European
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EHES WORKING PAPERS IN ECONOMIC HISTORY | NO. 127

Can Autocracy Promote Literacy? Evidence from a Cultural Alignment Success Story

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An updated version of this paper has been published as:

Palma, N. and J. Reis (2021). Can autocracy promote literacy? evidence from a cultural alignment success story *Journal of Economic Behavior and Organization* 86: 412-436

https://doi.org/10.1016/j.jebo.2021.02.011

MARCH 2018

EHES Working Paper | No. 127|March 2018

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Abstract

Do countries with less democratic forms of government necessarily have lower literacy rates as a consequence? Using a random sample of 4,600+ individuals from military archives in Portugal, we show that 20-year old males were twice as likely to end up literate under an authoritarian regime than under a democratic one. Our results are robust to controlling for a host of factors including economic growth, the disease environment, and regional fixed-effects. We argue for a political economy and cultural explanation for the success of the authoritarian regime in promoting basic education.

JEL classification: H41, I24, I25, N33, N34, O12

Keywords: Anthropometrics, economic history of education, public schooling provison, political economy of development.

* A previous version of this paper circulated under the title "A tale of two regimes: educational achievement and institutions in Portugal, 1910-1950". We are grateful for discussions with Robert C. Allen, Luciano Amaral, Fernando Alexandre, Pedro Pita Barros, Tim Besley, Pedro Carneiro, Luís Aguiar-Conraria, Sónia Félix, Carlos Madeira, Pedro Martins, José Borges Palma, Susana Peralta, Miguel Portela, Pedro Portugal, Hugo Reis, Paulo Rosário, Mauro Rota, J. M. C. Santos Silva, José Tavares, Pedro Vicente, Hugo Vilares. We also thank seminar participants at the LSE, Nova SBE, University of Minho, as well as conference participants at the Sixth Iberian Cliometrics Workshop at the University of Zaragoza, the Economic History of Education Meeting of the Frontier Research in Economic and Social History at the University of Barcelona, and the CEPR-NYUAD Workshop on Economic Divergence and Convergence in History. The usual disclaimer applies. We thank Adam Brzezinski for excellent research assistance, and Rita de Carvalho, Renato Pistola, António Ramalho, and Inês Versos and for their help with collecting the data.
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1 Introduction

In this paper we show that a nondemocratic regime had much greater success at educating the masses than the more democratic regime with preceded it, and we offer an explanation for why this occurred. Our case-study is Portugal during the first half of the twentieth century. We provide an institutional explanation for the success story of a remarkable observed reduction of child illiteracy. We argue that the nondemocratic regime succeeded because its policies were more gradual, more feasible, and importantly, more aligned with the desires and aspirations of the masses.

Our story differs from the narratives which usually appear in the literature. These are typically either primarily demand-based explanations, placing emphasis on families' desire to endow children with human capital, and those based on supply of public schooling. We show that the nondemocratic regime actively worked for and was successful in providing basic literacy to the masses, which contrasts with the way in which nondemocratic regimes are typically perceived. In order to arrive at these results, we rely on a new dataset of over 4,600 individual-level observations. Our data is not subject to sample selection as it does not refer to conscripts; instead, our military registers cover the entire male population for each year. We show that under the nondemocratic regime, a 20-year old male of average stature was about twice as likely to end up literate than under the more democratic regime which immediately preceded it, even after controlling for other covariates.

An active debate has taken place for some time concerning the determinants of schooling or of levels of human capital in different countries, particularly those where historically education has developed more slowly and more recently. The prevailing view is that political and institutional factors are of prime importance, although other variables, such as income and land inequality, ethnicity, religion, factor endowments and GDP per capita have been invoked to help account for these divergences. Studies have argued that countries which lacked democratic forms of government and where the suffrage was not widespread have been apt to have lower literacy rates and school enrolment as a consequence. The reason is that the supply of publicly funded mass education is a political decision and the elite holds political power do not favour a wide dissemination of human capital; conversely, the majority, who aspire to more education, lack the "voice" that will make this situation change (Engerman, Mariscal and Sokoloff 2009, Gallego 2008, Lindert 2004, 2010).

This literature suffers from several shortcomings. It tends to underplay the fact that human capital is not just the consequence of policy decisions but also of investments made by families whose decisions are strongly influenced by a variety of economic (Boucekkine et al. 2007) as well as cultural circumstances. Consequently it presents the provision of schools as the panacea for educational backwardness, forgetting that better access to education is only a necessary condition. While more favorable schooling policies can cause the appearance of more and better schooling facilities, which in the right context can lead to beneficial effects (Duflo 2001), these expanded

opportunities will not necessarily involve students more unless their families also want to send them, and are able to do so. Nonetheless, the historical record registers a few cases where the state was successful at coercing families in this matter.[1] This suggests a need to consider the positive incentives which can determine family decisions to invest in human capital.[2]

In the economic history literature, results have mostly been obtained by means of panel data and encompass a large number of countries over fairly lengthy time spans. In these specifications, explanatory variables are often aggregated and therefore miss out a lot of information. Dependent variables are all too often broad measures such as school enrolment or educational expenditure as a percentage of total expenditure or of GDP. A further difficulty in studying a large collection of countries over time is that this approach does not lend itself to exploring more deeply cross-sectional institutional differences which are crucial to the debate (Lindert 2010).

In this paper we follow a different methodology. We use individual-level data from one country only. Our dataset includes detailed information on the completed school careers of 4,600+ adult males, as well as about the circumstances facing their families during childhood. We consider different generations and gather observations at benchmark years using a new source: unpublished military recruitment registers. This allows us to employ a dependent variable which measures schooling directly, an attractive feature relative to the more common usage of enrolment data. Our dataset therefore evaluates "scholastic achievement" rather than the system that produces it and thus brings the analysis closer to the ultimate issue of relating education to economic performance.

The choice of Portugal as a case-study is justified by two circumstances. Firstly, ever since official statistics have been gathered, Portugal has been one of the worst performers in the field of educational attainment in the West (Reis 1993, Amaral 2002, Lindert 2004). At the beginning of the 20th century, its illiteracy rate of 75% of the population over 7 years of age was among the highest in Europe – in Spain it was only 53%, in Italy it was 46%. In 1940, this was still 50% and only fell to a quarter as late as 1970.[3] The other is the succession of political regimes which it experienced during the 20th century, which assumed disparate stances respectively on the questions of schooling and the extent of permitted political participation. In this context, an especially

[1] The classic case is Prussia, but it must be noted that this was done indirectly, was protracted and made use of the mobilization of religion and religious institutions. Eighteenth century Sweden, the Soviet Union, Cuba and China present other examples.

[2] There is a related debate in the development literature. Jeffrey Sachs considers poor countries need to have good schools provided by the government, regardless of market conditions (Sachs 2005). In opposition, William Easterly argues that what is important is that there is strong demand for education driven by increasing returns to human capital, and that unless these conditions are in place there is no point in government supplying education (Easterly 2001). Banerjee and Duflo (2011) have a more nuanced view, arguing that some state provision is necessary but conceding that the role of underlying demand is also critical. Indeed, empirical studies have confirmed the role of market conditions in providing the required incentives for people to choose to endow their children with higher human capital levels (e.g. Foster and Rosenzweig 1999)

[3] Children 10 to 14 had an illiteracy rate of 58% in 1930 which decreased to 24% in 1950 (Candeias 2004)

significant contrast opposes the Republic (1910-26), a limited parliamentary democracy, to a more authoritarian Military Dictatorship (1926-33) which morphed into the corporatist dictatorship of the Estado Novo (1933-74).[4] The latter denied the population any possibility of freely exercising the suffrage. For Portuguese historians and public opinion, this opposition between the two regimes epitomizes the main political and ideological struggles which have marked the 20th century. We have chosen for the present exercise the period 1910-1950, a period during which there was a marked rise in literacy in Portugal. This enables us to compare the efforts at producing human capital by these two regimes over similar time spans, while controlling for as many additional factors as possible.

In this paper we consider three issues. The first is whether institutional conditions, in particular with regard to the openness of the political process, had the effect on educational policies which the common political economy view leads one to expect, that is, that less democratic systems should be strategically less interested in educating the masses.[5] The second is whether a model which comprises both policy and family-based decision approaches provides a useful complementary explanation for variations in the supply of human capital over time compared to one focused mainly on institutional and political conditions. We must keep demand-side conditions constant before we can reach any definite conclusion about the importance of state-sponsored supply. The third is that we must control for confounding factors, by keeping economic growth constant in some way, since it affects outcomes over the long run, regardless of policy choices. In this paper we suggest and implement procedures which take into account each of these concerns.

The evidence we obtain shows that both the economic elements which shaped family decisions on education and the state were critical. But while neither can be dismissed, the latter mattered the most. The change in institutions and associated policy explains at least 70% of the considerable increase in literacy observed during 1911-1950 (this is in fact a lower bound because it assumes that the Estado Novo had nothing to do with the observed increases in heights and improvements in the disease environment as reflected in increases in life expectancy at birth). Furthermore, the "more democratic" Republic was substantially less successful than the authoritarian Estado Novo in expanding elementary education. It is also the case that poorer individuals which had limited political voice under both regimes benefited the most from new educational opportunities, but this effect was much stronger for the Estado Novo.

