Can autocracy promote literacy? Evidence from a cultural alignment success story

Nuno Palma and Jaime Reis

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The University of Manchester

Manchester M13 9PL

CAN AUTOCRACY PROMOTE LITERACY? EVIDENCE FROM A CULTURAL ALIGNMENT SUCCESS STORY

Nuno Palma

University of Manchester; ICS, Universidade de Lisboa; CEPR

Jaime Reis

ICS, Universidade de Lisboa

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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 more than 9000 individuals from military archives in 20th century Portugal, we show that 20-year old males were 50% more likely to end up literate under a nondemocratic regime than under a more 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 relative success of the authoritarian regime in promoting basic education.

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

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

1 Introduction

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

Our story differs from many of the narratives about the rise of mass literacy which appear in the literature. These are typically either primarily demand and market-based explanations, placing emphasis on families' desire to endow children with human capital, or based on the supply of public schooling, which is often seen to happen more frequently under democratic regimes. By contrast, we show that families were also motivated by cultural concerns, and that a nondemocratic regime could actively work for and be successful in providing basic literacy to the masses. Our evidence suggests that the democratic regime was perceived by the public as being anti-Catholic, which discouraged parents from sending their children to school (for related arguments, see Boppart et al. 2013, Meyersson 2014, Carvalho and Koyama 2016). By contrast, the Catholic nature of the later authoritarian regime encouraged parents to do so.[1]

In order to arrive at these results, we rely on a new military dataset of over 9,000 individuals. Our data are not subject to sample selection as it does not refer to conscripts; instead, our registers cover the entire male population for each year. We show that under the nondemocratic regime (the Estado Novo), a 20-year-old male of average stature was about 50% more likely to end up literate than under the more democratic regime (the Republic) which immediately preceded it, after controlling for relevant covariates (in particular, individual stature). The fact that the policy changes of the Estado Novo were causal can be illustrated by the discontinuity which coincides with its establishment. While during the Republic there was little improvement in literacy, the appearance of the Estado Novo led to a jump in literacy levels and continued growth afterwards, as seen in Figure 1.[2] Note also that no similar phenomenon took place in Spain over the same period.[3] In an effort to further show that the results are causal, we present evidence that more

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[1]Our work is related to the empirical literature on autocracy which typically focuses on its negative consequences (e.g. Xue and Koyama 2018). There is less work on how autocracies can provide public goods, though some recent papers have focused on this matter (e.g. Berdine et al. 2018, Geloso et al. 2020, Voigtländer and Voth 2014). Furthermore, our work also relates to the rapidly expanding historical economics literature on religion (e.g. Becker and Rubin 2020; Iyer 2016; Johnson and Koyama 2019).

[2]We show average literacy in Portugal for ease of comparison with the case of Spain, but the results would be similar if instead we showed only individuals at the same median height, or alternatively the same quintile. This would mitigate the possibility that the observed literacy progress was simply due to improved incomes or health environments.

[3]The literacy data for Spain refers to that of males aged 10 or more. For Spain, there are no data that precisely match ours because the only alternative to what we show in the figure is literacy for military personnel, clearly a selected sample. But note that literacy in Spain was already rising considerably between 1924 and 1930 (prior to the Civil War); while in Portugal at the same time, there was no progress.
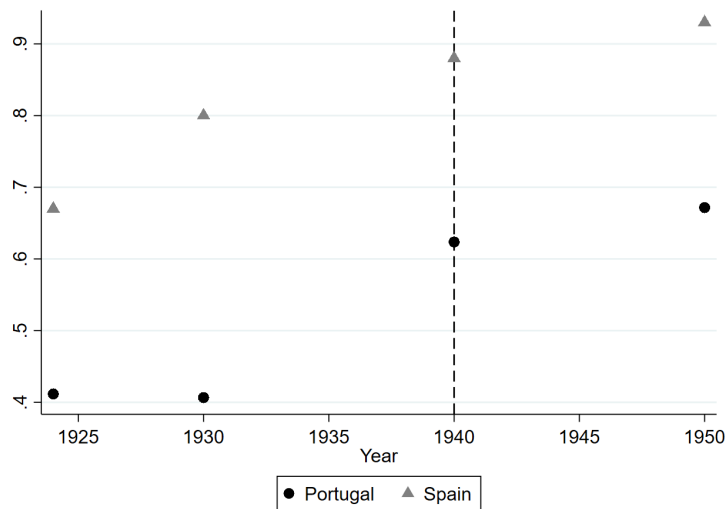
Figure 1: The Estado Novo marks a literacy discontinuity: the vertical line marks the first generation exposed to the Estado Novo. The years mark the time of observation at age 20, and each dot corresponds to the share of literate individuals. Note that no similar discontinuity took place for males in Spain over the same period (shown with triangles). Source for the Spanish data: Carreras and Tafunell (2005).

Catholic areas benefited the most from education under the Estado Novo.

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 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. Several studies have argued that countries which lacked democratic forms of government have been inclined, as a consequence, to have lower literacy rates and school enrolment. The reason is that the supply of publicly-funded mass education is a political decision and the elite which holds political power does not favor a wide dissemination of human capital; conversely, the majority, who aspire to more education, lack the "voice" that will make this situation change (Lindert 2004, 2010, Gallego 2008, Engerman et al. 2009, Acemoglu and Robinson 2012).

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. More favorable schooling policies can cause the appearance of more and better schools, which in the right context can lead to beneficial effects (Duflo 2001). But these expanded opportunities will not necessarily include more students unless their families also want to send them to school and are

able to do so. The historical record registers a few cases where the state was successful at coercing families in this matter. This was arguably easier done by authoritarian states.[4]

This suggests a need to consider the incentives which can determine family decisions to invest in human capital.[5] 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 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 more than 9000 twenty year-old males, as well as about the circumstances their families faced during their 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 but less reliable usage of enrolment data.[6] 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. One is that 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% for the population over 10 years of age was among the highest in Europe – in Spain it was only 53%, in Italy it was 46%. The other reason is the succession of political regimes which it experienced during the period under consideration, which assumed disparate stances on the questions of schooling and the extent of permitted political partic-ipation. In this context, there was a significant difference between the Republic (1910-26), a limited parliamentary democracy, and an authoritarian Military Dictatorship (1926-33) which eventually

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[4]One classic case is Prussia, where the mobilization of religion and religious institutions was critical. Sweden, the Soviet Union, Cuba, and China present other examples. Several recent papers emphasize how in many historical contexts, autocratic elites were able to educate the masses more efficiently than would have been possible under democracy (e.g. Aghion et al. 2019, Andersson and Berger 2019, Cvrcek and Zajicek 2019). By contrast, partial democracies are sometimes not sucessful due to cultural/religious constraints (e.g. Franck and Johnson 2016).

[5]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. 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 1996). But with some notable exceptions (Boppart et al 2013; Meyersson 2014, Carvalho and Koyama 2016), few studies have considered the cultural prerequisites for family demand to materialize.

[6]In the context of poor countries, enrolment often greatly differs from actual school attendance.

morphed into the corporatist dictatorship of the Estado Novo (1933-74).[7] The latter denied the population any possibility of freely exercising the suffrage. For historians and public opinion, this opposition between the two regimes embodies the main political and ideological struggles which marked much of the 20th century in Portugal. We have chosen for the present exercise the period 1910-1950 during which there was a pronounced 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. Since human capital can be a critical factor which contributes to catch-up, considerable progress in literacy during the second quarter of the century was an important contribution to the golden age of Portuguese economic growth and fast convergence to the European core which took place from approximately 1950 to 2000 (Amaral 2002).[8] We hence also contribute to the literature which considers the human capital preconditions for the take-off of sustained growth (e.g. Becker et al. 2011).

In this paper we consider three interconnected issues. The first is whether institutional conditions, in particular the openness of the political process, had an effect on educational policies. The standard political economy view is that less democratic systems are strategically less interested in educating the masses.[9] The second is whether family-based decisions relying on cultural concerns, rather than market returns, provide a useful complementary explanation for variation in the supply of human capital over time. The third is how to control for confounding factors such as economic growth, since these affect outcomes over the long run regardless of policy choices. We suggest and implement procedures which take into account each of these concerns. The conclusion we draw shows that both the supply of schooling by the state and the cultural influences which shaped family decisions on education mattered. But, while neither can be dismissed, the latter mattered the most. Indeed, changes in institutions and associated cultural policies explain over 70% of the considerable increase in literacy observed during 1910-1950.[10] Another 20% of the literacy increase observed under the first two decades of the Estado Novo is accountable by improvements in material life conditions which led to increased demand for schooling. Only 10% is explainable by an increase in school density, itself a result of Estado Novo policies. We furthermore show that the expansion of the school grid was more effective during the Estado Novo regime than had been the case under the Republic. We detail the cultural and political incentives that explains our results.

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[7]The Republic was more democratic than the Estado Novo, but was not a democracy in the modern sense (Ramos 2001, p.350 and 364; Ramos et al. 2009, pp.577-665). In Lindert's (2004) nomenclature, it was a limited democracy.

[8]Nineteenth century industrialists in Portugal repeatedly pointed out low human capital as an important cause for low productivity (Reis 1993).

[9]The reasons typically pointed out are that the elites are unlikely to promote the tax-financed education of the masses, and additionally want to keep the returns to education high by restricting access to schooling. Andersson and Berger (2019), who review this literature, argue, by contrast, that "there is mounting evidence that elites often played an important role in promoting universal schooling in less democratic countries" . 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.

[10]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.

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. The new regime was strongly influenced by the Free-masonry.[11] Although one of its earlier promises had been the establishment of universal suffrage, once in power the Republic defaulted on this promise 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).

The republicans claimed that education was one of their principal priorities. 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 it would emerge a "Republican Man", imbued with healthy nationalism, mental and physical vigor and readiness to defend the regime from its opponents.

In practice, the republican educational reform was less impressive than its pronouncements. It involved the creation of a previously non-existent Ministry of Instruction (education) 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. An energetic expansion of educational infrastructure was also proclaimed but fizzled out soon after it had started (Carvalho 1986). New universities were created, secondary and technical schools were reformed but none of these had any great impact on basic education.

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 from 1928 (Meneses 2010). The military dictatorship and the Estado Novo represented an overt ideological rejection of the Republic.[12] Both were nationalist, anti-liberal, pro-Catholic, and 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, which turned into mere formalities. Decisions were taken dictatorially and were enforced without open discussion. A secret police and special courts to judge political dissenters

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[11]Half the ministers and half the members of parliament during the Republic were free-masons (Ventura 2011).

[12]The militarized National Dictatorship which started in 1926 prefigured in many ways (including education policy) the civilianized Estado Novo created under the aegis of Dr. Salazar, a social conservative who was a professor at the University of Coimbra.

were instrumental in keeping the institutions stable. In terms of degree of democracy, it was an autocracy, unlike the more democratic Republic, even though the latter was in turn distant from the standards set by fully participatory regimes.[13]

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.[14]. 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.[15] Despite these concerns, the programmatic message of the Estado Novo could sometimes be different from actual policy. The pronouncements of some of its most reactionary stalwarts reflect an intense fear of the social repercussions produced by increased schooling.[16] But in fact, the Estado Novo at other times emphasized its own educational achievements, especially by comparison with the lackluster performance of the Republic.

Notwithstanding this rhetoric, the regime proved much more pragmatic, less monolithic, and more inclined to modernization than one might have expected (Amaral 2002, Carvalho 1986, Palma 1983, Rias 1997).[17] In fact, overall its major educational reforms aimed at "the minimum of culture essential to life and to fighting illiteracy in an energetic, efficient manner."[18] In this context, efficiency gains were sought by reducing the time of compulsory education and simplifying the newly-instituted national education programs. 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 known as *postos escolares* rather than proper schools, where they received the simplest tuition from barely literate assistants (Rias 1997).

