government in each municipality; *ceteris paribus* the effects of the other included variables.

Finally, a consistent and statistically significance negative effect of the cathedral antiquity, meaning that as old is the cathedral the higher the purchasing power in the municipality. This may be explained by the role cathedrals had in the Middle Ages as centers of creation and knowledge transfer. This may indicate that more educated municipal society may have its roots historically centuries ago. This is the most significant and robust finding in our paper (among the historical variables considered) and will be subject to a number of robustness checks. The fact that the effect and its significance does not disappear when the number of parishes and the education variable is present is an indication that this is not a confounding effect with current effect of religiosity or the church presence nor an effect of potentially omitting the effect of current education of municipalities' inhabitants.

Table 2 – Main results: baseline analysis

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Purchasing Power Index, year 2011					
Historical variables					
Castle year of construction	0.004**	0.004**	0.004**	0.004**	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Cathedral year of construction	-0.024***	-0.024***	-0.025***	-0.023***	-0.025***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Year of 'Foral'	0.002	0.001	0.002	0.001	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Current variables					
Gross Value Added (2009)	0.000007*	0.000007*	0.000007*	0.000007*	0.000007*
	(0.000004)	(0.000004)	(0.000004)	(0.000004)	(0.000004)
Education	4.089***	3.976***	4.084***	3.984***	3.630***
	(0.3316)	(0.317)	(0.331)	(0.316)	(0.363)
% of Public employment	--	-0.162**	--	-0.156**	-0.185***
		(0.067)		(0.065)	(0.071)
Number of parishes	0.018	-0.015	--	--	0.015
	(0.033)	(0.033)			(0.038)
Distance to Lisbon	--	--	--	--	-0.017***
					(0.005)
Goodness of fit					
Number of observations	308	308	308	308	280
Replications	500	500	500	500	500
Wald	589.6	638.64	511.65	598.84	692.12
Adjusted R^2	0.78	0.78	0.78	0.78	0.79

Source: Drafting by the authors themselves.
Notes: Bootstraped standard-errors in parenthesis.

Second, we present regressions for purchasing power index, using geographical controls such as the latitude, longitude, elevation, area and, again, distance to Lisbon. This approach is inserted in the literature that explains development also with (deterministic) geographical factors. Results are presented in Table 3. Also, in columns (4) and (5) we exclude from the analysis the Lisboa and Porto municipalities. These are the two richer municipalities with higher differences from the others, which may lead to consider them as influential observations that could mislead the results. Furthermore, also historically they were amongst the municipalities with the oldest cathedrals, castles and *forais*.

Interestingly, most geographical factors are non-significant. Maybe due to the fact that Portugal is a small country which makes those variables with low variability, latitude and longitude are not significant. Also, area is almost non-significant, with a marginal negative significant sign in the first column. When elevation (columns 2 to 5) and distance to Lisbon (columns 3 to 5) are taken into account, both are highly significant and with a negative sign. Besides the negative sign of distance to Lisbon,

the elevation result may be associated with lower land productivity and thus lower purchasing power in municipalities with higher mean elevation. As longitude and latitude are also included in the regression, one cannot argue that the effect of elevation is simply accounting for the fact that in Portugal more elevated territories are the ones that are in the northern and eastern part of the country.

Finally and consistently with results in Table 2, we obtain a statistically significant negative effect of the cathedral antiquity, meaning that as old is the cathedral the higher the purchasing power in the municipality. As we have written before, we associate this effect with the role cathedrals have in the middle-ages, as centers of knowledge transfers, which may be the origin of current education promoting institutions in the municipalities.

Table 3 – Main results: geographical variables Método

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Purchasing Power Index, year 2011					
Historical variables					
Castle year of construction	-0.0004	0.0009	-0.0002	0.003	0.003
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
Cathedral year of construction	-0.047***	-0.047***	-0.049***	-0.050***	-0.045***
	(0.008)	(0.007)	(0.008)	(0.007)	(0.006)
Year of 'Foral'	0.002	-0.001	0.001	0.002	0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Geographic variable					
Latitude	-0.757	-0.355	0.014	-0.003	-0.022
	(0.634)	(0.556)	(1.389)	(1.230)	(1.238)
Longitude	0.286	-0.247	-0.616	-0.596	-0.565
	(0.192)	(0.201)	(2.744)	(2.146)	(2.435)
Area	-0.008*	-0.007	-0.008	-0.005	-0.004
	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)
Elevation	--	-0.020***	-0.013***	-0.013***	-0.013***
		(0.002)	(0.003)	(0.003)	(0.003)
Distance to Lisbon	--	--	-0.054***	-0.045***	-0.046***
			(0.019)	(0.014)	(0.014)
Goodness of fit					
Number of observations	307	307	280	279	278
Replications	500	500	500	500	500
Wald	33.51	129.51	184	175.58	161.29
Adjusted R^2	0.13	0.32	0.38	0.42	0.39

Source: Drafting by the authors themselves.