[4]The Republic was more democratic than the Estado Novo, but it was not a democracy in the modern sense (Ramos 2001, p. 350, 365)

[5]Acemoglu and Robinson (2012) concede that during early stages of development, non-democratic systems may be beneficial for growth. It is their view, however, that this growth would have to be of the extractive kind.

2 Political regimes and educational policies

The overthrow of the Portuguese monarchy in 1910 ushered in a new political situation which was characterized ideologically as republican, Jacobin, and fiercely anti-clerical. It was strongly influenced by the Free-masonry.[6] Although one of its earlier promises had been the establishment of universal suffrage, the Republic soon retreated and by 1913 had restricted the vote to adult males who could read and write. The number of registered voters was in fact 26% of all adult males, while those who actually voted were only around 10%, a lower proportion than in the last decades of the monarchy (Marques 1991). Elections were not entirely free and fair, but they were multi-party. Results were frequently distorted by the dominant influence of the founding party of the regime, the Portuguese Republican Party (and its later de facto continuator, the Democratic Party). In Peter Lindert (2004)'s nomenclature, this was a "limited parliamentary democracy" of the kind unlikely to promote the tax-financed education of the masses.

The republicans who took over in 1910 elected education as one of their principal banners. The country's outrageous illiteracy rates were blamed on the departed monarchy, which had failed to supply the schools and train and adequately pay the teachers, while submitting to the obscurantist influence of the Catholic Church. Their project was to reform the mentality of the Portuguese, by creating a completely secular Republican School from which would emerge a "Republican Man", imbued with healthy nationalism, mental and physical vigor and readiness to defend the regime from its opponents. Eradicating illiteracy was declared one of the highest priorities.

In practice, republican educational reform was less impressive than its rhetoric. It involved the creation of a previously non-existent ministry of Instruction and a bold transformation of the primary education sub-system, much of which did not get beyond the stage of planning. The most significant changes were the implementation of three-year compulsory primary education (extended to five in 1919), the strengthening of teacher training and the improvement of their pay. The launch of an energetic expansion of educational infrastructure was also proclaimed but fizzled out, however, soon after it had started (Carvalho 1986, Ramos 2009, p. 58-9). New universities were created, secondary and technical schools were reformed but none had any great impact.

The Republic was toppled in 1926 by a military coup, but the Estado Novo was proclaimed by plebiscite only in 1933. In between, the regime which ruled Portugal was authoritarian and anti-Republican, and Salazar, the country's future dictator, played an increasingly powerful role since 1928 (Meneses 2010). The military dictatorship and the Estado Novo represented an overt ideological rejection of the Republic.[7] They were anti-liberal, nationalist and pro-Catholic, and

[6] Recent research has shown that half the ministers and half the members of parliament during the Republic were free-masons (Ventura 2010).

[7] The militarised National Dictatorship (*Ditadura Nacional*) which started in 1926 prefigured in many ways (including education policy) the civilianized Estado Novo created later under the aegis of Dr. Salazar, a professor from

embarked on a thorough re-organization of both the economy and the society of Portugal into a so-called corporatist state. The Estado Novo was ferociously anti-communist, and in terms of political representation, its approach was radical. Only one party was allowed to exist and participate in elections, a mere formality. Decisions were taken dictatorially and were enforced without open discussion. A secret police and special courts to judge political dissenters were instrumental in keeping the institutions stable. In terms of degree of democracy, it was far from the Republic, even though the latter was in turn distant from the standards set by fully participatory regimes.[8]

The approach of the Estado Novo to education could not have been more opposed to that of the Republic, except in two respects. Both saw it as a profoundly ideological question and openly sought to use schools as an instrument to change the minds of the Portuguese. Both were deeply concerned with the eradication of illiteracy, partly for reasons of national prestige, and partly because it was through the primary school that the greatest number of minds could be moulded. Obviously, the message poured into this mould by the Estado Novo was completely different. The same can be said of the pronouncements of some of its most reactionary stalwarts on issues of education, reflecting a fear of the social repercussions produced by increased schooling. Typical of these were statements like: "Blessed are those who forget their first letters and return to the shovel"; or "To teach how to read is to corrupt the essence of our race".[9]

Notwithstanding this rethoric, the regime proved much more pragmatic and less monolithic than one might have expected, as recent revisionist studies have shown (Amaral 2002, Carvalho 1986, Palma 1983, Rias 1997).[10]

In fact, the tone of major reforms in elementary education had as their aim "the minimum of culture essential for life and to fight illiteracy in an energetic and efficient manner".[11] In this context, efficiency gains were sought by reducing the time of compulsory education and simplifying the newly-instituted national education programmes. The struggle to eradicate illiteracy was pursued by expanding the school grid but at a minimum of cost, even if parsimony meant having to lower standards. For this, it was necessary to lower teachers' status, pay and qualifications. In the country's more remote regions this went further: a significant number of pupils were placed in rudimentary installations (*postos*) rather than schools, where they received the simplest tuition

the University of Coimbra.

[8]This is underscored by their respective valuations by the Polity IV Project ranking. On a scale from -10 to +10, the Republic scored +7, and the Estado Novo,- 9. (Marshall et al. (2017)

[9]Quoted in Carvalho (1986, p. 727). For similar statements, see Mónica (1978) and Sampaio (1975-7).

[10]A critic of the regime, Carvalho (1986, p. 728) argues that Salazar opted for teaching the masses to read while seeking to control what they read rather than not educate them at all. The efforts of the Estado Novo continued beyond the period we cover in this paper. These culminated in 1952, with a vast multi-pronged Plan for Popular Education intended to finally extirpate illiteracy and put into school every child of school age. This plan included fines for parents. Eventually Portugal succeed in pulling itself out of the educational abyss in which it had long found itself (Candeias 2004); by 1950 illiteracy among children (10-14 yrs of age) had fallen to 24% (from 76% in 1900).

[11]From the preamble to law DL 27279, Novermber 24th, 1936.

from barely literate assistants (Rias, 1997).[12]

Judging by this summary of ideological and political dimensions of the two regimes, one might be tempted to expect much more, in terms of the promotion of literacy, from the Republic than from the Estado Novo. National-level indicators point in the opposite direction, however. The share of public expenditure used during the Estado Novo for education was 12%, almost double what it had been during the Republic (7%). The country's mean literacy rate increased from 38.2% in 1926 to 58.6% circa 1950. It had been 31.1% in 1911 (Candeias 2004). Between these two moments the number of children of school age per state school declined from 95.4 to 52.5. Finally, the annual growth of the literacy rate increased from an average of 1.4% during the Republic to 1.8% during the Estado Novo. Before trying to resolve this paradox with the help of a model that controls for a host of other explanatory factors, we must, however, present the data on which our exercise will be based.

3 Data and the variables

We have hand-collected our new data from primary sources belonging to the archives of the Portuguese army.[13] Other sources for some of our covariates are from published compilations of official statistics.[14] Our data were gathered for the following benchmarks: 1924, 1931, 1941 and 1950.[15] The primary source data provides information on the population of interest, and from this we have taken a random sample of 4,600+ individuals.

Our military data are drawn from the many thousands of individual observations made every year since the mid-nineteenth century in the course of recruiting young males for the Portuguese armed forces.[16] The procedure, covering the whole country, was organized to ensure that all young men complied with their obligation of national service and were treated equitably in the process.[17]

[12] For a more extensive list of deficiencies in the Estado Novo's system of education, see Nóvoa (1992, 1996).

[13] Arquivo Geral do Exército, Lisbon. The data are part of the collection entitled "Exército Portugês, Relatórios de Inspeção"

[14] Life expectancy at birth, the raw wage and the (real)wage premium are measured at the aggregate (national) level.

[15] We have some missing covariates for some individuals in 1924, but for most individuals our record is complete.

[16] In the period 1908-1930, the only one for which national data of interest to us are available, a total of 1.7 million twenty year-olds were processed in the manner described here (Marques 1991).

[17] The regulations for military recruitment under the Republic and the Estado Novo were essentially the same. For the former, see Lei do Recrutamento Militar, Diário do Governo (1911), n. 56, 10th March 1911, pp.1027-31. For the latter, see Ministério da Guerra (1937), Lei N. 1961, Lei do Recrutamento e Servico Militar (1937). Before the Republic, the system was different (Reis 2009). Under the monarchy, when all liable individuals were listed prior to the inspection, the local civilian authorities were permitted to exclude, on compassionate or functional grounds, a substantial number of individuals. This introduced a significant element of bias in the selection process since it

All those liable (i.e., 20 years old) were called for an inspection where they were identified by name, place of birth and residence, occupation, as well as by the names and residences of the parents. Anthropometric characteristics were taken down too, namely height.[18] Starting in 1924, the scholastic achievement of these subjects was also recorded.

The first aspect to note regarding these data is their high quality. There were several reasons for this. They were collected by nationally appointed boards composed of three highly qualified and respectable individuals (two doctors and one high-ranking military officer). Since the results of the inspection were subject to publicity, the probability of tampering was reduced. Finally, those under inspection had strong reasons to be truthful and accurate. The institutional aura of the inspectors, the solemnity of the occasion, and the gravity of the penalty for falsifying information or attempting to corrupt the boards (a one to two-year sentence) were powerful deterrents.