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[13]According to 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). An alternative (V-Dem's liberal democracy index, provided by Coppedge et al. 2018) leads to the same qualitative results: both regimes were much less democratic than modern democracies, but the Republic was considerably more democratic than the Estado Novo.

[14]This was mainly because politicians in both regimes were primarily interested in their own political survival; see for example, Buchanan and Musgrave (1999), Lott (1990, 1999), Testa (2018), Vahabi (2016a, 2016b) and Geloso and Salter (2020)

[15]Additionally, the provision of education and other public goods could have had a political monitoring or repression function, in line with the evidence we have for other autocracies. Note that this mechanism does not depend on any particular ideology or regime; in the specific case of Cuba, for example, successful health outcomes are in part a consequence of such forces (Carnoy et al 2007, Berdine et al 2018, and Geloso et al 2020).

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

[17]Salazar seems to have opted for teaching the masses to read while seeking to control what they read rather than not educate them at all, as argued by a prominent critic of the regime (Carvalho 1986, p. 728). 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. 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).

[18]From the preamble to *Decreto-Lei* 27279, November 24th, 1936.

Judging by this summary of ideological and political dimensions of the two regimes, one might be tempted to expect 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 on average 12%, compared with 7% under the Republic (Valério 2001). Mean literacy for individuals aged 10 or more increased from 31.1% in 1911 to 38.2% in 1926, to 58.2% in 1950 (Candeias 2004).[19] Between these two periods, the school grid also expanded and the number of children of school age per state school declined from 95.4 to 52.5. To resolve this paradox we must now turn to a detailed consideration of the dataset and the model from which we shall draw our conclusions.

3   Data and variables

We have hand-collected our data from primary sources belonging to the archives of the Portuguese army.[20] Other sources for our covariates are published compilations of official statistics. Our data were gathered for the following benchmarks: 1924, 1930, 1940 and 1950.[21] The primary source data provides information on the population of interest, and from this we have taken a random sample of more than 9000 individuals. For each county and year, we collected a random sample of at least 25% of the avaliable data.

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.[22] The procedure, covering the whole country, was organized to ensure that all young men complied with their obligation to perform national service and were treated equitably in the process.[23] 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 residence of their parents. Anthropometric characteristics were taken down too, namely height.[24] Starting in 1924,

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[19]These official, national-level data are consistent with the lack of progress in the military data we collected for 20 year-olds during the Republic (as shown in Figure 1). The reason is that the progress in literacy during the Republic corresponded to the most likely survival over time of younger, more educated individuals. According to official reports (possibly biased, as the authors themselves recognized), mean literacy of children 7 to 11 years old (including girls) was 20.6% in 1911, 26.5% in 1920, 26.9% in 1930, 53.8% in 1940 and 79.7% in 1950; see *Decreto-Lei* 38968 (1952), Rosas (1992), Ministério das Finanças (1925).

[20]Arquivo Geral do Exército, Lisbon. Part of the collection entitled "Exército Portugês, Relatórios de Inspeção".

[21]We are missing covariates for a few individuals in 1924, but otherwise our record is complete.

[22]In the period 1908-1930, the only one for which such national data are available, a total of 1.7 million 20 year-olds were processed in the manner described here (Marques 1991).

[23]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 Serviço 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 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.

[24]From the 1910s to the 1950s, children were brought up in increasingly better-off environments. Median statures

the scholastic achievement of these subjects was also recorded. This is what we will focus on as an outcome variable; hence, our results concern directly observed literacy at the individual level and defined in accordance with clearly defined capabilites, rather than the artificially constructed "attainment" variable based on enrolment data, interpolation and a number of strong assumptions which several studies employ (e.g. Lee and Lee 2016).

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 (Carrilho 1986).

A second aspect of value is that the original data base is universal.[25] Our sample is therefore taken directly from (and representative of) the population of interest.[26] Figure 2 illustrates that our sampling was proportional to the population of each region. A third feature of our data 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 social and economic features of the population under observation. The information on scholastic achievement at the age of 20, though no more than a snapshot of the aptitudes accumulated over several years, provides a history of each individual's interaction with the educational system starting at age 7.

Table 1 displays the different variables which will be used in our regressions.[27] These have been taken from the manuscript data on military recruitment, as well as from printed official sources and demographic studies. They are related to the year in which they were observed. Figure 3 shows the

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rose by about 2 centimeters between 1924-1950 years, according to our sample: from 163 cm. to 165 cm. This corresponds to fast growth by historical standards considering that the overall mean height in Europe from the 8th century BCE to the 18th century CE increased by only 0.5 cm per millennium on average (Koepke 2016). 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-run view of Portuguese statures, see Cardoso and Gomes (2009), and Stolz et al (2013). Hatton (2011) finds growth of half a centimeter per decade for the first half of the 20th century in Britain, which is similar to the increases we find for Portugal (from a lower base).

[25]It is important to distinguish here 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 use selected samples, which is not the case here.

[26]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 grow less than they would have under a better health and nutrition environment.

[27]During the first half of the twentieth century there were approximately 325 counties (*concelhos*) but their number fluctuated over time. Their average size was 273.8 square kilometers. Many go far back in time. By contrast, the *distritos* are more modern units of administration, copied from the French republican *département*. They represent the central government at the local level. In the twentieth century there were 18 districts. Their average size was therefore about 5,000 square kilometers.
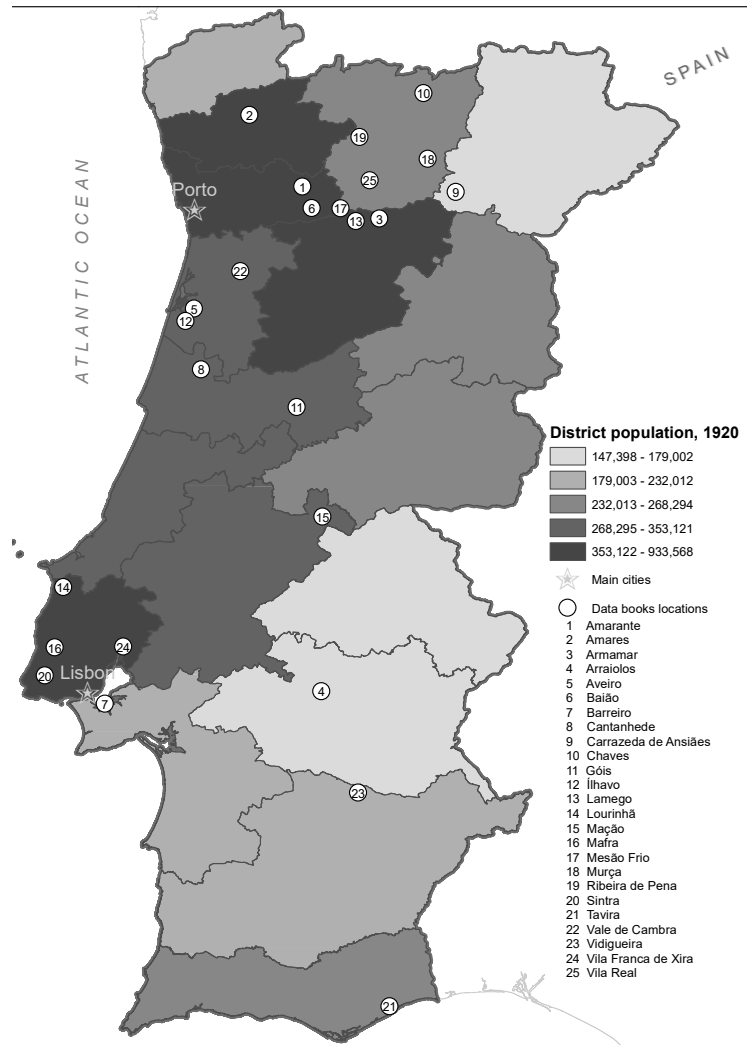
Figure 2: Sampled counties and district-level population. Regions are classified according to quintiles. Source for 1920 population densities: Direcção Geral de Estatística (1923).

Variable	Content	Data level	Observed
1. Literacy	5 degrees of proficiency (from 1= cannot read, to 5 = passed at least the 1st degree exam)	Individual	T
2. Stature	Measured in meters at age 20	Individual	T
3. School density	Average number of schools per square kilometer	County	approx. T-10
4. Life expectancy at birth	Number of years	District	approx. T-10
5. Estado Novo	Regime dummy, 0=Republic, 1=Estado Novo	National	T-10

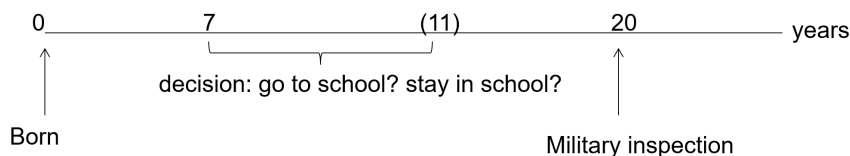Table 1: Variables used in the model. Source: see text.

Figure 3: The timeline for the events in our study. Source: see text.

timeline for the events of our study. Individuals are born at time 0 and from age of 7 their family decides whether they go to school and for how long they stay there.[28] We observe them at age 20, which corresponds to time T in Table 1. As Table 1 shows, we use measures of school density, life expectancy and the Estado Novo for time periods $T - 10$ rather than T. This is because these variables have an impact on educational outcomes while individuals are at school, i.e. around the age of 10, rather than when they are examined for military recruitment.

Our main dependent variable is 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. Using a binary variable, however, conceals disparate packages of skills under the same cover and therefore implies a considerable loss of information.

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[28]In past societies some individuals could acquire literacy by means other than schooling. It is difficult, however, to establish how common this was, beyond the fact that informal learning of this kind would have been more challenging. In the case of Portugal during the first half of the twentieth century, the evidence is scant. To the best of our knowledge, none of the few who have written about their literacy-gaining experiences (usually political activists from the urban labor movement or their rural counterparts) were self-taught. Their common experience was learning at school with a less than requisite number of years of attendance (e.g. Sequeira 1978; Picão 1983).

The richer alternative, which we also adopt for this study, takes advantage of the fact that the inspection boards laboriously distinguished between a variety of outcomes. Beyond simply "illiteracy", these could range from a number of 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, the board resorted to informal classification of the sort "able to read and write well", or "badly". We have converted these indicators into a scale from 1 (for illiteracy) to 5, as exemplified in Table 2, which lists common examples.

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.

Stature (st) is available in our source for every candidate and is measured in meters.[29] In keeping with the principles of anthropometrics, it is taken as a proxy for the economic and social resources of the family of the examinee when in his early formative stage, from the time of birth, twenty years prior to the inspection, up to the age of 7.[30] Note that cognitive function depends positively on height, as it develops along with the rest of the body (Case and Paxton 2008, Deaton 2013).

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[29]Throughout preindustrial human history, the heights distribution was close to invariant, though it grew slightly over several millennia (Koepke and Baten 2005, Koepke 2016). 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).

[30]Baten 2000 provides evidence that the contribution of environmental factors after the age of 7 is negligible for the determination of final adult heights. Hatton (2013) places emphasis on the improving disease environment as a proximate source of increasing height, 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.