Notes: Bootstraped standard-errors in parenthesis. Column (4) excludes Lisbon; Column (5) excludes Lisbon and Oporto.

Channels and discussion

In this Section, results, their limitations are discussed. Also, it explores the channel found for the effect of cathedrals antiquity and current development of the Portuguese municipalities.

First, it offers an in-depth insight about the suggested channel through which the cathedral antiquity can affect current municipalities' development. As written above, it is suggested that this can occur due to the role of cathedrals in the Middle Ages and knowledge transference institutions which were the origin of current municipal societies that favor and promote education. For that, there must be a higher and statistical significant effect of cathedral antiquity in the current level of education in the municipality. Table 4 shows that this effect happens indeed. But if this happens only by chance, thus the effect of cathedrals antiquity through other current determinant of current development would also be the same. The regression with the firms' added value as a dependent variable were tested. Table A.1 shows the results. Despite some negative and significant signs, those present much less significance than those shown in Table 4. Notwithstanding, it is reasonable to argue that if cathedrals have an historically rooted effect in current development, thus it may be through current levels of education.

Other important result of this paper is the positive and significant effect of current education (at the secondary level) in the current purchasing power of people living on Portuguese municipalities, pointing it as one of the most important determinants of standards of living (and thus also of regional income inequality). Thus, it would be important to disentangle the effect education may have through productivity (thus affecting development) from the effect education may have though the wage premium, which could point out for a possible reverse causality problem. It is proposed to evaluate if higher development (for instance through an exogenous shock such as foreign direct investment) can attract more educated people that earn higher wages and thus positively influence the purchasing power of the municipality. In order to do that and due to the data availability, an alternative regression is thus carried out in which education is included (as people with secondary education as a percentage of the total population), but with a lag of 10 years. Thus, in those regressions it would be more difficult to argue that the wage premium of educated population ten years before 2011 would be affecting the purchasing power in 2011. Results are presented in Table A.2 and they show that education (lagged 10 years) continue to be highly significant and positively related with purchasing power ten years later.

Comparing with other works that want to distinguish the emergence of institutions on the roots of history, centuries ago, some additional difficulties were faced when taking this to the Portuguese medieval society. In fact, as a small country with quite small distances led to a quite early centralized state in the medieval ages when

compared to other regions in Europe and even in the Iberia. Portugal is also known as one of the countries with the ancient stable boarders in Europe. Earlier centralization and homogeneity among the Portuguese territories let to very small institutional differences among the small administrative units: the *municípios*. The small institutional variability and small sample led to estimation challenges that cannot be overcome in this reality. The small variability could be partially overcome by an improved in-depth analysis of the role of each of the cathedrals included in the sample in the medieval ages. This would call to the study of unpublished material in historical archives to access if each cathedral has an associated school, the number of masters associated and to which trades it was related. This is an interesting topic for future research.

The fact that the main result in the paper related to the historical rooted determinants of current development (the significant effect of the cathedral antiquity arguably related to modern education-prone institutions) cannot be subject to instrumental control implies that we cannot strongly argue for a causal relationship. Finding a valid instrumental variable (correlated with the cathedrals' antiquity but not with current development) remains a challenging prospect for future research.

Table 4 – On the channels of historical roots of development: Education

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Education, year 2011					
Historical variables					
Castle year of construction	-0.0002	-0.00003	-0.00018	-0.0002	-0.0002
	(0.0005)	(0.00049)	(0.00046)	(0.0004)	(0.0005)
Cathedral year of construction	-0.005***	-0.005***	-0.005***	-0.005***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year of 'Foral'	0.0003	-0.0001	0.0001	0.0001	0.0001
	(0.0005)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Geographic variable					
Latitude	-0.209	-0.1499	-0.099	-0.099	-0.098
	(0.149)	(0.1369)	(0.275)	(0.256)	(0.278)
Longitude	0.129***	0.051	0.008	0.008	0.006
	(0.038)	(0.039)	(0.518)	(0.437)	(0.488)
Area	-0.002**	-0.002**	-0.002**	-0.002**	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Elevation	--	-0.003***	-0.002***	-0.002***	-0.002***
		(0.004)	(0.001)	(0.001)	(0.0005)
Distance to Lisbon	--	--	-0.009***	-0.009***	-0.009***
			(0.003)	(0.003)	(0.003)
Goodness of fit					
Number of observations	307	307	280	279	278
Replications	500	500	500	500	500
Wald	54.4	124.71	233.3	207.45	221.8
Adjusted R^2	0.12	0.31	0.40	0.399	0.40

Source: Drafting by the authors themselves.
Notes: Bootstraped standard-errors in parenthesis; column (4) excludes Lisbon; column (5) excludes Lisbon and Oporto.