A second aspect of value is that the original data base was universal.[19] Our random sample is therefore taken directly from the population of interest.[20] A third one is that our recruitment records provide detailed information on the educational attainment of each individual which is unobtainable elsewhere. Moreover, they allow us to relate it to important economic, social, demographic and occupational features of the population under observation. The information on scholastic achievement by the age of 20, though no more than a snapshot of the scholastic aptitudes accumulated over several years, provides a history of each individual's interaction with the educational system during the critical period of this relationship, starting at age 7. It is therefore a valuable pointer for the impact of institutions on human capital formation.

Table 1 displays the different variables which will be used in our regressions. These have been taken from the manuscript data on military recruitment, as well as from printed official sources

subjected it to local economic, personal and political interests. Under the Republic, and later, the Estado Novo, this system was discontinued and only the bearers of very significant bodily lesions were dispensed outright.

[18]From the 1910s to the 1950s, children were getting brought up in increasingly better-off environments, with greater economic resources. Median statures rose by about 2 centimeters during these years. According to our sample, the median height increased from 163 cm. to 165 cm. during this period. As Allen (2008) writes, " As a rough guide, a mean height of 160 centimeters is " short" with few societies having a lower mean height for men. Indeed, 160 centimeters is characteristic of a bare bones subsistence wage like eighteenth century China or Italy" (See also A'Hearn 2003). For a long-term view of Portuguese statures, see Cardoso and Gomes (2009), and Stolz et al (2013). Hatton (2011) also finds growth of half a centimeter per decade for the first half of the 20th century in Britian, which is similar to the increases we see in Portugal (from a lower base).

[19]It is important to distinguish here the difference between two notions: inspection, which registered all those liable to be called-up for service; and recruitment, or conscription, which encompassed only those who were actually obliged to serve. Many anthropometric studies cover only the latter, and hence cover selected samples, while the former cover the entirety of the male population of age 20.

[20]We are implicitly assuming that there is no selection of survivors (i.e. that the very shortest did not die in greater proportions before we can observe them at the age of 20). For England, Hatton (2011) does not find such a selection effect; instead, he finds a scarring effect which leads children of ages 2-4 to growth less than they would have under a better health and nutrition environment.

Variable	Content	Data level	Measured	Acquired
1. Literacy	5 degrees of proficiency (from 1= cannot read, to 5 = passed at least the 1st degree exam)	Individual	T	$\geq T-13$
2. Stature	Measured in cm. at age 20	Individual	T	$\geq T-20$
3. Inverse school density	Average number of square kilometers per school	County	-	T-10
4. Life expectancy at birth	Number of years, national	National	-	T-10
5. Estado Novo	Regime dummy, 0=Republic, 1=Estado Novo	National	-	-

Table 1: Variables used in the model. Source: see text.

and demographic studies. They are related to both the year in which they were measured and to that in which they had their effect. We start with Literacy (Lit), which is the measure of human capital and our dependent variable. Table 2 displays the different categories of literacy used in the recruitment process. There are two ways of expressing an individual's possession of the basic reading, writing and counting skills imparted by primary schooling, normally between the ages of 7 and 11. Conventionally it is a dichotomous variable which reflects the presence (=1) or absence (=0) of these attributes. We follow this standard procedure in this study. But using a binary variable conceals disparate packages of skills under the same cover and therefore implies a considerable loss of information.

The richer alternative, which we also adopt for this study, takes advantage of the fact that the conscription boards laboriously distinguished between a variety of outcomes. These could range from several years of school attendance, with varying informal results; or approval in the 1st or 2nd degree public examination at the end of primary school. In the absence of exam approval information, the board resorted to informal classification of the sort "being able to read and write well", "regularly" or "badly". We have converted these indicators into a scale from 1 (for illiteracy) to 5, as listed in Table 2.

Stature (st) is given in our source for every candidate and is measured in centimeters.[21] In keeping with the principles of Anthropometric History, it is taken as a proxy for the economic and social resources of the family of the examinee when in his early formative stage.[22] We take this to

[21] Throughout preindustrial human history, the heights distribution was close to invariant (Koepke and Baten 2005). Heights are kept in check in poor societies due to a physiological check: when body size increases, subsistence requirements also grow, which limits further nutritional advances (Dalgaard and Strulik 2015). Only with industrialization did a reduction in family size and an intensification of nutrition per child take place (Dalgaard and Strulik 2016).

[22] Hatton (2013) places emphasis on the improving disease environment as a proximate source of increasing height,

Educational Status	Description in recruitment register (in Portuguese)	Rank order (Lit)
Illiterate	Analfabeto	1
Reads poorly	Lê mal	2
Reads	Lê	2
Reads and writes poorly	Escreve e lê mal	2
Reads and writes	Escreve e lê	3
Reads and writes well	Escreve e lê bem	3
Reads, writes and counts	Lê, escreve e sabe contar	4
Reads, writes and counts well	Lê, escreve e sabe contar bem	4
Passed 1st degree exam	Aprovado no exame do 1° grau ou classe	5
Passed 2nd degree exam	Aprovado no exame do 2° grau ou classe	5
Enrolled in higher than elementary education	Matriculado em cursos superiores ao primário	5

Table 2: Categorization of literacy levels. Source: see text.

be close to twenty years prior to the inspection. We assume a degree of persistence in this variable such that its influence on family decisions was felt at least throughout the period of his primary schooling, i.e. up to eleven years after birth (here rounded to 10).[23]

The preceding variables refer to individuals. In addition, our study employs a set of environmental factors which is constituted by aggregate indicators, either of policy input, or of general economic conditions, both of which could have shaped family decisions on education. The first of these is the total number of primary schools in each administrative division (*município*) relative to its area. It is designated "inverse of school density" (*ischde*) and proxies the average distance that children had to cover in order to reach their place of instruction. This was the main cost of schooling which families had to bear, attendance being free in the dominant state system.[24]

while claiming that these were not driven by the effects of welfare spending by the state. However, when household income can be directly verified, it is a strong predictor of heights (Hatton and Martin 2010, concerning England during 1906-38). In any case, it does not matter for our results whether heights mainly reflect household income or the health environment, as we are not interested in separately identifying these effects on literacy. We just need to control for them when evaluating the effects of different regimes.

[23]Furhermore, cognitive function depends positively on height, as it develops along with the rest of the body (Case and Paxton 2008, Deaton 2013, p.157).

[24]The cost of clothing and shoes that had to be used for going to school, was probably non-negligible but we lack this information either on an individual or collective basis.

Three other variables need to be quantified at national level. At present, it is impossible to estimate with reasonable success the household-level rate of return on investment in schooling, an indicator which families might have found useful in taking their educational decisions.[25] Instead, we adopt the skill premium as a proxy for the economic advantage of constituting basic human capital.[26] It is measured at the time when roughly (T-10) the draftee would be going into school. It is the ratio of the raw to skilled labor wage in an occupation (textile workers) presumed to require a minimum degree of literacy. These constituted a large part of the industrial work force and were often literate at the time.[27]

A second variable of this sort is our proxy for the opportunity cost of attending school. Although we cannot know the wage of child labor, we assume, reasonably, that it can be proxied by that of adult men working in the countryside and deflate it by a standard CPI. [28] The third variable which we measure at the national level is life expectancy, which is a standard component of any model used to analyze investment decisions in human capital (Boucekkine et al 2007) and is obtained from national demographic tables. It matters greatly in reflecting the disease environment faced by the children, as well as the number of years they would be expected to live, since this affects the present discounted value of earnings, and hence, the rate of return of investment in human capital. It is refers to the approximate moment in which school enrolment was taking place, i.e. approximately T-10.

We collected a random sample of 4,600+ individual entries from twelve counties, for four benchmark years. Our counties happen not to include the country's two biggest cities, where private schooling existed and represented part of the supply of schooling. This is convenient because national education statistics for this period do not take private establishments into account. This would make it impossible to estimate school density for such major centres of population. Hence our study is restricted to rural Portugal, including rural towns, i.e. the entire country except Lisbon and Porto. During the time span we are considering, this corresponded to between 90 (1911) to 87 (1940) percent of total population.[29]

[25] We are here referring to the household-level rate of return (i.e. that internalized by families), as oposed to the global (i.e. social) rate of return which includes state costs. The calculation of the latter was attempted for a later period by Amaral (2002).

[26] Anuário Estatístico de Portugal (several years)

[27] In 1961, the date of the first scientific enquiry into the human capital of Portuguese workers, 81% of skilled workers in manufacturing were literate. See Projecto Regional (1965), vol. 2.

[28] For the nominal raw labor wage, Anuário Estatístico de Portugal (several years); for the CPI, Valério et al. (2001).