The preceding variables, literacy outcomes and heights, refer to individuals. In addition, our study employs a set of environmental factors made up of aggregate indicators (at the national or sub-national level), either of policy input, or of general economic conditions. Both of these could have shaped family decisions on education. One important variable for the latter is the total number of primary schools in each administrative division (*município*, i.e. county) relative to its area.[31] We designate it as "school density"and it proxies the ease with which children could reach their place of instruction. Together with the opportunity cost of foregone labor, covering the distance to schools was an important cost which families had to bear, attendance being free in the dominant state system.[32]

Life expectancy at birth, which is a standard component of any model used to analyze investment decisions in human capital (Boucekkine et al 2007), is measured at the district level and is obtained from national demographic tables (Bandeira 1996, Rodrigues 2008).[33]. 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. We recognize that life expectancy at birth, rather than at the age of 7, is perhaps not ideal for the parent's decision to send a child to school, due to the effects of child mortality, which was considerable at the time. However, data on life expectancy at 7 or 10 years old is not avaliable, and the latter would be in any case endogenous to schooling decisions. Life expectancy at birth also arguably reflects the health environment better than that for later ages.

We collected a random sample of about 9000 individual entries from 25 counties, for four benchmark years.[34] Our sample does not include the country's two biggest cities, where private schooling existed and represented a sizable part of the supply of schooling. Hence our study is restricted to rural Portugal, but including small cities such as Aveiro and rural towns, i.e. the entire country except Lisbon and Porto.[35] During the time span we are considering, this corresponded to between 90% (1911) and 87% (1940) of the total population.[36] The population of rural Portugal is

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[31]We include the makeshift *postos escolares* in our school density measure. To build this variable we relied on: Direcção Geral de Estatística (1913), (1923), (1933); Instituto Nacional de Estatística (1945), (1952); Ministério das Finanças (1919), (1923), (1925). The same sources along with Instituto Nacional de Estatística (1944) show that typically there was only one teacher per school; the median number of teachers per school was one and the average number was close to one as well.

[32]The cost of clothing that had to be used for going to school was probably non-negligible and more expensive than that used for agricultural work, but we lack this information either on an individual or collective basis. In many regions, children went to school without shoes; in others there was a social stigma for doing so (Sequeira 1978).

[33]Data for 1914 is not available so we use instead 1902, the only available year prior to 1914; while for 1920 we use what is given as corresponding to 1920-1 (Bandeira 1996 p. 42) For 1930 and 1940 we use the 1940-1 data; this equality is justified in Bandeira (1996, p. 167).

[34]Our sampling was done using a two-stage process: first, we randomly selected 25 counties; and second, we randomly selected at least 25% of the individuals entries for each county for each of our benchmark years.

[35]Private schools outside these cities occasionally existed, but were rare. National education statistics for this period do not take private establishments into account. In Table A1 of the Appendix, we have such a measure for all the counties in our sample using commercial yearbooks. We show that private schools were rare everywhere.

[36]The populations of Lisbon and Porto were comparatively small at the time (never higher altogether than 13% of the country's population). While we used the location of work, not birth, 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

also of the greatest interest here in that it was the part of the country which displayed the highest and most persistent illiteracy rates.[37]

Table 3 displays some summary statistics for both regimes, regarding the counties that are used in the regressions. We can see that literacy,[38] stature, life expectancy at birth, and school density were higher under the Estado Novo. In the next section, we 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 (percent)	40.1%	64.8%
	(49.2)	(47.8)
Average stature (meters)	1.63	1.65
	(0.06)	(0.06)
Life expectancy (years)	40.5	48.7
	(7.4)	(3.5)
School density (schools per 100 sq km)	15.1	21.6
	(11.9)	(14.1)
Observations	4,779	4,290

Table 3: Summary statistics across the two regimes for our dataset. Standard deviations in parentheses. The number of observations given in this table corresponds to those for which we have complete data for all variables. 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 families' decisions. Our study provides answers to many questions raised earlier by Portuguese historians of education but 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

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case of Lisbon. Owing to the fact that only males aged 20 are observed, two shortcomings are present. Since the records exclude men over 20, this 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 unavoidable exclusion of females. Rather than 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.

[37]The counties used represent the country well, with both coastal and interior locations represented, and some being located in the South of the country, others in the Centre, and many in the North.

[38]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).

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 human capital attainment and rests on a number of assumptions. School enrolment was decided upon by families who acted on the basis of a relevant stock of information. Local studies have concluded that families were aware of the possibilities of upward mobility which education might confer (Fonseca and Guimarães 2009a, 2009b).[39] Additionally, families cared about the ideological exposure of their children to different ideas and material taught in school. Equally important is the presumption that school enrolment, though compulsory by law, was in practice largely voluntary.[40] Furthermore, elementary state-provided schooling was free.[41]

Our first step is to estimate a probit model 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 time T as their reference, when the subject had his stature measured by the army board. Hence, those observed, at the age of 20, in 1924 and 1930 were educated by the Republic while those observed in 1940 and 1950 were educated by the Estado Novo regime.[42]

Height, which proxies economic conditions in the early years of life or even during the mother's pregnancy (Baten 2000; Behrman 2016; Steckel 2016), 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 school density (proxying how easy it was for children to get to school on average) for time $T - 10$ because that was approximately when 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 for Estado Novo. We are aware that this does not suffice, by itself, to prove causality and, in what follows, we use a variety of different strategies to overcome this limitation.

A key assumption is that the assignment a regime (Republic or Estado Novo) was exogenous to each individual, conditional on height and the other covariates. It is safe to assume that the reasons for the timing of regime change and continued survival were exogenous to the individuals in our sample. The 1926 coup, which initiated the military dictatorship that eventually morphed

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[39]We do not need to assume that families acted with perfect information. They acted according to the perceived rather than actual returns to education (e.g. Jensen 2010).

[40]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 *Decreto-Lei* 38968 of 1952 in *Diário do Governo*.

[41]Lei n. 1969, 20 May 1938 in *Diário do Governo*, pp.845-47.

[42]If we had collected another benchmark between 1930 and 1940, it would be unclear under which regime those men had been educated. This is because children were free to start or return to school later than at the age of 7, and there is evidence that some did.

into the Estado Novo, was modelled after Mussolini's march on Rome four years earlier. While we do not wish to overemphasize the similarities between these regimes, Portugal's small size and limited 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 also 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 (i.e. when it is in category of literacy of 2 or higher as shown in Table 2), $\mathbf{x}$ 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:

$$Pr(blit_{i,t} = 1 \mid \mathbf{x}) = \Phi(constant + \beta_1 EN_t + \beta_2 stature_{i,t} + \beta_3 lifeexpectancy_{i,t} + \sum_{j=2}^{12} \alpha_j region_{i,j})$$

Table 4 summarizes the regression results alongside the estimated marginal effects of the Estado Novo.[43] The baseline model is presented in column 1.[44] The estimated average marginal effect (AME) of the Estado Novo on literacy is 19.4 percentage points (p.p.), after controlling for the other covariates, notably individual stature.[45] The size of this effect is large: compared to an average literacy rate of 40 percent in the previous regime, the Estado Novo on average raised the probability of an individual being literate by about 50%, after controlling for other covariates.[46] For completeness, we also report the marginal effect at the mean (MEM) which turns out to be similar, but larger than the AME. The fact that the MEM 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 MEM of the Estado Novo with that for both short

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[43]Since the Estado Novo (EN) variable corresponds to a dummy, this is really a discrete effect. Nonetheless, we will follow convention in referring to it as a marginal effect.

[44]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 often the case in poor societies, most of the increase in life expectancy at birth over time is due to declining child mortality.

[45]Our baseline results are based on the assumption that adult individual stature is pre-determined by the age of 7. This is in line with the existing evidence in the anthropometric literature (Baten 2000). If individual height was itself partly an outcome of the school attendance decision, however, for instance via future income differentials, then it would be a bad control (Angrist and Pischke 2009, p. 64). To insure against this possibility, as a robustness test we ran the same regressions using instead for each individual the average stature of his county and year as a control, instead of his individual stature. This also proxies for the local health environment and poverty levels, albeit less precisely, but it has the advantage that the previously mentioned potential endogeneity issue can no longer apply. We show in Table A2 that the results under this alternative specification remain similar. We thank Yannay Spitzer for this suggestion.

[46]The precise value is 48.5%, calculated by dividing 19.4 p.p. by the 40 percent literacy rate of the Republic.

and tall individuals (which we define as those on the threshold of the 1st and 5th quintiles, i.e. at the 20th and 80th percentiles), also reported at the bottom of Table 4.[47] Columns 2-4 show that these results do not change much if alternative control variables are dropped.

DEP: Literacy (binary)	Probit (1)	Probit (2)	Probit (3)	Probit (4)	Probit (5)	Probit (6)	LPM (7)
Estado Novo = 1	0.542***	0.576***	0.605***	0.419***	0.486***		0.190***
	(0.0650)	(0.0642)	(0.0371)	(0.0876)	(0.0565)		(0.0237)
Year = 1930						0.00640	
						(0.0829)	
Year = 1940						0.483***	
						(0.0642)	
Year = 1950						0.604***	
						(0.0866)	
Stature	3.335***		3.320***	3.526***	3.304***	3.321***	1.145***
	(0.232)		(0.233)	(0.269)	(0.235)	(0.234)	(0.0895)
Life Expectancy (Males)	0.00754	0.00564		0.0211**	0.00840	0.00782	0.00316
	(0.00643)	(0.00634)		(0.00997)	(0.00628)	(0.00687)	(0.00232)
School Density					0.966**		
					(0.473)		
Constant	-5.805***	-0.289	-5.511***	-6.859***	-5.955***	-5.797***	-1.511***
	(0.440)	(0.228)	(0.382)	(0.626)	(0.445)	(0.458)	(0.161)
AME of Estado Novo	0.194***	0.210***	0.216***	0.160***	0.174***		0.190***
	(0.0230)	(0.0230)	(0.0128)	(0.0349)	(0.0202)		(0.0237)
MEM of Estado Novo	0.213***	0.226***	0.237***	0.166***	0.191***		0.190***
	(0.0249)	(0.0244)	(0.0141)	(0.0344)	(0.0218)		(0.0237)
ME at 80th pct of stature	0.194***		0.216***	0.159***	0.174***		0.190***
	(0.0229)		(0.0128)	(0.0355)	(0.0201)		(0.0237)
ME at 20th pct of stature	0.198***		0.221***	0.163***	0.177***		0.190***
	(0.0235)		(0.0131)	(0.0348)	(0.0206)		(0.0237)
County FE	YES	YES	YES	NO	YES	YES	YES
Observations	9,069	9,084	9,069	9,069	9,069	9,069	9,069

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

Table 4: Baseline probit regressions. Source: see text.

Column 5 illustrates the effect of adding 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.[48] Hence, the interpretation of the effect of the Estado Novo dummy now changes. In the specification of column 5, the Estado Novo estimated coefficient captures the effect of supply-side policies of the regime except for changes in school density associated with this regime, which are held constant. The coefficient on school density is only statistically significant at the 5% significance level, and

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[47]This effect turns out to be quite similar to the AME, and also to the marginal effect for the poorest (shortest) individuals, i.e. those at the 20th percentile height.

[48]When not controlling for school density, we allow it to change as it did empirically (Table 3).

while it does have the expected negative sign, the magnitude of the Estado Novo dummy on literacy does not change much. The average marginal effect is 17.4 p.p. which compares favorably with 19.4 in the baseline specification. This suggests that almost 90% of the Estado Novo effect was due to channels not related to the increase in school density, which only explain about 10% of the increase in literacy associated with the Estado Novo regime (even after controlling for stature and life expectancy). The fact that most of the increase in literacy was not due to the expansion in the school grid but other policies pursued by the Estado Novo contrasts with the emphasis in some of the development literature on the importance of school-building (Duflo 2001). We will be further investigate this matter in subsections 4.2-4.3.