Conclusions and prospects of future research

In this article we study the deeply rooted historical determinants of development in Portugal. Thus, it contributes to the literature on these determinants of current development that are rooted centuries ago, determining institutions that shape current development opportunities. Typically, those determinants have been analysed worldwide with countries being the unit of analysis (e.g. BARRO; MCCLEARY, 2003; TABELLINI, 2008; GUISO *et al.,* 2009; ASHRAF; GALOR, 2013b).

There are only two previous contributions that studied the importance of historically-rooted determinants of development inside countries. One by Oto-Peralías and Romero-Avila (2016) studying the effect of the velocity of the *Reconquista* process on the institutions created in the different provinces of Spain. The fastest the conquest of Muslim territories, the more prone the conquerors are

to create more inequalitarian institutions which still influence the distribution of land and income nowadays. Another, in Brazil (NARITOMI *et al.*, 2012), compares the two booming ages of the colonial period: the sugar and the gold ages, arguing that the later created more extractive institutions with lower governance quality and access to justice while the first created more inequality-prone oligarchic institutions. Both argue that given historical episodes had crucially determined the type of institutions created, which remaining for centuries and still have influence nowadays.

The contribution of this article is the study the effects of the institutions linked with three medieval classes in Portugal: the burgess (or municipalities), the nobility and the king, and clergy. In regressions that also include controls for the proximate determinants of development, we conclude that the antiquity of castles is correlated with less current development and the antiquity of cathedrals is correlated with current development. After reviewing medieval Portuguese historians' contributions, we associate the first to higher tax extraction institutions or a negative effect of centralization and the second to the creation of education-prone institutions. The second effect is the most robust one to several changes in specifications. Additionally, current education seems also to be an important (statistically significant) determinant of current development of Portuguese municipalities.

This paper opens prospects to continue to study medieval institutions as historically rooted determinants of development and in particular, in Portugal. However, future research should focus on differentiating the role of the different institutions created by burgess, nobility, the crown and municipalities. In particular, it would call for in-depth research on the role of guilds in Portuguese municipalities and its relationship with the church and the influence of the church in the knowledge transfer. Moreover, researchers on economic history should make an effort to provide stronger results on causality effects, looking for possible instrumental variables for the historically rooted determinants of current development.

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Appendix

Table A.1 – Main results: on the channels of historical roots of development, firms' added value

	(1)	(2)	(3)	(4)	(5)
Dependent variable: VAB, year 2011					
Historical variables					
Castle year of construction	-512.35	-488.31	-515.52	-67.33	-76.68
	(440.93)	(430.22)	(454.82)	(80.62)	(79.40)
Cathedral year of construction	-432.76	-439.92	-511.86*	-642.05**	-386.57***
	(351.87)	(327.03)	(291.53)	(255.21)	(109.81)
Year of 'Foral'	-169.19	-216.48	-196.72	-19.54	14.79
	(179.74)	(193.77)	(193.91)	(61.78)	(58.32)
Geographic variable					
Latitude	-9489.08	-2220.43	13236.91	10488.19	9458.4
	(18408.9)	(16068.67)	(51864.6)	(32608.97)	(33823.37)
Longitude	4936.06	-4688.71	-23834.24	-20688.29	-18942.43
	(4705.51)	(6264.86)	(89566.08)	(56297.24)	(65331.25)
Area	-638.05*	-613.02*	-651.71	-256.09**	-200.65**
	(371.83)	(355.26)	(406.63)	(106.75)	(94.02)
Elevation	--	-359.63**	-126.65	-171.67**	-133.76**
		(142.91)	(109.21)	(71.27)	(64.66)
Distance to Lisbon	--	--	-1858.54	-486.1	-562.09
			(1401.87)	(440.27)	(455.25)
Goodness of fit					
Number of observations	307	307	280	279	278
Replications	500	500	500	500	500
Wald	8.94	17.94	16.62	24.09	31.38
Adjusted R^2	0.02	0.03	0.05	0.12	0.08

Source: Drafting by the authors themselves.
Notes: Bootstraped standard-errors in parenthesis; column (4) excludes Lisbon; column (5) excludes Lisbon and Oporto.