[29] The population of Lisbon and Porto was comparatively small at the time (never higher than 13%), and migration is unlikely to bias our estimates due to an urban penalty as the country industrialized (Bodenhorn et al 2017); see also Reis (2009) for the case of Lisbon. Owing to the fact that only males aged 20 are observed, two shortcomings are present. One is that the records exclude everybody under or over 20 and could cause an underestimate of the literacy levels, given that during this period this attribute could be acquired out of school by people in their twenties or early thirties (Ramos 1998, Candeias 2004). The second problem arises with the exclusion of females. Rather than

This rural (and rural towns) population is of the greatest interest here in that it was the part of the country which displayed the highest and most persistent illiteracy rates.[30] Table 3 displays some summary statistics separately for both regimes, for the counties that were used in the regression. We can see that literacy[31], stature and life expectancy at birth were higher under the Estado Novo, while school density was higher (i.e. inverse school density was lower). In the next section, we want to investigate how the change in literacy is related to the movement in the other variables.

	Republic (1910-1926)	Estado Novo and preceding military dictatorship (1926-1950)
Literacy rate	40.3%	66.0%
Average stature	1.64	1.65
Life expectancy	39.1	46.7
Inverse school density	10.5	7.2

Table 3: Summary statistics across the two regimes. Source: see text.

4 Regression Results

Our model describes the circumstances which influenced families in their decisions to endow with basic human capital their young male offspring and by how much. Its aim is also to establish the extent to which the political regimes affected the families' decisions. Our study provides answers to questions raised earlier by Portuguese historians of education and casts them for the first time in a rigorous quantitative framework. We consider the obstacles this literature has postulated as having held back children from schooling during all these years. Was it the direct cost to families of education? Was it an atavistic hostility towards knowledge and culture? Were families unable to perceive a sufficient return from this investment? Or were they reacting to physical isolation, a lack of adequate facilities, or a feeling that life was too short and uncertain to merit such a costly, long term investment?

Our analysis combines demand and supply side explanatory variables to account for individual

being constant during these decades, women were on the whole catching up on men in this respect (Candeias 2004), though at differing convergence speeds over time.

[30]The counties used are: Aveiro (1), Cantanhede (2), Chaves (3), Ilhavo (4), Loures (5), Mafra (6), Mesão Frio (7), Murça (8), Ribeira da Pena (9), Sintra (10), Vila Franca de Xira (11) and Vila Real (12). These regions seem to represent the country well, with both coastal and interior locations represented, and 4 being located in the South of the country, 3 in the Centre, and 5 in the North.

[31]In the case of literacy the attribute would have been acquired up to 13 years before but not earlier, since children at this time started school at the age of 7 (or later)

human capital attainment and rests on a number of assumptions. The critical one is that school enrolment was freely decided upon by families who acted rationally, on the basis of a relevant stock of information with the aim of maximizing their progeny's benefits from education.[32] Recent studies have concluded families were aware of the possibilities of upward mobility which education might confer. Equally important is the presumption that school enrolment, though compulsory by law, was in practice largely voluntary.[33] Elementary schooling was provided by the state and was therefore a free good.[34].

Our first step is to estimate a probit in which the dependent variable is the literacy binary indicator, *blit*. The second is an ordered probit in which the dependent variable (human capital) is the categorical *lit* variable, classified according to Table 2. All individual-level measurements have as their measurement reference time T, when the subject had his stature measured by the army board. Height, which proxies economic conditions in the early years of life (or even during the mother's pregnancy), should explain in part the human capital stock observed at time T. The economic conditions it reveals shaped the decision, at about time T-13, as to whether the subject would be sent to school, and subsequently the annual decision to stay or leave school. We set the relevant value of the inverse of school density (*ischde*) (proxying how far away schools were from home, hence how difficult it was for children to get to school in average) for time T-10 because that was approximately when and wheter the decisions, to enroll the youth in question and to keep the child in school, were taken. We estimate the effects of different political regimes by including a dummy: EN=1 for Estado Novo and EN=0 for the Republic[35].

[32]Fonseca and Guimarães (2009a and b), who also use micro data but of a completely different nature, i.e. marriage records.

[33]The first modern reform of education, in 1835, declared primary instruction compulsory for children over 7 and made parents responsible for the observance of this norm. In 1952, after many legislative efforts to render this effective by means of fines and threats of imprisonment, it was noted, in a ministerial report, that 20% of all children between 7 and 11 were still not matriculated in any school, despite inducements such as free meals, clothing and books for the poor ones. See preamble to Decree-Law n. 38968 of 1952 in Diário do Governo.

[34]Law 1969 of 20 May 1938 in Diário do Governo, pp.845-47.

[35]We are hence assuming that the assignment of the regime (EN or Republic) was exgenous to each individual, conditional on height and the other covariates. It is safe to assume that the reasons for the timings of regime change and continued survival were exogenous to the individuals in our sample. The 1926 coup which initiated the military dictatorship which would eventually morph into the Estado Novo was modelled after Mussolini's march over Rome which had occurred three years earlier; and while we do not wish to overemphasize the similarities between these regimes, Portugal's limited size and international influence suggest that the rise of right wing authoritarian regimes elsewhere in Europe set the tone for regime change independently of internal developments, just as the cold war later contributed to the regime's survival, as was the case in Spain.

4.1 Basic Regression Results

The baseline model follows a probit regression which estimates the probability of a given person being literate when the error term is assumed to follow a normal distribution. Denoting $blit = 1$ when a person is literate, $\mathbf{X}$ as the vector of covariates and Φ as the cumulative normal distribution, the probability of a person being literate conditional on covariates can be written as follows:

$$Pr(blit_{it} = 1 \mid \mathbf{X}) = \Phi(const + \beta_1 EN_t + \beta_2 st_{i,t} + \beta_3 lifeexp_{i,t} + \sum_{j=2}^{12} \alpha_j region_{i,j} + u_{i,t})$$

Table 4 summarizes the regression results alongside the estimated marginal effects of the Estado Novo.[36] The baseline model is presented in column 1, which controls for demand-side and regional variables.[37] The estimated average marginal effect (AME) of EN on literacy is 20.5 percentage points (p.p.), after controlling for the other covariates. The size of this effects is large: compared to an average literacy rate of 40 percent in the previous regime, EN on average raised the probability of an individual being literate by more than 51%, after controlling for other covariates.[38] For completeness, the marginal effect at the average (MEA) is also reported and turns out to be similar, but higher, than the AME. The fact that the MEA of the Estado Novo is larger than the AME counterpart suggests that the "average joe "benefited the most from the Estado Novo. We reach the same conclusion by comparing the MEA of EN with that for tall individuals (which we define as those on the threshold of the 1st quintile, i.e. at the 20th percentile), also reported at the bottom of Table 4.[39]. Columns 2-4 show that these results do not change much if control variables are dropped. Column 7 shows that the results also do not change much if a different estimation approach which relies on weaker distributional assumptions (Linear Probability Model, i.e. OLS) is pursued.

Column 5 illustrates the effect of adding inverse school density to the model. School density is a policy variable for the Estado Novo (which is why we do not control for it in the baseline regression), and hence the interpretation of the EN effect now changes: it now captures the effect of supply-side policies of the regime except for changes in school density associated with this regime. However, the coefficient on inverse school density is only statistically significant at the 10% significance level,

[36] Since the EN corresponds to a dummy, this is really a discrete effect. Nonetheless, we will follow convention in referring to it as a marginal effect.

[37] In our regressions, we interpret life expectancy at birth as controlling for the share of the disease environment not explained by income, which we control using heights. We measure life expectancy at birth, since as is always the case in poor societies, the bulk of the increase in life expectancy at birth is due to declining child mortality.

[38] This is calculated by dividing 20.5 p.p. over the 40 percent literacy rate of the Republic.

[39] This effect turns out to be quite similar to the AME

DEP: Literacy (binary)	Probit						LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Estado Novo = 1	0.580***	0.621***	0.677***	0.545***	0.536***		0.204***
	(0.125)	(0.125)	(0.0513)	(0.116)	(0.126)		(0.0419)
Stature	2.606***		2.582***	3.159***	2.563***	2.594***	0.868***
	(0.333)		(0.334)	(0.443)	(0.334)	(0.327)	(0.127)
Life Expectancy	0.0127	0.00942		0.0125	0.0136		0.00450
	(0.0167)	(0.0169)		(0.0166)	(0.0170)		(0.00571)
Inverse school density					-0.0144*		
					(0.00785)		
Year = 1931						-0.0580	
						(0.124)	
Year = 1941						0.611***	
						(0.0834)	
Year = 1950						0.689***	
						(0.106)	
Regional dummies	YES	YES	YES	NO	YES	YES	YES
AME of EN	0.205***	0.222***	0.239***	0.209***	0.189***		0.204***
	(0.0440)	(0.0442)	(0.0175)	(0.0446)	(0.0446)		(0.0419)
MEA of EN	0.227***	0.243***	0.264***	0.214***	0.210***		0.204***
	(0.0475)	(0.0472)	(0.0192)	(0.0447)	(0.0482)		(0.0419)
ME of EN at 1st Quintile	0.205***	0.243***	0.239***	0.207***	0.189***		0.204***
	(0.0440)	(0.0472)	(0.0175)	(0.0446)	0.0447		(0.0419)
Pseudo R^2 / R^2	0.1372	0.1266	0.1368	0.0665	0.1384	0.1373	0.1733
Observations	4,614	4,616	4,614	4,614	4,606	4,614	4,614

Robust standard errors clustered by county. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Baseline regressions. Source: see text.

and while it does have the expected negative sign, the effect of EN on literacy does not change much in this specification. Hence, it appears that the increase in literacy is not due to school density but due to other policies pursued by the Estado Novo. This result, which contrasts with the emphasis on school-building for other poor economies (Duflo 2001), will be further investigated in Sections 4.2-4.4.