These regression results do not incorporate year dummies, as these would confound the estimation of the Estado Novo effect. 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.[49] 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. 1940 and 1950 (given that 1924 is the base year). Secondly, the difference in the coefficients across these two years should not be statistically significant. This formulation of our assumption is testable, as we do in column 6 of Table 4. As expected, the coefficients are not significantly different between 1940 and 1950: a test of equality of coefficients fails to reject no difference at a 5% significance level (p-value=0.088). Moreover, the size of the effect of each of the two year dummies for the Estado Novo years, i.e. for 1940 and 1950, are similar to the estimates in the baseline regression, while the year dummy in 1930 has no significant effect. 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. Second, and relatedly, this provides evidence for the underlying assumption that the effect of each different regime on literacy did not change significantly over time. These facts are also illustrated by Fig. 1 shown at the beginning of the paper, even though that refers to unconditional effects, hence the continued improvement under the Estado Novo shown there also include the effects of improved school density and material conditions over time. Finally, in column 7 we show that the results do not change much if a different estimation approach which relies on weaker assumptions (Linear Probability Model) is pursued.[50]

Across the regressions, there is a clear pattern with regards to the control variables. Stature yields an individually significant and large effect. Based on the baseline regression in column 1, the effect of a one cm. increase in height results on average in a 1.15 p.p. increase in the probability of being literate, ceteris paribus.[51] However, life expectancy at birth is not significant while school

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[49]Here and in what follows, by demand-side we mean the variables that reflect well-being: stature and life expectancy, rather than demand generated by cultural beliefs. Additionally, our results are in fact likely to underestimate the true total Estado Novo effect due to the implicit assumption that the observed changes in heights are independent from the decisions of this regime.

[50]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 them, 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.

[51]The effect has a very similar magnitude in the LPM specification of column 7. The effect is large, given that

density is only significant at the 10% significance level.[52] This is not due to large standard errors; in fact, the standard errors on these variables are small, so the 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.

In our regressions we cannot include the skill premium[53] or the opportunity cost of having children in school[54] (the raw labor real wage) as they are collinear with other covariates, namely, the time dummies. This is because we can only observe these variables 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 sample period the skill premium was falling and the real wage for unskilled workers was rising.[55] This suggests that fast accumulation of human capital was not driven by falling opportunity costs or 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.[56] We suggest that this was because the Estado Novo's policies were targeted towards expanding the educational opportunities for everyone, including the poor, which led to some social convergence.

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stature has a standard deviation of 6.28 cm.; hence, a one s.d. increase in stature leads to an increase in the probability of being literate of about 7.22 p.p. Note that the probit model is nonlinear, so the coefficients of all columns except for 7 cannot be interpreted directly, requiring additional (but standard) calculations. Note also that the size of 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 one cm. increase in stature on average leads to a 1.37 p.p. increase in literacy under the Estado Novo, but only to a 0.99 p.p. increase in literacy under the Republic.

[52]Note, however, that school density is no longer significant when controlling for interactive effects between the Estado Novo dummy and stature; see the next subsection.

[53]We are here referring to the household-level rate of return, i.e. that internalized by families, as opposed to the global, i.e. social, rate of return which includes state costs. We adopt the skill premium as a proxy for the economic advantage of acquiring basic human capital (Anuário Estatístico de Portugal, several years). It is measured at time $T - 10$, roughly when the draftee would be entering school. Due to lack of data, as in school density we use the nearest census to $T - 10$. It is the ratio of the skilled labor wage in an occupation (textile workers), presumed to require a minimum degree of literacy, to the raw agricultural wage. Textile workers constituted a large part of the industrial work force and were often literate: in 1961, the date of the first scientific enquiry into the human capital of Portuguese workers, 81% of skilled workers in manufacturing were literate (Projecto Regional do Mediterrâneo 1965).

[54]Although we cannot know the wage of child labor, we assume that it can be proxied by that of adult men working in agriculture and deflate it by a standard CPI (Valério 2001). For the nominal raw labor wage and the wage in the textile sector, the source is Anuário Estatístico de Portugal (several years).

[55]Skill premia fell from 1.74 in 1920 to 1.67 in 1930 and 1.53 in 1940, while the real wage paid to male agricultural workers rose from an index of 100 in 1921 to 113 in 1930 and 135 in 1940, which is in line with the observed rise in statures and with contemporary economic growth (Batista et al 1997).

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

4.2 Interactive effects

The next question we turn to is the extent to which the political regime change affected differently children of different heights, or those in different regions; and additionally, whether school expansions had different effects. For this purpose, we interact the other covariates with the Estado Novo dummy, as shown in Table 5. Column 1 shows that stature has a positive interactive effect with the Estado Novo dummy, ceteris paribus.[57] Columns 2 and 3 show that increases in school density had a greater effect under the Estado Novo than the Republic; in fact they did not have a statistically significant effect under the Republic altogether. This relates to the discussion which we will have below in subsection 5.2: additional schools will only lead to more schooling if people in fact send their children to school. Finally, column 4 shows the presence of significant heterogeneity across regions in the effect of the Estado Novo.[58] In particular, the regions in our sample which are close to the city of Lisbon or other urban centers tend to have large estimated effects. Only one county in our database, the isolated region of Arraiolos, experienced an overall negative effect of the Estado Novo on literacy (see Figure 7 below). We discuss possible explanations in section 5.

We now perform additional exercises, using our baseline results (column 1 of Table 5). How much greater a probability of ending up literate does a 20 year-old gain by going from the 25th to the 50th percentile in stature under each regime, keeping life expectancy at the unconditional average? According to our regression, such a change in stature increases literacy by 4.0 p.p. under the Republic, compared with 6.2 p.p. for the Estado Novo. Alternatively, at the median, a one centimeter increase raises the probability of literacy by only 1 p.p. in the Republic, but by 1.4 p.p. in the Estado Novo. This indicates that the policies of the Estado Novo were creating more human capital accumulation opportunities for citizens.[59]

Figure 4 shows the marginal effect of the Estado Novo dummy on the probability of being literate across unconditional 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. the 1st quintile includes the shortest individuals, and quintile 5 the tallest). The figure shows two facts clearly. First, for both regimes, height was a very strong predictor of literacy, even after controlling for the early life disease environment as captured by a county-level estimate of life expectancy. The relationship is, for each regime, monotonic – taller people always tended to be 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: the probability of an individual in the shortest quintile of stature who lived during the Estado Novo of being literate was similar to that of an individual in the tallest quintile during the Republic.

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[57]This is mainly driven by those between quintiles 3 and 5, as we discuss in the ordered probit subsection below. In fact, the Estado Novo raised literacy levels for everyone, though especially for those who were around or above median stature, and so likely to have faced better economic and social environments during childhood. We will show this and explore it in greater detail using ordered probit regressions in subsection 4.4.

[58]We give the details about the interaction with each county in Table A3 of the Appendix.

[59]These results use the heights corresponding to each regime, but if we use the whole sample (hence considering absolute poverty levels), changing stature from the 25th to the 50th percentile (i.e. from 1.60 meters to 1.64 meters)

DEP: Literacy (binary)	(1)	(2)	(3)	(4)
Estado Novo = 1	-1.445	0.399***	-1.479	0.389***
	(0.932)	(0.0950)	(0.929)	(0.0534)
Stature	2.769***	3.305***	2.772***	3.346***
	(0.387)	(0.236)	(0.382)	(0.229)
Life Expectancy (Males)	0.00712	0.00873	0.00829	0.00631
	(0.00641)	(0.00662)	(0.00659)	(0.00818)
Estado Novo * Stature	1.215**		1.150**	
	(0.568)		(0.560)	
Estado Novo * School Density		0.495**	0.488**	
		(0.243)	(0.236)	
School density		0.606	0.584	
		(0.483)	(0.470)	
Constant	-4.864***	-5.907***	-5.017***	-5.701***
	(0.677)	(0.447)	(0.672)	(0.476)
County Fixed Effects	YES	YES	YES	YES
Estado Novo * County	NO	NO	NO	YES
AME of Estado Novo	0.195***	0.174***	0.176***	0.198***
	(0.0230)	(0.0235)	(0.0238)	(0.0244)
MEM of Estado Novo	0.215***	0.193***	0.195***	0.220***
	(0.0249)	(0.0253)	(0.0256)	(0.0259)
ME at 80th pct of stature	0.217***	0.175***	0.197***	0.199***
	(0.0251)	(0.0235)	(0.0260)	(0.0244)
ME at 20th pct of stature	0.178***	0.179***	0.160***	0.201***
	(0.0256)	(0.0239)	(0.0259)	(0.0246)
Observations	9,069	9,069	9,069	9,069

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

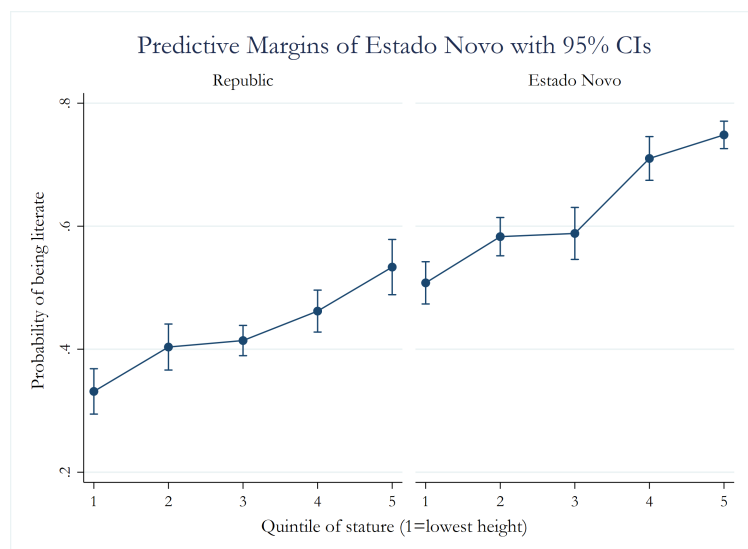Table 5: Probit regressions with interactive variables. Source: see text.

Figure 4: Probability of being literate, conditional on height (quintile 1=lowest) and controlling for other covariates, for both regimes. Sources: See text.

Another way to assess each regime is to simply consider an abstract person at some absolute level, i.e. at some height quintile, and then compare what were this person's chances to be literate under both regimes using summary statistics. Table 6 shows the results. These again reject the idea that the poorest did not benefit from the Estado Novo: all categories benefited considerably. While individuals above the middle of the heights distribution seem to have benefited the most, almost all men in our sample were poor from today's perspective. It is plausible that the shortest did not benefit as much because they were too poor to benefit from schooling to the same degree. Nevertheless, these are relative statements; in absolute terms, even the poorest tended to benefit greatly.[60]

Stature	Heights (cm)	Republic	Estado Novo	Difference
Quintile 1	1.160-1.590	32.63 %	51.69 %	19.1 p.p
Quintile 2	1.591-1.622	38.97 %	60.08 %	21.1 p.p.
Quintile 3	1.623-1.655	40.16 %	60.55 %	20.4 p.p.
Quintile 4	1.656-1.690	44.41%	72.44 %	28.0 p.p.
Quintile 5	1.691-1.880	50.90 %	76.72 %	25.8 p.p.

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

increases literacy again by 4.0 p.p. under the Republic but now by 5.8 p.p. under the Estado Novo.

[60]In subsection 4.4., we reach a similar conclusion using a different methodology (see Figure 6 below).