Table A.2 - Robustness to Education variable

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Purchasing Power Index, year 2011					
Historical variables					
Castle year of construction	0.003*	0.003*	0.003*	0.003*	0.003
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Cathedral year of construction	-0.014***	-0.014***	-0.015***	-0.015***	-0.015***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Year of 'Foral'	0.002	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Current variables					
Gross value added (2009)	0.000006**	0.000006**	0.000006**	0.000006**	0.000006**
	(0.000003)	(0.000003)	(0.000003)	(0.000003)	(0.000003)
Education (2001)	3.815***	3.788***	3.810***	3.779***	3.578***
	(0.268)	(0.271)	(0.268)	(0.271)	(0.308)
% of public employment	--	-0.029	--	-0.035	-0.052
		(0.050)		(0.049)	(0.055)
Number of parishes	0.021	0.015	--	--	0.044
	(0.025)	(0.026)			(0.029)
Distance to Lisbon	--	--	--	--	-0.013**
					(0.005)
Goodness of fit					
Number of observations	308	308	308	308	280
Replications	500	500	500	500	500
Wald	733.79	736.38	686.73	704.27	639.84
Adjusted R^2	0.82	0.82	0.82	0.82	0.82

Source: Drafting by the authors themselves.
Notes: Bootstraped standard-errors in parenthesis.

Table A.3 – Variables, description and sources

Variables	Description	Sources
PPpc	Purchasing power index	PORDATA
Foral1	Foral year	REIS, A. M. *História dos municípios, 1050-1383*. Lisboa: Livros Horizonte, 2007.
Castelyear	Castle's construction year	https://lifecooler.com/dossiers/patrimonio/castelos-e-fortalezas-de-portugal http://www.patrimoniocultural.gov.pt Counties official website
Cathedral	Cathedral's construction year	https://lifecooler.com/dossiers/patrimonio/catedrais-de-portugal/888 http://www.patrimoniocultural.gov.pt/pt/patrimonio/patrimonio-imovel/pesquisa-do-patrimonio/classificado-ou-em-vias-de-classificacao/geral/view/69825 https://www.guiadacidade.pt/pt/poi-se-de-viseu-15290 https://sites.google.com/site/invictacidade/Home/patrimonio-edificado/se-catedral-do-porto https://www.visitarportugal.pt/distritos/d-viseu/c-lamego/lamego/se-catedral
parishes_count	Number of parishes in the county	http://www.paroquias.org/paroquias.php?vdio=VLR
Edu	Percentage of residents, with 15 or more years, with secondary education	PORDATA
VAB	Gross value added	PORDATA
Latitude	Latitude of the county	Bing tool embodied on Excel
Longitude	Longitude of the county	Bing tool embodied on Excel
Area	County area	PORDATA
Elevation	County maximum elevation (meters above water level)	PORDATA
Distance to Lisbon	Distance in kilometers by the fastest root	Google maps

	Gross value added	Castle year of construction	Cathedral year of construction	Year of 'Foral'	Latitude	Longitude	Area	Elevation	Distance to Lisbon	Education	Purchasing Power Index	% of public employment	Number of parishes
Gross value added	1.00												
Castle year of construction	-0.13	1.00											
Cathedral year of construction	-0.06	0.17	1.00										
Year of 'Foral'	-0.04	0.26	0.13	1.00									
Latitude	-0.01	-0.04	-0.03	0.08	1.00								
Longitude	-0.06	-0.04	-0.03	-0.06	0.51	1.00							
Area	-0.09	-0.20	-0.15	-0.32	-0.13	0.04	1.00						
Elevation	-0.14	-0.01	-0.01	-0.15	0.20	0.13	0.09	1.00					
Distance to Lisbon	-0.18	-0.05	-0.08	-0.01	0.25	0.18	-0.03	0.56	1.00				
Education	0.22	-0.01	-0.23	0.05	-0.23	-0.16	-0.11	-0.48	-0.51	1.00			
Purchasing Power Index	0.59	-0.02	-0.34	0.04	-0.13	-0.15	-0.07	-0.45	-0.43	0.74	1.00		
% of public employment	-0.12	-0.06	0.16	-0.14	-0.08	0.16	0.14	-0.01	0.02	-0.26	-0.33	1.00	
Number of parishes	0.26	-0.15	-0.29	-0.09	0.07	-0.04	0.15	0.16	0.25	0.05	0.21	-0.33	1.00

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