These regression results do not incorporate year dummies, as these would confound the estimation of the Estado Novo effect (in this case they would be perfectly collinear). The regressions rest on the assumption that, once the demand-side and regional controls are included, the only effect that the year dummies should have is caused by the regime change.[40] It is possible to test for the validity of this assumption using the following exercise. Firstly, year dummies should only be significant in the years of the Estado Novo, i.e. 1941 and 1950 (given that 1924 is the base year) and secondly, the difference in the coefficients across these two years should not be statistically significant. This formulation of the assumption makes it possible to test it, as we do in column 6 of Table 5. As expected, the coefficients are not significantly different between 1941 and 1950, and they are similar to the estimates in the baseline regression, while the year dummy in 1931 is not significant. This result confirms two points: First, when controlling for the other variables, the effect of year dummies matters only insofar as it coincides with the regime change. Secondly, and relatedly, this provides evidence for the underlying assumption that the effect of each different regime on literacy did not change over time.

Across the regressions, there is a clear pattern with regards to the control variables. Stature yields an individually significant and relatively large effect: based on the baseline regression in column 1, for the average individual, the effect of a ten centimeter increase in height results in a 9 percentage point increase in the probability of being literate (i.e. not being illiterate), ceteris paribus.[41] However, life expectancy at birth is not significant while inverse school density is only significant at the 10% significance level.[42] This is not due to large standard errors; in fact, the standard errors on these variables are small, so the null effect is estimated precisely. Instead, the effect is due to the small magnitudes of the coefficients. Most regional dummies, on the other hand, are significant; the heterogeneity of effects across regions will be discussed in the next subsection.

[40] Our results are in fact likely to underestimate the true total Estado Novo effect by assuming that the observed changes in heights are independent from this regime (this matter is discussed in more detail in a subsection below).

[41] This effect is even larger in the baseline with interactive effects between regime and stature, shown in column 1 of Table 5 in the next subsection. There, a ten centimeter increase in stature for the average individual leads to a 12 pp increase in literacy under the Estado Novo, but only to a 5.5 pp increase in literacy under Republic

[42] Note, however, that inverse school density is no longer significant when controlling for interactive effects between EN and stature, see Table 5, discussed in the next subsection.

4.2 Interactive effects

The next question we turn to is whether the Estado Novo affected differently children of different heights. For this purpose, we interact the other covariates with the EN dummy, as shown in Table 5. The evidence points towards significant demand-side effects: Column 1 shows that stature has a positive interactive effect with EN, ceteris paribus.[43] Columns 2 and 3 show that no similar interactive effects are significant with the other covariates.

Column 4 shows the presence of significant heterogeneity across regions in the effect of the Estado Novo. In particular, the three regions in our sample which are close to the city of Lisbon form three of the four highest estimated effects. These are, in decreasing order: Loures (Region 12), Sintra (Region 19), and Mafra (Region 13); this order also corresponds to how far away each is from Lisbon. A possible explanation for this is that enforcement of enrolment and school attendance rules by the regime was more credible close to the capital, as will be further explored in Section 4.4.

We now perform an additional exercise (using our baseline results, column 1 of Table 5). How much greater a probability of ending up literate does the child gain by going from the 25th to the 50th percentile? Our regression suggests that the above change in stature increases literacy by 2.2 percentage points under the Republic, but 4.9 percentage points for the EN. Alternatively, at the 50th percentile (the median), a 1 centimeter increase raises the probability of literacy by only 0.55 percentage points in the Republic (from 0.407 to 0.413), but 1.2 percentage points in the EN (from 0.663 to 0.675). This indicates that the policies of the Estado Novo were creating more human capital accumulation opportunities for the average (and median) citizen than had been the case under the Republic.[44]

Figure 1 shows the marginal effect of EN on the probability of being literate across quintiles of stature. This follows the same specification as column 1 of Table 5, except that instead of a continuous measure of stature we group individuals into five quintiles of stature (i.e. where the 1st quintile includes the tallest individuals, from the 80th to the 100th percentile of heights, and so on; quintile 5 includes the shortest). The figure shows two facts clearly. First, for both regimes, height

[43] This is driven by those between quintiles 2 and 4, i.e. in the percentiles 20 to 80, as illustrated by Figure 3 of the ordered probit subsection, below. In any case, the Estado Novo raised literacy levels for everyone, though especially for those individuals that were around average stature. Levels of education rose for all and not just those who were economically better off. This will be shown and explored in greater detail using ordered probit regressions in Section 4.4.

[44] These results use the heights correspondent to each regime; but if we use the whole sample (hence considering absolute poverty levels), changing in stature from the 25th to 50th percentile increases literacy by 2.2 percentage points under the Republic but 5.0 percentage points for the EN. Alternatively, at the median, a 1 centimeter increase raises the probability of literacy by 1.3 percentage points in the EN (from .593 to .606) but only by 0.55 percentage points in the Republic (from 0.408 to 0.414).

DEP: Literacy (binary)	(1)	(2)	(3)	(4)	(5)
Estado Novo = 1	-2.725*	0.0863	0.582***	0.361***	-2.653
	(1.656)	(1.603)	(0.157)	(0.137)	(1.667)
Stature	1.550**	2.594***	2.562***	2.581***	1.531**
	(0.636)	(0.327)	(0.335)	(0.331)	(0.638)
Life Expectancy	0.0113	0.00936	0.0123	0.0150	0.0108
	(0.0164)	(0.0200)	(0.0168)	(0.0172)	(0.0165)
Inverse school density			-0.0125*		-0.0119
			(0.00741)		(0.00764)
EN * Stature	2.022**				1.982**
	(0.996)				(0.994)
EN * Life Expectancy		0.0111			
		(0.0363)			
EN * Inverse school density			-0.00410		-0.00446
			(0.00896)		(0.00884)
EN * Cantanhede				0.0428***	
				(0.00743)	
EN * Chaves				0.274***	
				(0.00586)	
EN * Ilhavo				0.303***	
				(0.00173)	
EN * Loures				0.811***	
				(0.0479)	
EN * Mafra				0.339***	
				(0.00372)	
EN * Mesão Frio				0.234***	
				(0.00905)	
EN * Murça				-0.0461***	
				(0.00653)	
EN * Ribeira da Pena				0.240***	
				(0.00758)	
EN * Sintra				0.467***	
				(0.0589)	
EN * Vila Franca de Xira				0.167***	
				(0.0600)	
EN * Vila Real				-0.0698	
				(0.0511)	
AME of EN	0.209***	0.200***	0.193***	0.204***	0.197***
	(0.0430)	(0.0460)	(0.0456)	(0.0462)	(0.0451)
MEA of EN	0.233***	0.233***	0.214***	0.226***	0.117
	(0.0463)	(0.0463)	(0.0494)	(0.0505)	(0.0986)
Observations	4,614	4,614	4,606	4,614	4,606

Robust standard errors clustered by county. *** p<0.01, ** p <0.05, * p <0.1

Table 5: Regressions with interactive variables. Source: see text.

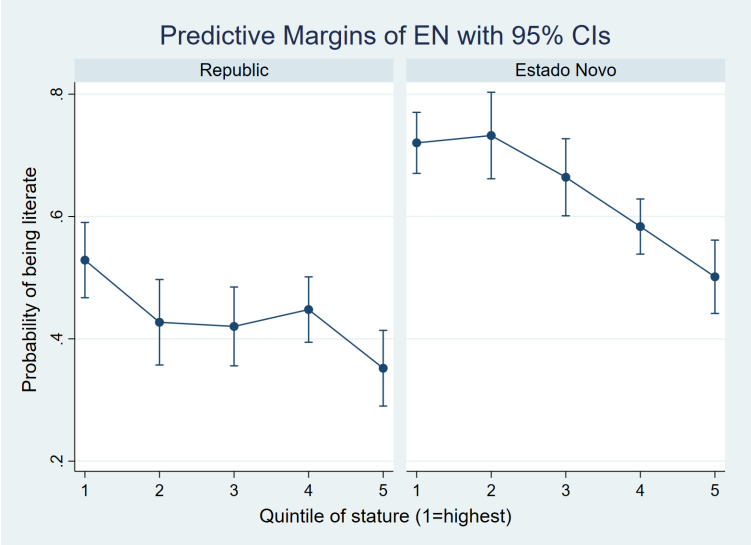

Figure 1: Probability of being literate, conditional on height (1=tallest) and controlling for other covariates, for both regimes. Sources: See text

was a very strong predictor of literacy, even after controlling for the early life disease environment as captured by a national estimate of life expectancy. The relationship is, for each regime, close to monotonic – taller people ended up more educated. A second fact is that, under the Estado Novo, the probability of literacy increased (compared to the Republic) across the entire height distribution. The results are striking. For example, the probability of an individual in the shortest quintile being literate during the Estado Novo was similar to that of an individual in the tallest quintile during the Republic.