4.3 Breaking up the effect of the Estado Novo

A potential confounding factor for our analysis is that relevant demand-side variables (e.g. height and life expectancy) were rising for reasons possibly beyond the control of the regime. It would therefore be interesting to disentangle the effect that the Estado Novo would have had if it had 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. Would the Republic have fared much better had it faced the improved material conditions of the Estado Novo? And conversely, would the Estado Novo have succeeded to the same degree if subject to the conditions of the Republic?

To help answer these questions, we calculate literacy in a counterfactual Republic, where we set the Estado Novo dummy to zero while changing the other covariates (stature, life expectancy, and school density) to the mean of the values which applied to the 1940 and 1950 cohorts. Similarly, we estimate a counterfactual Estado Novo that takes the mean values of the control variables of the cohorts educated during the Republic. Using the estimated probabilities of the counterfactual as a benchmark, we can then estimate more precisely the effect of the Estado Novo on literacy that arose solely due to the regime change, rather than due to other socioeconomic changes.[61]

Table 7 shows the probabilities of literacy across counterfactual regimes and years that result from these calculations. For this purpose we are using the specification of Table 5, column 3, which includes interactive effects of both stature and school density with the Estado Novo dummy. 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 for the summary statistics). For instance, for the first entry in the second column, we set the Estado Novo dummy equal to 0, but for the control variables we plug in the values that occurred during the Estado Novo regime. This gives us a predicted literacy rate of 46.1%, which would have occurred if the Republic had faced the same socioeconomic conditions as the Estado Novo.

The results of this exercise again points towards a strong effect of the change in regime. For example, literacy increased in the Estado Novo by approximately 19.1 p.p. compared to a counterfactual republic that experienced the same levels as the Estado Novo for other covariates (second column of Table 7). The effects are similar to what we found in our baseline regression results. Hence, the model rejects the idea that literacy rose under the Estado Novo only because of an improvement in income levels, the health environment, and school density. Since the estimates suggest that the new regime had a significant effect on literacy, over and above what is explained by socioeconomic conditions including school density, this implies that other factors have to explain much of the additional demand for schooling, an issue to which we will return below.

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[61]As in any calculation of counterfactuals, this exercise rests on a number of assumptions. The most important one here is that estimated parameters are policy-invariant such that they can be used for counterfactual analysis under the two regimes. In this case, this assumption in fact seems likely to bias the results against the Estado Novo to the extent that some of the observed increases in stature were due to economic growth resulting from policy actions of this regime.

	Covariate values of the Republic (1924 and 1930)	Covariate values of the Estado Novo (1940 and 1950)
Predicted Literacy: Republic	41.1%	46.1%
Predicted Literacy: Estado Novo	58.8%	65.2%
Difference, Republic versus Estado Novo	17.7 p.p.	19.1 p.p.

Table 7: Counterfactuals for demand-side and supply-side effects. Source: see text

In order to further disentangle the effects of the economic demand side (life expectancy at birth and stature) and supply side (school density), we calculate two further counterfactuals.[62] First, we allow demand-side variables to change while keeping supply-side variables constant. Second, we change the supply side while keeping demand-side variables constant. Relative to Table 7, this exercise allows us to separately estimate the size of supply-side and of demand-side effects on literacy that occurred over the course of the regime change.

	Probability of Literacy under Estado Novo	Difference to counterfactual Republic
Baseline: All variables vary	65.2%	19 p.p.
Scenario 1: demand-side held constant	61.3%	15 p.p.
Scenario 2: school density held constant	62.7%	17 p.p.

Table 8: Estimates and counterfactuals. Source: see text.

Table 8 shows the estimated probabilities of literacy under the Estado Novo for these two scenarios, as well as their difference relative to the counterfactual Republic as calculated in Table 7.[63] When holding demand-side variables (life-expectancy at birth and stature) constant, as shown in scenario 1, the change in the probability of literacy under the Estado Novo is 4 p.p. lower than if all controls were allowed to vary. Hence, demand-side variables seem to explain part of the increase in literacy, but cannot account for the large observed increase by themselves. Under scenario 2 where school density is held constant, the change in literacy is estimated to be 2 p.p. lower than in the baseline scenario. This points to the conclusion that increases in school density did play a role in the increase of literacy experienced under the new regime, but that other factors were more important.

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[62]When we simply refer to demand-side variables, we mean those related to economic demand, that is, the factors which could potentially generate more demand from families: income and the health environment, proxied here by stature and life expectancy. The cultural alignment factor which mattered is, of course, also a source of demand, albeit not of an economic nature, and one which responded "along the curve" to the shift in the nature of supply.

[63]As with Table 7, we use column 3 of Table 5 to calculate these results.

To further understand the role of schooling, we estimate the effect of an additional school per square kilometer on literacy, conditional on the regime. For this purpose, we return to the regressions in Table 5, focusing on columns 2 and 3 that include the interaction between school density and the Estado Novo dummy. The results are presented in Table 9. Our findings suggest that adding one additional school per 100 square kilometers during the Estado Novo led to a statistically significant increase in literacy of 0.37-0.38 percentage points, depending on the specification. On the other hand, an equivalent increase in schools during the Republic failed to increase literacy rates: the magnitude is smaller and statistically insignificant. Thus, the expansion of the school grid was more effective during the Estado Novo regime. As we argue in detail below, a key for this increased effectiveness was that the Estado Novo was culturally more aligned with the social norms of the public, compared to the preceding Republic. This explains the greater take-up of the school under the Estado Novo, because parents were more willing to send children to school.

	Specification 2	Specification 3
ME of extra school/km^2, Republic	0.217	0.210
	(0.172)	(0.168)
ME of extra school/km^2, Estado Novo	0.382***	0.369***
	(0.145)	(0.142)

Results stem from Table 5, Specifications 2 and 3 from the respective columns.
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Marginal effect of an extra school per square kilometer. Source: see text.

Overall, our counterfactual analysis implies that the effect of the Estado Novo on literacy growth is not mainly explicable by changes in economic well-being (as captured by stature and life-expectancy at birth). The counterfactual scenarios suggest that only approximately 20% (4 p.p.) of the total observed increase in literacy associated with the Estado Novo period is accountable by improvements in life expectancy at birth and in stature which led to increased demand for schooling. Approximately 10% (2 p.p.) of the effect is explainable by the change in school density, which itself is a policy variable and hence should be attributed to the Estado Novo regime. A further 70% (13 p.p.) of the observed increase in literacy is due to the institutional characteristics of the Estado Novo that are unrelated to the well-being demand-side variables and to changes in school density. The cause was the reaction of families to the nature of the Estado Novo. We are confident that the effect we estimate is not simply a change in time periods but rather caused by the Estado Novo regime.[64] We discuss our hypotheses for why this was the case in the next section.

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[64]One reason for this was explained in subsection 4.1: in an alternative specification where time dummies are included instead of regimes, they are only statistically significant insofar as they coincide with the regime change. In other words, having controlled for changes in family income and well-being (through stature and life expectancy at birth), the effect of the Estado Novo dummy variable only captures the institutional changes that arose with the new regime.
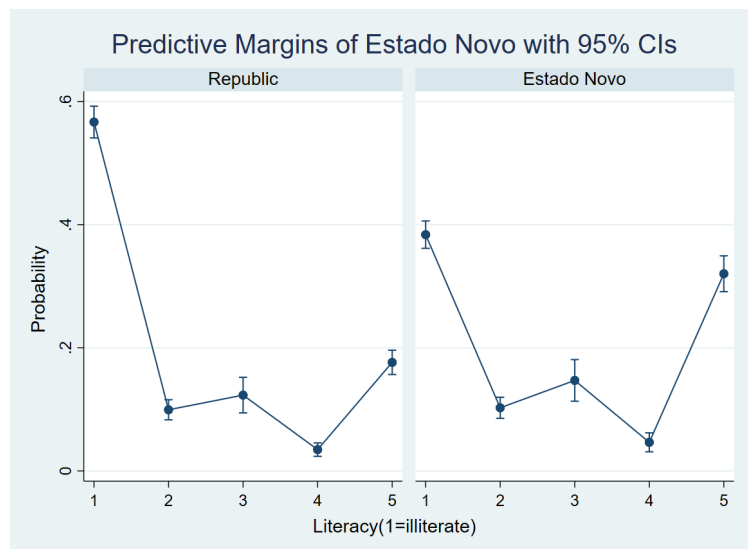
Figure 5: Literacy categories across the two regimes. Source: see text.

4.4 Ordered Probit Regression

The scores used to classify the literacy of individuals lend themselves naturally to an ordered probit regression. The specification is similar to the previous subsections of the present 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, as in Table 2. 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 our highest level of literacy ($lit = 5$) corresponds to what would now be considered basic education.

Figure 5 plots the estimated probability of falling into each of the literacy categories for each regime according to this ordered probit regression.[65] The overall decrease in illiteracy under the Estado Novo seems to be driven by two developments. First, the estimated probability of being illiterate ($lit = 1$) decreased from close to 60% to less than 40% under the Estado Novo. Second, the probability of being in the highest category ($lit = 5$) increased from less than 20% to more than 30% (i.e. this 10 p.p. differential means a 50% increase over the initial 20% probability). The remaining categories did not change much. Hence, the Estado Novo regime mainly brought illiteracy down and increased the proportion of people who passed at least the first final degree exam of primary school (i.e. those who ended up in category 5 according to Table 2), but had more negligible effects for the intermediate categories.

In our analysis in subsection 4.2. we found a positive interactive effect between stature and the

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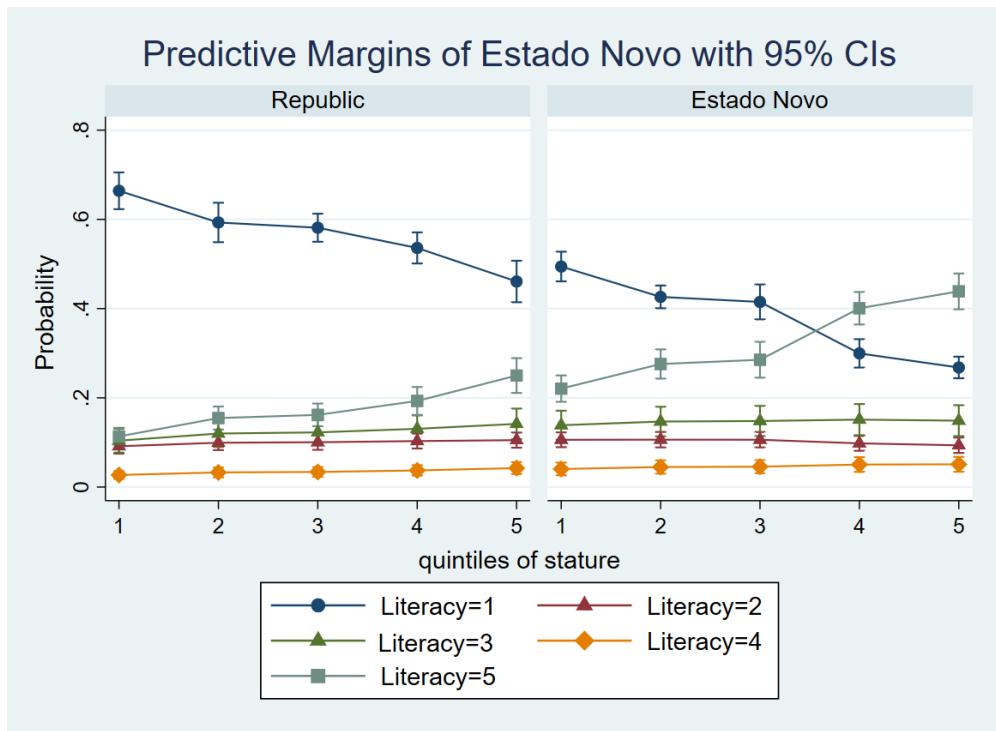[65]As before, standard errors are clustered by county.

Figure 6: Literacy categories by quintiles of stature. (Source: see text)

Estado Novo dummy. In order to further investigate this effect, we classify individuals according to the quintile of stature they are in, to take account of changing stature distributions over time. The pattern that emerges, as shown in Figure 6, is that individuals across all quintiles, including the shortest, experienced a significant improvement in literacy levels under the Estado Novo. As before, improvements mainly took the form of it becoming less likely that individuals fell into the illiteracy category ($lit = 1$), and more likely that they fell into the highest category ($lit = 5$), while for intermediary categories there was little change. Figure 6 shows that, statistically, the Estado Novo improved literacy for everyone including the poorest individuals.

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. This policy succeeded in part because it was feasible and 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 made a difference marginally, it was secondary relative to other matters relating to enforcement, the way that families reacted to the nature of the regime, and political economy incentives. 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 much of the large observed increases in literacy were due to institutional characteristics of the Estado Novo unrelated to the well-being demand-side variables (i.e. stature and life expectancy), or even to the expansion of school density. Ultimately, it was the close alignment of the policies of the Estado Novo with the culture of the common people 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 to 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 the dictatorship if they were properly controlled and if what people read was monitored.

Ultimately then, 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 may have been better enforcement. Secondly, the Estado Novo's educational policy was more in line with the cultural preferences of the majority of the population. Thirdly, despite being an autocracy, the Estado Novo had stronger political incentives than the Republic to educate the masses, since providing them with literacy did not threaten the regime's continuity, which was not the case with the Republic. We now go over these three arguments in turn.

5.1 Feasibility and state intervention

The education policy of the Estado Novo was characterized by what Nóvoa (1996) has called "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.[66] Furthermore, schools under the Estado Novo were more under the control of the central government, while the Republic had a more decentralized policy. Under the Republic, many schools were managed by municipalities (counties) which were underfunded and could not pay teachers on time. This led to a lack of teacher motivation (Presidência do Conselho de Ministros 1954, p. 90). Finally, the Estado Novo may have been more credible in enforcing school enrolment and related measures which increased literacy, especially in regions close to the capital.

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[66]These policies must be interpreted as pragmatic measures designed to make education more accessible to both students and teachers. They are in line with the policies which modern development economists have concluded work best (Glewwe et al. 2019). The fact that the Estado Novo reduced the compulsory minimum number of years was of no consequence since during the Republic (and to a lesser extent the Estado Novo itself) these were not enforced (see for instance Sequeira 1978).

5.2   Culture and ideology

The Estado Novo's ideology was undoubtedly 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 culture-driven 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. This allowed parents to worry less about the perceived indoctrination effects of sending their children to school.[67] The main ideologue behind the Republic's educational practices, J. de Barros, 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; Ramos et al. 2009, pp.586-7). 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).

Situations in which a regime change happens present at once a challenge to causal inference as they often lead to national-level changes in policy, as is the case in our setting. One way to confront this issue is to explore cross-sectional local variation in receptivity to the policy changes. Figure 7 presents empirical evidence regarding the importance of the ideological alignment of the Estado Novo with the population. The figure shows the average marginal effect of the Estado Novo on literacy and different measures of religiosity quantified at the county-level at different moments in time. The positive relationship (which is stronger in regions away from the capital) suggests that families in more Catholic regions were more comfortable with sending their children to school during the Estado Novo.[68] This is in line with our hypothesis that the increase in literacy under the Estado Novo was at least partly due to the regime's ideology being more closely aligned with the culture of the population.[69]

Why did religion matter so much? As we mentioned, a relevant ideological principle of the Republican school was the secular nature of its education. Another was co-education. This turned out to matter a great deal. Co-education was encouraged by the Republic from its early years, and reaffirmed in a 1923 speech by J. Camoesas, a leading republican in the field of education and

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[67]Our argument is related to the fact that some communities underinvest in education as a form of cultural resistance (Carvalho and Koyama 2016).

[68]In Table A4 of the Appendix, we show that regions close to the capital, such as Mafra, Sintra, Vila Franca de Xira, and even Lourinhã, had high rates of residing migrants compared with most of the country (we define as migrants those whose home address differs from their birthplace). Many of these individuals are likely to have migrated after going to school, or alternatively it was their parent's worldview that mattered for their education even if it was parents migrating when the child was in a pre-school age. Both these reasons then suggest that the determining religiosity level which mattered for their educational outcome is that of their home county, which biases downwards the religiosity effect for such regions.

[69]Gomes and Machado (2019) find, using county-level data, that the growth in literacy rates across cohorts during the 1940-1962 period is larger in counties with a larger fraction of Catholics.
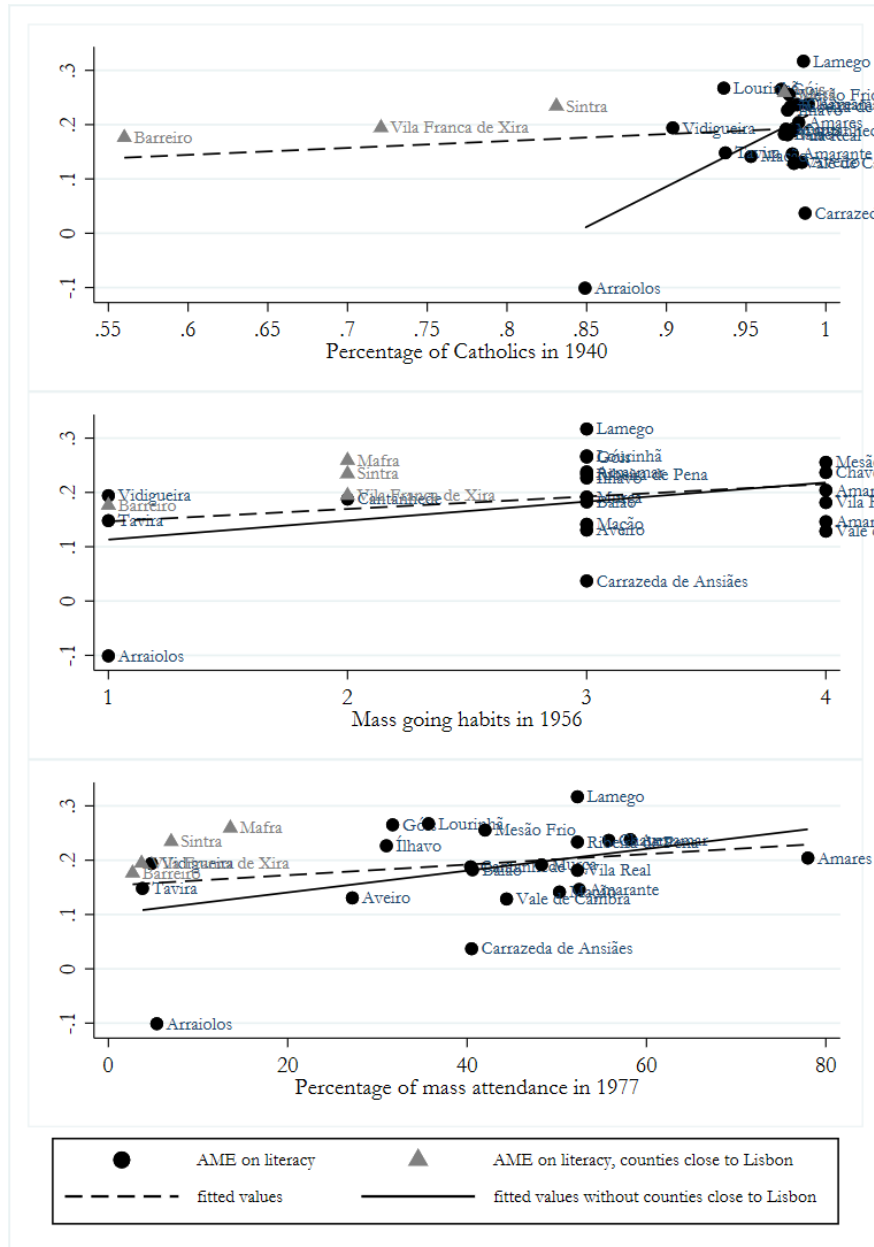
Figure 7: Relationship between the average marginal effect of the Estado Novo on Literacy (y-axis) and different measures of religiosity (x-axis). Sources: for the percentage of self-declared Catholics, Instituto Nacional de Estatística (1945); for Church-measured mass-going habits (1=very weak to 4=unanimous): Rezola (1992); for the percentage of people going to mass: França (1981).

minister for education under the Republic.[70] By contrast, co-education was rejected immediately following the Republic's end with the 1926 military coup (Marques 1991, p. 530). There is evidence that parents were not comfortable with co-education. In a high-level official document written in 1921, it was recognized that enrolment numbers were falling at that time (Instituto Nacional de Estatística 1923), and 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.[71] By contrast, once the regime changed it was decided, significantly, that there should be full gender separation in school buildings and playgrounds.[72] It was also reiterated that education was entirely free[73] and that primary education was to be uniform and compulsory for all Portuguese children between ages 7-12. The stated aims were basic, but feasible: teaching to read, write and count, and "moral and civic virtues", and a love for Portugal. Instruction was to follow a single national program, which was characterized by a pro-Catholic shift in the nature of the teaching materials, including through the adoption of a single authorized national textbook (Nóvoa 1990, pp. 510-5, Carvalho 1986).

5.3 Political incentives

Compared with the Republic, there is one final reason why the Estado Novo ended up having more success in promoting 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. Since most of the opposition to the socially conservative Estado Novo consisted of urban dwellers, this regime had an incentive to mainly invest instead in rural areas.[74] The Estado Novo did not expect literacy to lead to increased opposition from a generally conservative rural majority, especially given its de-facto alliance with the Church.[75] To the Republicans, the matter was different. When in opposition during the monarchy from 1891 to 1910, the Republican party had promised the suffrage to all men. But the Republicans defaulted on their promise once in power. Their great worry was that a large part of the country's rural and illiterate masses who needed education were Catholic and strongly opposed to their political program of republicanism and secularism.[76]

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[70]Camoesas recognized many of the limitations of the Republic's policies which were later addressed by the Estado Novo.

[71]By contrast, the report did not mention the Spanish influenza as a motive.

[72]The Church had supported the 1926 coup from the start (Pinto 2015, p. 83). When in the 1940s, a survey from a Department of Education official asked high school teachers whether co-education might return, there was anger across the country, with several newspapers accusing the inquiring official of treason to righteous religious principles and being a supporter of Soviet policies (Carvalho 2011, pp. 213-214).

[73]There were plans to eventually introduce a small fee for middle and higher income households, but this was never implemented (Lei n. 1969, May 20 1938).

[74]These had less schools to start with, and more literacy catch-up potential.

[75]For a general discussion of strategic partnerships of this kind in the context of rent-seeking, see McChesney (1987) and Tollison (1982, 2004).

[76]The Republic refused the suffrage to all women for similar reasons, as was made clear during the parliamentary debate on the 1913 electoral law. See the speeches by deputies Matos Cid and José Brandão in Diário da Câmara dos Deputados (1913, p. 24).