Finally, instead of using the height specific to each regime, as we do in Figure 1, an alternative way to assess each regime is to consider an abstract person at some absolute level, i.e. at some height quintile, who faces life expectancy at the unconditional average level (43.0 years). We can then compare what were this person's chances to be literate under both regimes (we allow school density to vary with each regime, from an average of 10.5 in the Republic to 7.3 in the Estado Novo as this was a policy variable). Table 6 shows the results. These results reject the idea that the poorest did not benefit from the Estado Novo, or even that the richest benefited the most. Instead, it turns out that everyone benefited, though it was the individuals around the middle of the distribution that benefited the most.[45]

[45]In section 4.5., we reach a similar conclusion using a different methodology (see Figure 3).

Stature	Heights (cm)	Republic	Estado Novo	Difference
Quintile 5	1.49-1.59	33.97%	49.79 %	15.9 p.p
Quintile 4	1.59-1.63	44.21 %	58.92%	14.7 p.p.
Quintile 3	1.63-1.66	39.90 %	67.61%	27.7 p.p.
Quintile 2	1.66-1.70	43.89%	74.21%	30.3 p.p.
Quintile 1	1.70-1.79	51.60%	73.28%	21.7 p.p.

Table 6: Probability of literacy: differential effects across both regimes. Source: see text.

4.3 Breaking up the effect of the Estado Novo

The inclusion of interactions allows a more detailed analysis of the EN effect on literacy. In particular, since relevant demand-side controls (e.g. height and life expectancy at birth) were rising for reasons possibly beyond the control of the regime, it is interesting to disentangle the effect that the Estado Novo would have had if it faced the same conditions as the Republic. The question is how much of the increase in literacy can be attributed to the Estado Novo, and how much of it is due to other changing characteristics that worked to the benefit of literacy.

For this purpose, we calculate literacy in a counterfactual Republic, where we set EN=0 while changing the other covariates to the mean of the values in the years 1941 and 1950. Similarly, we estimate a counterfactual Estado Novo during the time of the Republic. Comparing the estimated probabilities of the counterfactual Republic and of the Estado Novo then allows us to isolate the effect that solely stems from the change of regime to the Estado Novo.[46]

Table 7 shows the resulting probabilities of literacy across counterfactual regimes and years, using the specification of Table 5, column 5, which includes interactive effects of both stature and inverse school density with EN. For each combination of years, the mean value of the indicated covariates is taken in order to calculate the estimated and counterfactual probability of literacy (see Table 3). The result again points towards a strong effect of the change in regime. Literacy increased in the Estado Novo by approximately 47%, compared to a counterfactual republic that experiences the same levels as the EN for other covariates. (Previously, the estimate was 51%.) Hence, the model decidedly rejects the idea that literacy rose under the Estado Novo only because of a change in demand-side variables. Instead, the estimates suggest that the new regime had a very significant effect on literacy, over and above what is applicable through changing stature, life expectancy at birth and school density.

[46] As any calculation of counterfactuals, this exercise rests on a number of assumptions. The most important here is that the estimated parameters are policy-invariant, such that they can be used for counterfactual analysis under the two regimes.

	Probability of Literacy under EN=1	Difference to counterfactual Republic
Baseline: All variables vary	0.6645941	21 p.p.
Scenario 1: demand-side held constant	0.6230153	17 p.p.
Scenario 2: inverse school density held constant	0.6463438	19 p.p.

Table 7: Estimates and counterfactuals. Source: see text.

In order to further disentangle the effects of the demand side (life expectancy at birth and stature) and supply-side (school density) effects, we calculate two further counterfactuals. Under Scenario 1, we only let (inverse) school density vary to the mean of the Estado Novo while keeping life expectancy at birth and stature at the mean value under the Republic. This isolates the effect of the change in regime which is not due to changes in the demand-side variables. Under Scenario 2, we let the two demand-side variables vary, while keeping (inverse) school density constant. This estimates the effect of the change in regime on literacy which is due to factors other than school density. The results are quantitatively similar across specifications.

Table 8 shows the estimated probabilities of literacy under the Estado Novo for the two scenarios of Table 7.[47] When holding life-expectancy at birth and stature constant, the change in the probability of literacy under the Estado Novo is 4 percentage points lower than if those variables were allowed to vary. Hence, demand-side variables seem to explain some of the increase in literacy, but cannot account for the large observed increase by themselves. Under scenario 2 where inverse school density is held constant, the change in literacy is estimated to be 2 percentage points lower than in the baseline scenario. This points to the conclusion that increases in school density were not a defining factor in the increase of literacy experienced under the new regime.

	Republic (1924 and 1931)	Estado Novo (1941 and 1950)
Literacy under Republic	0.405	0.454
Literacy under Estado Novo	0.604	0.665
Difference, Republic versus Estado Novo	20 p.p.	21 p.p.

Table 8: Counterfactuals for demand-side and supply-side effects. Source: see text

The counterfactuals imply that the effect of the Estado Novo on literacy is not explicable due

[47] As with Table 6, we use column 5 of Table 5 to calculate these results.

to changes in economic wellbeing (as captured by stature and life-expectancy at birth) or by the provision of more schools. As already hinted in the previous section, and discussed in more detail below, the bulk of the effect stems from other changes associated with the Estado Novo itself.

4.4 Unbundling the increase in literacy

Having calculated the counterfactual analysis in Section 4.3, we will now decompose the observed variation in literacy into its individual causes.[48]. Ultimately, our goal is to understand how much of the variation in literacy is caused by the change in regimes, and how much of it is explainable by other factors. The total estimated effect of literacy from the change to the Republic was 21 percentage points. Out of this, 4 percentage points or approximately 20% of the effect is accountable by changing demand-side variables (changes in life expectancy at birth and in stature). Only 2 percentage points or approximately 10% of the effect is explainable by the change in school density.[49] Hence, 70% of the observed increase in literacy is due to the institutional characteristics of the Estado Novo that are unrelated to the demand-side variables and to changes in school density. We interpret this effect as being caused by institutional changes under the Estado Novo. We discuss our hypotheses for why this was the case in the next section (Section 5).

We are confident that the effect we estimate is not simply a change in time periods but rather caused by the Estado Novo. The reasons for this were explained in Section 4.3.: In an alternative specification where time dummies are included instead of regimes, they are only statistically significant insofar as they coincide with regime change. In other words, having controlled for the changing family wealth and wellbeing (through stature and life expectancy at birth), the effect of the Estado Novo variable captures the institutional changes that arose with the new regime.

In our regressions we cannot include the skill premium or the opportunity cost of having children in school (the raw labor real wage) as they are collinear with other covariates, namely, the regime or time dummies. This is because we can only observe these at the national level. Their absence could be a problem if the skill premium was rising (or was expected to rise in the future), or if the raw labor real wage was falling, since either of these factors would mean increased differential incentives for parents to invest in human capital of their children. However, the bias resulting from their absence only makes our results stronger, because what in fact happened was that during our

[48]It is worth noting here that there are two additional factors likely to influence families' decision to send their children to school and to keep them there for a longer or shorter time. These are: the skill premium, which influences incentives to accumulate human capital; and the raw labor wage, which corresponds to the opportunity cost of keeping children in school. We cannot include these in the regressions because we only have national measures for these, leading to collinearity with other covariates; nonetheless, we show at the end of this subsection that, given their trends, the resulting bias can only make our results stronger

[49]Our calculations are based on Tables 7 and 8 of Section 4.3.

sample period the skill premium was falling and the real wage for unskilled workers was rising. The real wage paid to male agricultural workers went from an index of 100 in 1921 to 137 in 1930 and 163 in 1940, which is consistent with the observed rise in statures and with contemporary economic growth (Batista et al 1997).[50]

As for the skill premium, it fell during the entire period of our sample.[51]. This fall suggests that fast accumulation of human capital was not driven by rising returns to human capital. Rather, it seems possible that the number of people accumulating human capital at this time grew faster than did the available jobs requiring such skills.[52] We suggest that the Estado Novo's policies were targeted towards expanding the educational opportunities for the poor. These were successful, and hence led to some social convergence.

4.5 Ordered Probit Regression

The scores used to classify the literacy of individuals (see Table 2) lend themselves naturally for an ordered probit regression. The specification is similar to the previous section, with the difference that the dependent variable now consists of five different categories, in increasing order of literacy. The dependent variable is $lit_{it} \in \{1, 2, 3, 4, 5\}$, where $lit = 1$ if the person is illiterate. It becomes $lit = 5$ if the individual at least passed the first exam of primary school. Instead of predicting the conditional probability of a person being literate, the model now predicts the conditional probability of a person being in any one of the five categories of literacy. Note that even the highest level of literacy captured only corresponds to what would now be considered basic education.