A careful description of the events during the Republic is suggestive of the mechanisms at play.[77] During the Monarchy, and in particular in the last decade prior to the Republic (1899-1910), only men over the age of 21 who could read and write or who paid taxes over a certain amount per year could vote. This consisted of about 630,000 individuals, but only 150,000 were actually registered to vote (out of a total population of 5.5 million). By 1911, right after the Republic's triumph, the suffrage was given to all Portuguese men over 21 who could read and write, or who had been heads of household for over a year (with few exceptions such as criminals). This consisted of about 840,000 individuals. Had male universal suffrage had been in place, the figure would be about twice as much.

Only two years later, in 1913, the Republic further reduced the franchise: only those over the age of 21 who could read and write and with other additional exclusions (e.g. the military) could vote. This reduced the potential number of voters to 617,000 individuals (out of which 397,000 were in fact registered to vote). The change was imposed by the three main parties, and justified by the fact that there was much monarchical support in rural Portugal. The major political figure of the Republic and the head of its main party, Afonso Costa, said in parliament that "individuals who never leave their parish and do not have clear ideas about anything or anyone should not be allowed to vote".[78] The 1911 voting experiment had shown that the illiterate rural masses could easily fall under the influence of the Church which supported the Monarchy and strongly opposed the Republic (Marques 1991, p. 417). Two years later, in 1915, the new electoral law did not change anything except for the fact that the military were again allowed to vote, and those registered to vote increased to 472,000 individuals. The law continued to explicitly exclude illiterate individuals from voting.[79]

We are hence offering a political economy explanation for the Estado Novo's success, in line with the public choice literature which suggests that rulers provide public goods due to self-interested motives (Buchanan and Musgrave 1999, Lott 1990, 1999, Geloso and Salter 2020). But our political economy explanation has foundations underpinned by the cultural background of the masses. It was the fact that Portugal was a socially conservative country that constrained the Republic's educational efforts more than was the case for the Estado Novo.

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 such a

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[77]We rely on Marques 1991, pp.413-417 for the changes to the electoral rules which we now describe.

[78]Our translation of the speech quoted in Marques (1991, pp. 417-8).

[79]During 1918 the Republic was briefly interrupted by the rule of the conservative autocrat Sidónio Pais who announced a wider franchise for males, although only 514,000 registered to vote. After the assassination of Pais on 14 of December 1918, the electoral law remained similar to what it had been in 1915 until the end of the Republic.

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 administered 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 regime should have been more successful in this task. Both regimes made a serious effort in this regard, but what is remarkable is the fact that it was the least democratic which finally turned the tide on illiteracy.

The Estado Novo succeeded because it worked with rather than against the prevailing cultural norms of Portugal at the time. It 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 around 50% more likely to be literate 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.[80]

We have further broken down the total literacy increase into the shares 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 80% 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. Our results suggest that it was the latter which mattered most. Furthermore, the social 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 ended up considerably better off.

References

Manuscript Archival Sources

[1] Exército Portugês, Relatórios de Inspeção. Arquivo Geral do Exército, Lisboa

Printed Primary Sources

[2] Anuário Comercial de Portugal, Ilhas e Ultramar (1914). Periodical Publication (Yearbook), Lisboa

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[80]See also Musacchio et al. (2014) for the expansion of mass education in Brazil.

[3] Anuário Comercial de Portugal, Ilhas e Ultramar (1920). Periodical Publication (Yearbook), Lisboa

[4] Anuário Comercial de Portugal, Ilhas e Ultramar (1930). Periodical Publication (Yearbook), Lisboa

[5] Anuário Comercial de Portugal, Ilhas e Ultramar (1940). Periodical Publication (Yearbook), Lisboa

Official Publications

[6] Anuário Estatístico de Portugal (several years). Lisboa: Imprensa Nacional.

[7] Decreto-Lei 38968. (1952). In Colecção Oficial de Legislação Portuguesa, 27th October. Lisboa: Imprensa Nacional.

[8] Diário da Câmara dos Deputados (1913). Session number 125. Lisboa: Imprensa Nacional.

[9] Direcção Geral de Estatística (1913). Censo da População de Portugal no 1° Dezembro de 1911 (5° Recenseamento Geral da População). Lisboa: Imprensa Nacional.

[10] Direcção Geral de Estatística (1923). Censo da População de Portugal no 1° Dezembro de 1920 (6° Recenseamento Geral da População). Lisboa: Imprensa Nacional.

[11] Direcção Geral de Estatística (1933). Censo da População de Portugal no 1° Dezembro de 1930 (7° Recenseamento Geral da População). Lisboa: Imprensa Nacional.

[12] Instituto Nacional de Estatística (1944). Estatísticas da Educação 1941-1944. Lisboa, Bertrand Irmãos.

[13] Instituto Nacional de Estatística (1945). VIII Recenseamento Geral da População no Continente e Ilhas Adjacentes em 12 de Dezembro de 1940. Lisboa: Imprensa Nacional.

[14] Instituto Nacional de Estatística. (1952). IX Recenseamento Geral da População no Continente e Ilhas Adjacentes em 15 de Dezembro de 1950. Lisboa: Imprensa Nacional.

[15] Lei do Recrutamento e Serviço Militar (Lei n. 1961) (1937). In: Reformas Militares de 1937. Lisboa: Imprensa Nacional.

[16] Lei n. 1969 (de Bases) (1938). In Colecção Oficial de Legislação Portuguesa, 20th May. Imprensa Nacional.

[17] Ministério das Finanças, Direcção Geral de Estatística (1919). Ensino Primário Oficial. 1910 a 1915. Lisboa: Imprensa Nacional.

[18] Ministério das Finanças, Direcção Geral de Estatística (1923). Ensino Primário Oficial. Anos Lectivos de 1915-1916 a 1918-1919. Lisboa, Imprensa Nacional.

[19] Ministério das Finanças, Direcção Geral de Estatística (1925). Instrução Pública. Dados Estatísticos referentes aos Anos Lectivos de 1919-1920 e 1920-1921. Lisboa: Imprensa Nacional.

Secondary Sources

[20] A'Hearn, Brian (2003). Anthropometric Evidence on Living Standards in Northern Italy, 1730-1860. *Journal of Economic History*, 63 (2), pp. 351-381.

[21] Acemoglu, D. and Robinson, J. (2012). *Why Nations Fail. The origins of power, prosperity and poverty.* New York, Profile Books.

[22] Aghion, Philippe, Xavier Jaravel, Torsten Persson and Dorothée Rouzet (2019). Education and Military Rivalry. *Journal of the European Economic Association* vol. 17(2), pages 376-412.

[23] Allen, R. C. (2008). A review of Gregory Clark's A farewell to alms: A brief economic history of the world. *Journal of Economic Literature* 46, 946-973.

[24] Amaral, Luciano (2002). *How a country catches up: Explaining economic growth in Portugal in the post-war period (1950s to 1973).* Ph.D. dissertation, European University Institute, Florence.

[25] Andersson, J., and Berger, T. (2019). Elites and the expansion of education in nineteenth century Sweden. The Economic History Review 72(3), 897-924.

[26] Angrist, J. D., and Pischke, J. S. (2009). Mostly harmless econometrics: An empiricist's companion. Princeton University Press.

[27] Banerjee, A. and Duflo, E. (2011). *Poor economics. A radical rethinking of the way to fight global poverty.* New York, Public Affairs.

[28] Bandeira, M. Leston (1996). *Demografia e modernidade: família e transição demográfica em Portugal.* Lisboa: Imprensa Nacional-Casa da Moeda.

[29] Baten, J. (2000). Heights and real wages in the 18th and 19th centuries: an international overview. *Economic History Yearbook*, 41(41), 61-76.

[30] Batista, D., Martins, C., Pinheiro, M. and Reis, J. (1997). New estimates for Portugal's GDP: 1910-1958. Lisboa, Banco de Portugal.

[31] Becker, S. O., Hornung, E., and Woessmann, L. (2011). Education and catch-up in the industrial revolution. *American Economic Journal: Macroeconomics*, 3(3), 92-126.

[32] Becker, Sascha O. and Rubin, Jared and Woessmann, Ludger (2020). Religion in Economic History: A Survey. *CEPR Discussion Paper 14894*

[33] Berdine, G., Geloso, V., and Powell, B. (2018). Cuban infant mortality and longevity: health care or repression? *Health policy and planning*, 33(6):755-757.

[34] Behrman, J. R. (2016). Growth faltering in the first thousand days after conception and catch-up growth. In: Komlos, J. and Kelly, I. (eds), *The Oxford Handbook of Economics and Human Biology*

[35] Boppart, T., Falkinger, J., Grossmann, V., Woitek, U., and Wüthrich, G. (2013). Under which conditions does religion affect educational outcomes?. *Explorations in Economic History*, 50(2), 242-266.

[36] Bodenhorn, H., Guinane, T. and Mroz, T. (2017). Sample-selection biases and the industrialization puzzle. *The Journal of Economic History* 77, 171-207.

[37] Boucekkine, R., de la Croix, D. and Peeters, D. (2007). Early literacy achievements, population density, and the transition to modern growth. *Journal of the European Economic Association* 5(1): 183-226

[38] Buchanan, J. M. and Musgrave, R. A. (1999). *Public finance and public choice: two contrasting visions of the State.* Cambridge MA: MIT press.

[39] Candeias, António (2004). Alfabetização e Escola em Portugal nos Séculos XIX e XX. Os censos e as estatísticas. Lisboa, Fundação Calouste Gulbenkian.

[40] Cardoso, H- F. V. and Gomes, J. E. A. (2009). Trends in adult stature of peoples who inhabited the modern Portuguese territory from the Mesolithic to the late 20th century. *International Journal of Osteoarchaeology* 19, 711-725.

[41] Carnoy, M., Gove, A. K., and Marshall, J. H. (2007). *Cuba's academic advantage: Why students in Cuba do better in school.* Stanford: Stanford University Press.

[42] Carvalho, Rómulo de (1986). *História do Ensino em Portugal desde a Fundação da Nacionalidade até ao Fim do Regime de Salazar-Caetano.* Lisboa, Fundação Calouste Gulbenkian.

[43] Carvalho, Rómulo de (2011). *Memórias.* Lisboa: Fundação Calouste de Gulbenkian. 2nd edition.

[44] Carvalho, J. P., and Koyama, M. (2016). Resisting education. *GMU Working Paper in Economics*

[45] Carreras, A. and Tafunell, X. (eds) (2005). *Estadísticas Históricas de España: Siglos XIX-XX.* Bilbau: Fundación, BBVA.

[46] Carrilho, Maria (1986). Forças Armadas e Mudança Política em Portugal no Século XX. Lisbon: Imprensa Nacional.

[47] Case, Anne and Paxton, Christina (2008). Stature and status: Height, ability, and labor market outcomes. *Journal of Political Economy* 116, 499-532.

[48] Coppedge, M., J. Gerring, C. H. Knutsen, S. I. Lindberg, S. Skaaning, J. Teorell, V. Ciobanu, and M. Olin. 2018. V-Dem Dataset v8. Varieties of Democracy (V-Dem) Project.

[49] Cvrcek, T., and Zajicek, M. (2019). The making of a liberal education: Political economy of the Austrian school reform, 1865-1880. *Explorations in Economic History*, 73

[50] Dalgaard, C. J., and Strulik, H. (2015). The physiological foundations of the wealth of nations. *Journal of Economic Growth* 20, 37-73.

[51] Dalgaard, C. J., and Strulik, H. (2016). Physiology and development: Why the West is taller than the rest. *The Economic Journal* 26, 2292-2323

[52] Deaton, A. (2013). *The great escape: health, wealth, and the origins of inequality.* Princeton University Press.

[53] Duflo, E. (2001). Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment. *American Economic Review* 91, 795-813.