Figure 2 plots the estimated marginal effects for this ordered probit regression (standard errors are calculated as before). The increase in literacy observed under the Estado Novo seems to be driven by two developments. Firstly, the probability of being illiterate ($lit = 1$) decreased from 53% to 40% under the Estado Novo. Secondly, the probability of being in the highest category ($lit = 5$) increased from 20% to 30% (i.e. this 10% differential means a 50% increase over the initial 20%). The frequency of the remaining categories did not change much. Hence, the regime both brought illiteracy down and increased the proportion of people who at least passed the first final

[50]Source: for the nominal raw labor wage, Anuário Estatístico de Portugal (several years); for the CPI, Valério et al. (2001).

[51]It fell from 2.2 in 1924, to 1.84 in 1931, 1.6 in 1941 and down to 1.53 in 1950. This is related to the fact that the real wage for raw labor, fell from a mean of 0.38 in 1924 to 0.33 in 1931 but then rose to 0.48 in 1941 and again to 0.55 in 1951.

[52]Our proxy for the school premium is the ratio of a worker on the textile sector relative to the raw labor wage rate. Hence is a real measure. While this is evidence for one sector only, textile sector output grew in real terms 63% between 1924 and 1940, while male literacy for those of 10 or older years old grew from 1.6 to 2.9 million during the 1920-40 period, which corresponds to a net growth of 81.25%. So perhaps the decline in skill premium is not that surprising

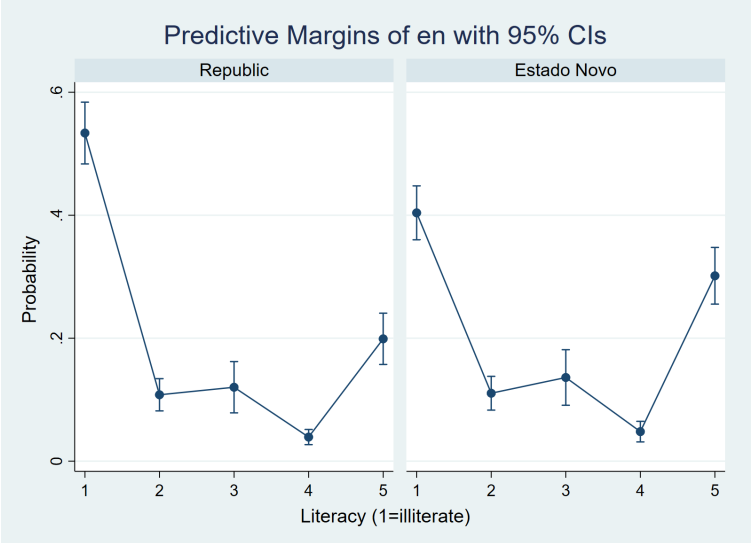

Figure 2: Literacy categories across the two regimes. (Source: See text)

degree exam of primary school.

In our analysis in Section 4.2. we found a positive interactive effect between stature and EN. In order to further investigate this effect, individuals are classified according to the quintile of stature they are in, separately for each regime in order to take account of changing stature distributions. An interesting pattern emerges, as shown in Figure 3: individuals in the 2rd to 4rd quintles experienced most of the significant changes in literacy under the Estado Novo. These can be loosely interpreted as the middle class, spanning the 80th up to the 20th percentile of stature.

This "middle class" (which, in absolute terms, was poor from today's perspective) experienced both the greatest decline in illiteracy and an increase in the highest level of literacy. We speculate that the reason was that on the one hand, there was less progress to be made among the tallest to start with; and the shortest were too poor to benefit as much as those a bit taller. Nevertheless, these are relative statements, but in absolute terms, even the poorest benefited. Figure 3 shows that the Estado Novo did improve the situation of very poorest since the the distribution of the lowest quintile in stature across values of literacy improved with the Estado Novo. Under this regime, the probability of illiteracy for the very poorest decreased from 60% to less than 50%, while the probability of reaching the highest level of education improved from about 18% to over 20%.

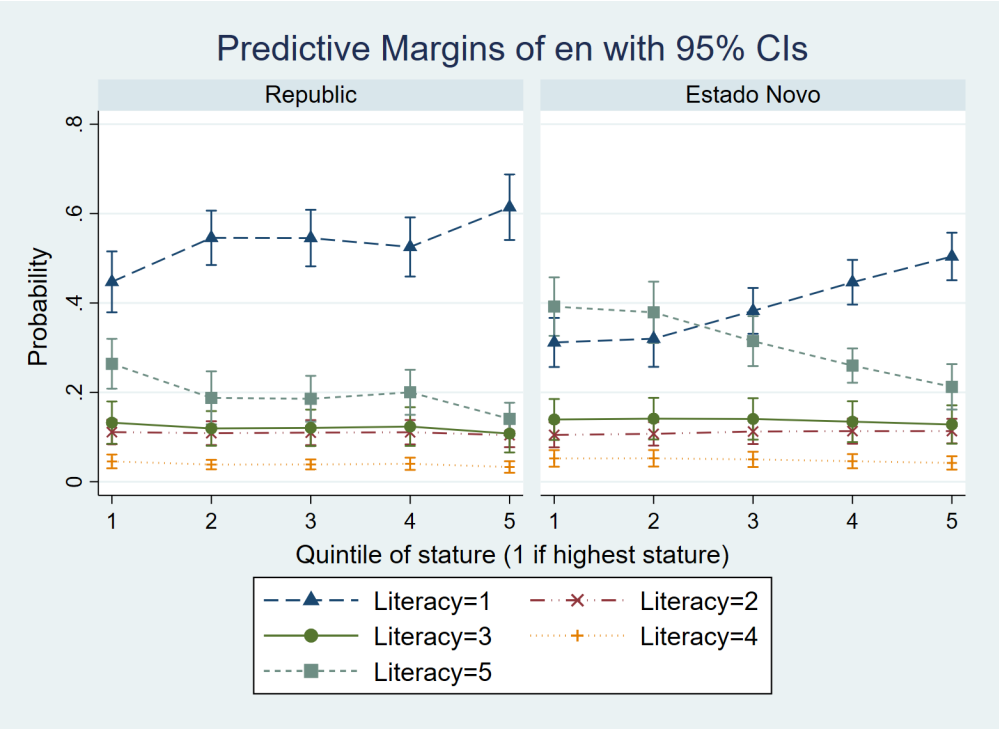

Figure 3: Literacy categories by quantiles of stature. (Source: See text)

5 Explaining educational success under autocracy

As far as education policy is concerned, the Estado Novo in its early years had the correct development strategy for the poor, rural country which Portugal was. The Estado Novo policy succeeded in part because it was realistic (i.e. feasible) and targeted at, as well as aligned with, the preferences of the mass of the population. Previous historians such as Candeias (2004) have emphasized school-building, and while we found above that it mattered marginally, it was secondary relative to other matters related to enforcement, political economy incentives, and to the way that families reacted to the nature of the regime. As our counterfactual shows, the Republic had enough infrastructure to make a greater difference than it did. But it could only realize its potential if it was better aligned with the cultural preferences of the population. By contrast, we have shown that at least 70% of the large observed increase in literacy is due to the institutional characteristics of the Estado Novo that are unrelated to the demand-side variables (i.e. stature and life expectancy). Most of this effect is due to aspects of the institutional change under the Estado Novo unrelated to school density increases. Ultimately, it was the close alignment of the policies of the Estado Novo with the culture of the masses which (perhaps in part as an unintended consequence) led to remarkable increases in literacy.

For lack of satisfactory historical research, we can only speculate about the fact that the Estado Novo adhered effectively the cause of mass education. Many of its supporters in fact opposed this. Yet others felt that widespread literacy had two advantages. One was the need to wipe away the shame of Portuguese cultural backwardness when confronted with the "civilized world". The other was that schools would not represent a threat to a dictatorship if they were properly controlled and if what people read was properly monitored.[53]

The success of the Estado Novo in educating the masses on a greater scale was due to three factors. First, its policies were more feasible than those of the Republic. By this we mean that they were more cost-effective, more centralized, and there was better enforcement. Secondly, the Estado Novo's educational policy was more in line with the cultural background of the masses. Thirdly, despite being an autocracy, the Estado Novo had stronger political incentives than the Republic to educate the masses, since providing literacy to the masses did not threaten the regime's continuation, which was not the case with the Republic. We now go over these three arguments in turn.

[53] Ramos (2001), p. 642

5.1 Feasibility and state intervention

The education policy of the Estado Novo was constituted by what Nóvoa (1996) calls "pragmatic realism": careful attention to what was feasible as opposed to more ambitious policies which would seem optimal under ideal conditions but impossible to implement given the state's financial possibilities of the time. The Estado Novo reduced the years of compulsory schooling, introduced a national program of education, reducing and simplifying program content, and lowered the required level of teacher qualification. Furthermore, the Estado Novo was more credible at enforcing school enrolment and related measures which increased literacy. The evidence for this claim lies in the finding that regions closer to the capital experienced a particularly sharp increase in literacy, as we showed in subsection 4.2.

5.2 Culture and ideology

The Estado Novo's ideology was more closely aligned with the culture of the population than had been the case under the Republic. Our view is that this led to an increase in the demand for education under the Estado Novo. The Republic had strongly promoted secularization and other values looked at with suspicion by the masses, while the Estado Novo was seen as a pro-Catholic regime, which would allow parents to worry less about the perceived indoctrination effects of sending their children to school. J. de Barros, the main ideologue behind the Republic's educational practices, wrote that "The Republic liberated the Portuguese child, eliminating the Jesuit influence"(our translation, cited in Marques 1991, p. 527).

For the republican elites, secularization did not mean only separation of state and church but even the takeover of the church by the state; the state would administer the church while destroying its internal hierarchy (Ramos 2001). Throughout the country, priests took the opportunity to communicate their anger in their parishes. The Republic banned crucifixes from the walls of the school, while the Estado Novo put them back, along with the slogan "God, Fatherland, Family: The Trilogy of National Education" (Rosas 1992)

Other relevant ideological principles of the Republican school were decentralization and co-education. The latter was pursued by the Republic from its early years, and reaffirmed in 1923 by J. Camoesas, a leading republican in the field of education (and minister for education).[54] By contrast, co-education was rejected immediately following the Republic's end with the 1926 military coup (Marques 1991, p. 530). Hence, co-ed education was imposed by the Republic, but rejected by the Estado Novo. There is evidence that parents were not comfortable with co-education. In

[54]In this parliament bill, Camoesas recognized many of the limitations of the Republic's policies which were later addressed by the Estado Novo

a high-level official document written in 1921, it was recognized that enrollment numbers were falling at that time.[55] This was true especially for women, but also for men. The suggested reasons included parents' aversion to co-education (the report noting a discrete decline in the year this was adopted as a general policy), as well as the inefficient organization of the Republic.[56] By contrast, once the regime changed it was decided, among other matters, that there should be separation of the genders in school buildings and playgrounds; that education was entirely free for the poor, while others would pay a small fee; and that primary education was to be uniform and compulsory for all Portuguese children between ages 7-12. The aims were basic, but feasible: learning to read, write and count, and "moral and civic virtues ", together with a love for Portugal. Instruction was to follow a single national program. Finally, all children should pass exams; in the letter of the law it was the obligation of parents to ensure that this happened on pain of "an efficient system of direct and indirect sanctions "(our translation).[57]

5.3 Political incentives

Compared with the Republic, there is one final reason why the Estado Novo ended by having a much success for human capital formation. Educating the masses during the Estado Novo did not pose the risk of having to give them the vote afterwards and then losing political control, since the vote was meaningless. The Estado Novo did not expect literacy to lead to increased opposition from a generally conservative rural majority. To the Republicans, the matter was different. When in opposition during the monarchy, the Republican party had promised full voting rights; it defaulted once in power. Their great worry was that a large part of the country's rural and illiterate masses that needed education were Catholic and strongly opposed to their political program of republicanism, secularism and the free masons. This is a political economy explanation for the Estado Novo's success, but one which is underlined by the cultural background of the masses.

Furthermore, schools under the Estado Novo were more likely to have been under the control of the central government, while the Republic had a more decentralized policy, as we previously mentioned. Under the Republic, many schools were managed by the municipality and were underfunded, which led to lack of teacher motivation.

[55] Instituto Nacional de Estatística (1923)
[56] The report did not mention the Spanish influenza flu as a motive.
[57] Lei de Bases N. 1969, 20th May 1938.

6 Conclusion

Several conclusions can be drawn from this "tale of two regimes" which are of interest both to Portuguese historians and to scholars who are engaged in the international debate about the relations between institutions and human capital inequality. The Portuguese state, claiming a pressing concern to eliminate illiteracy, took steps to improve the supply of education. The logic behind this policy was that it would be unlikely that the desire of consumers to accede to education would in itself have led, in such a poor country, to the spread of mass education paid for by users. During the first half of the 20th century, two quite different and fiercely opposed regimes ministered to the mass educational needs of Portugal. If we are to follow the conventional wisdom of the literature on educational inequality in history, the most democratic should have been more successful in this task. Both regimes made a serious effort in this regard, but what is remarkable is the fact it was the least democratic which finally turned the tide on illiteracy.

The authoritarian Estado Novo had a differentially positive effect on educational outcomes relative to the limited impact of the democracy which preceded it. An individual of average stature under the Estado Novo was only about half as likely to be illiterate relative to the Republic. This result controls for a host of factors including stature (which absorbs growth-related effects not reflected in other covariates), life expectancy at birth, and regional fixed effects. Although the mass of the population had no political voice under the Estado Novo, they benefited from the new educational opportunities which this regime provided. Portugal thus fits uncomfortably into the accepted scheme which links the existence of democracy and popular participation in politics to the democratization of education.[58]

We have further broken down the total literacy increases into those due to the actions of the Estado Novo and those due to other factors, such as economic growth, which improved nutrition, heights, the disease environment, and cognitive ability. The actions of the Estado Novo were responsible for at least 70% of the observed increase in literacy levels during this period. In turn, the Estado Novo effect can be broken down into measurable institutional policy targeted towards raising human capital (i.e. the increase in the number of schools), versus immaterial factors. The latter mattered the most; it would be unwarranted to conclude that government institutional policy directed at extending the schools grid can explain most of the observed decrease in illiteracy levels. Furthermore, the groups around the median of heights, all of which were unquestionably poor in absolute terms, benefited the most from new educational opportunities; but even those in the poorest quintile benefitted considerably.

[58] In a recent paper on Brazil, Musachio (2010) has shown that mass education can spread in a country which has the "wrong" institutions.

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7 Appendix (for online publication only)

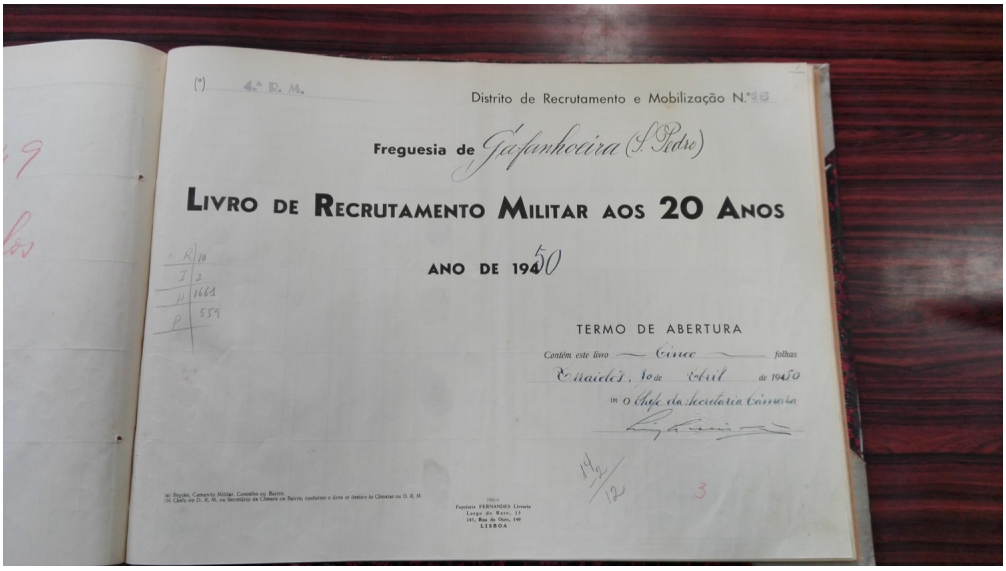

Figure A1: A typical "Livro do Recrutamento"

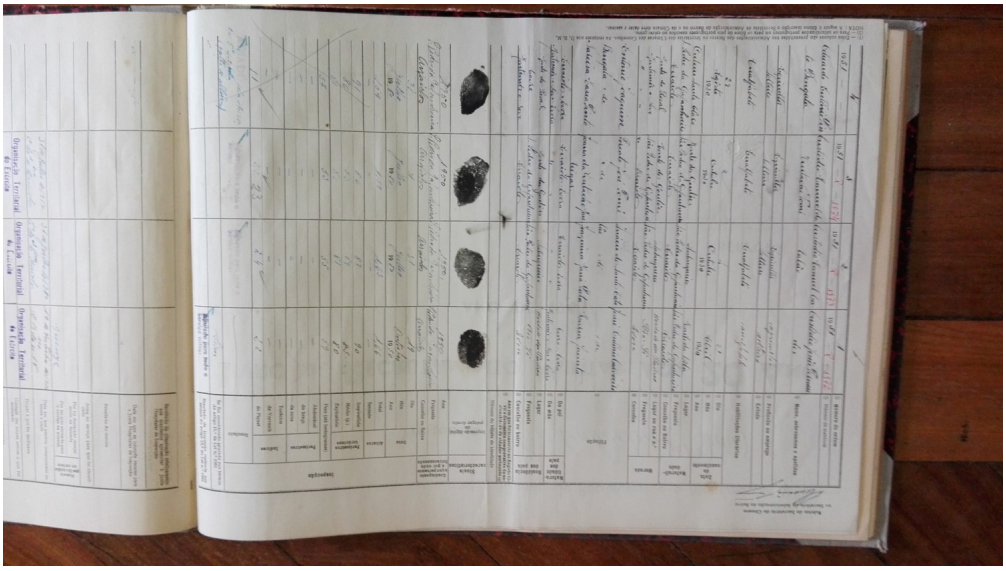

Figure A2: A typical "Livro do Recrutamento"

Figure A3: The archive from which we hand-collected our data

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