[54] Easterly, W. (2001). *The elusive quest for growth: Economists' adventures and misadventures in the tropics.* Cambridge, Mass., MIT Press.

[55] Engerman, S., Mariscal, E. and Sokoloff, K. (2009). The evolution of schooling institutions in the Americas, 1800-1925. In S. Haber (ed.), Political institutions and economic growth in Latin America, Stanford, Hoover Institution Press, 159-217

[56] Fonseca, Helder A. and Guimarães, Paulo E. (2009a). A Mobilidade Social Intergeracional em Portugal, 1911-57: A Investigação sobre a Estratificação Social e a Mobilidade Social em Portugal. In Serrão, J. V., Pinheiro, M. A. and Sá, M. F. S. M. (eds), Desenvolvimento Económico e Mudança Social: Portugal nos Últimos Dois Séculos (Homenagem a Miriam Halpern Pereira). Lisboa: ICS, 349-71.

[57] Fonseca, Helder A. and Guimarães, Paulo E. (2009b). Social Mobility in Portugal (1860-1960): Operative Issues and Trends. *Continuity and Change* 24, 513-46.

[58] Foster, A. and M. Rosenzweig (1996). Technical Change and Human Capital Returns and Investments: Evidence from the Green Revolution. *American Economic Review* 86 (4), 931-953

[59] França, L. de (1981). *Comportamento religioso da população portuguesa.* Lisboa: Moraes

[60] Franck, Raphaël and Johnson, Noel D. (2016). Can public policies lower religiosity? Evidence from school choice in France, 1878–1902 *The Economic History Review* 69 (3), 915-944

[61] Gallego, F. (2008). Historical Origins of Schooling: The Role of Democracy and Political Decentralization. *The Review of Economics and Statistics* 92, 228-243.

[62] Geloso, V., Berdine, G., and Powell, B. (2020). Making sense of dictatorships and health outcomes. *British Medical Journal: Global Health*

[63] Geloso, V. J., and Salter, A. W. (2020). State capacity and economic development: Causal mechanism or correlative filter? *Journal of Economic Behavior and Organization*, 170, 372-385.

[64] Glewwe, P., Kremer, M., and Moulin, S. (2009). Many children left behind? Textbooks and test scores in Kenya. *American Economic Journal: Applied Economics*, 1(1), 112-35.

[65] Gomes, P., and Machado, M. P. (2019). Literacy and primary school expansion in Portugal: 1940-62. *Revista de Historia Económica-Journal of Iberian and Latin American Economic History*, 1-35.

[66] Hatton, T. J. (2011). Infant mortality and the health of survivors: Britain, 1910-50. *The Economic History Review, 64*, 951-972.

[67] Hatton, T. J. (2013). How have Europeans grown so tall? *Oxford Economic Papers* 66, 349-372

[68] Hatton, T. J., and Martin, R. M. (2010). Fertility decline and the heights of children in Britain, 1886-1938. *Explorations in Economic History* 47, 505-519.

[69] Iyer, S. (2016). *The new economics of religion.* Journal of Economic Literature, 54(2), 395-441

[70] Jensen, R. (2010). The (perceived) returns to education and the demand for schooling. *Quarterly Journal of Economics*, 125(2), 515-548.

[71] Johnson, Noel D. and Koyama, Mark (2019). *Persecution & toleration: The long road to religious freedom.* Cambridge University Press

[72] Koepke, N. (2016). The biological standard of living in Europe from the late iron age to the little ice age. In: Komlos, J. and Kelly, I. (eds), *The Oxford Handbook of Economics and Human Biology.* Oxford: Oxford University Press, 70-109.

[73] Koepke, N. and J. Baten (2005). The biological standard of living in Europe during the last two millennia. *European Review of Economic History* 9, 61-95.

[74] Lee, J. W., and Lee, H. (2016). Human capital in the long run. *Journal of Development Economics*, 122, 147-169.

[75] Lindert, Peter L. (2003). Voice and Growth: Was Churchill Right? *Journal of Economic History* 63, 315-50.

[76] Lindert, Peter L. (2004). *Growing Public: Social Spending and Economic Growth since the Eighteenth Century.* Cambridge: Cambridge University Press, 2 vols.

[77] Lindert, Peter L. (2010). The Unequal Lag in Latin American Schooling since 1900: Follow the Money. *Revista de Historia Economica-Journal of Iberian and Latin American Economic History* 28, 375-405.

[78] Lott, J. R. (1990). An explanation for public provision of schooling: The importance of indoctrination. *The Journal of Law and Economics*, 33(1):199-231.

[79] Lott, J. R. (1999). Public schooling, indoctrination, and totalitarianism. *Journal of Political Economy*, 107

[80] Marques, A. H. de Oliveira (ed.) (1991). Portugal, da Monarquia para a República. Lisboa: Presença.

[81] Marshall, Monty G., Gurr, Ted Robert and Jaggers, Keith (2017). Polity IV Project: Political Regime Characteristics and Transitions, 1800-2016. Dataset User's Manual (Center for Systemic Peace: www.systemicpeace.org).

[82] McChesney, F. S. (1987). Rent extraction and rent creation in the economic theory of regulation. *The Journal of Legal Studies*, 16(1):101-118.

[83] Meneses, Filipe Ribeiro (2010). *Salazar: A Political Biography*. Enigma Books.

[84] Meyersson, E. (2014). Islamic Rule and the Empowerment of the Poor and Pious. *Econometrica*, 82(1), 229-269.

[85] Mónica, Maria Filomena (1978). *Educação e Sociedade no Portugal de Salazar (A Escola Primária Salazarista 1926-1939)*. Lisboa, Presença, Gabinete de Investigações Sociais.

[86] Musacchio, Aldo, Fritscher, A. M. and Viarengo, Martina (2014). Colonial institutions, trade shocks, and the diffusion of elementary education in Brazil. *Journal of Economic History* 74, 730-766.

[87] Nóvoa, António (1996). Educação Nacional, in F. Rosas and J.M. Brito (eds.), Dicionário de História do Estado Novo. Lisbon: Bertrand.

[88] Palma, J. B. (1983). Quelques aspects de l'evolution de l'enseignement secondaire au Portugal: 1947-1974. Ph.D. dissertation, Université René Descartes, Paris.

[89] Picão, José da Silva (1983). Através dos Campos: usos e costumes agrícolo-alentejanos (concelho de Elvas). Lisboa: Publicações Dom Quixote, 2nd edition.

[90] Pinto, A. C. (2015). *Os camisas azuis e Salzar. Rolão Preto e o Fascismo em Portugal*. Lisboa: Edições 70.

[91] Polity IV Project, The. http://www.systemicpeace.org/polity/polity4.htm.

[92] Presidência do Conselho de Ministros (1954). 25 Anos de Administração Pública. Ministério de Educação. Lisboa: Imprensa Nacional.

[93] Projecto Regional do Mediterrâneo (1965). Evolução da Estrutura Escolar Portuguesa (Metrópole): Previsão para 1975. Lisboa, 2 vols.

[94] Ramos, Rui (1998). O chamado problema do analfabetismo: as políticas de escolarização e a persistência do analfabetismo em Portugal (séculos XIX e XX). *Ler História*, 35: 45-70.

[95] Ramos, R. (2001). A Segunda Fundação. Lisboa: Editorial Estampa.

[96] Ramos, Rui, Sousa, Bernardo V., Sousa and Monteiro, Nuno G. (2009). *História de Portugal*. Lisboa: A Esfera dos Livros.

[97] Reis, Jaime (1993). *O Atraso Económico Português 1850-1930*. Lisboa: Imprensa Nacional.

[98] Reis, Jaime (2009). Urban Premium or 'Urban Penalty'? The Case of Lisbon, 1840-1910. *Historia Rural* 47, 69-94.

[99] Rezola, Maria Inácia (1992). Breve Panorama da Situação da Igreja e da Religião Católica em Portugal (1930-1960), In: Rosas, Fernando (ed.). *Portugal e o Estado Novo (1930-1960)*. Lisboa: Presença, 222-255.

[100] Rias, Ana Paula Andrade (1997). Regentes Escolares: Colaboradores benévolos ao serviço da educação nacional. Unpublished Master's thesis, UTL, Lisbon.

[101] Rodrigues, Teresa Ferreira (2008). *História da População Portuguesa*. Porto: Afrontamento.

[102] Rosas, Fernando (ed.) (1992). *Portugal e o Estado Novo (1930-1960)*. Lisboa: Presença.

[103] Sampaio, J. Salvado (1975-7). *O Ensino Primário (1911-1969). Contribuição Monográfica*. Lisbon, 3 vols: Instituto Gulbenkian Cincia.

[104] Sachs, J. (2005). *The end of poverty: economic possibilities for our time*. New York: Penguin Books.

[105] Sequeira, José dos Reis (1978). *Relembrando e Comentando. Memórias de um Operário Corticeiro*. Porto: A Regra do Jogo

[106] Steckel, R. (2016). Biological measures of well-being. In: Komlos, J. and Kelly, I. (eds), *The Oxford Handbook of Economics and Human Biology*. Oxford: Oxford University Press 31-51.

[107] Stolz, Y., Baten, J., and Reis, J. (2013). Portuguese living standards, 1720-1980, in European comparison: Heights, income, and human capital. *The Economic History Review* 66, 545-578.

[108] Testa, P. (2018). Education and propaganda: Tradeoffs to public education provision in nondemocracies. *Journal of Public Economics* 160: 66-81

[109] Tollison, R. D. (1982). Rent seeking: A survey. *Kyklos*, 35(4):575-602.

[110] Tollison, R. D. (2004). Rent seeking. In: *The Encyclopedia of Public Choice*, pp. 820-824. Springer.

[111] Vahabi, M. (2016a). *The political economy of predation: Manhunting and the economics of escape*. Cambridge University Press.

[112] Vahabi, M. (2016b). A positive theory of the predatory state. *Public Choice*, 168.

[113] Valério, N. (ed) (2001). *Estatísticas Históricas Portuguesas*. Lisboa, Instituto Nacional de Estatística.

[114] Ventura, A. (2011). *Os Constituintes de 1911 e a Maçonaria*. Lisboa: Temas e Debates

[115] Voigtländer, Nico and Voth, Hans-Joachim (2014). Highway to Hitler. University of Zurich, Department of Economics, Working Paper No. 156

[116] Xue, Melanie M. and Koyama, Mark (2018). Autocratic Rule and Social Capital: Evidence from Imperial China. Available at SSRN: https://ssrn.com/abstract=2856803

A   Appendix

	% of private schools 1914 (1910)	% of private schools 1920	% of private schools 1930	% of private schools 1940
Amarante	0	0	0	0
Amares	0	0	0	0
Armamar	0	0	0	0
Arraiolos	0	0	0	0
Aveiro	7.7	0	0	0
Baião	0	0	0	0
Barreiro	0	0	0	0
Cantanhede	0	0	0	0
C. de Ansiães	0	0	0	0
Chaves	3.2	0	0	0
Góis	0	0	0	0
Ílhavo	8.3	0	0	0
Lamego	2.4	5.3	0	0
Lourinhã	0	0	0	0
Mação	0	0	0	0
Mafra	0	0	0	0
Mesão Frio	0	0	0	0
Murça	0	0	0	0
Ribeira de Pena	0	0	0	0
Sintra	0	0	0	0
Tavira	0	0	0	0
Vale de Cambra	0	0	0	0
Vidigueira	0	0	0	0
V. F. de Xira	0	0	0	0
Vila Real	0	0	0	0

Table A1: Share of private schools. Due to lack of data, the 1914 figures correspond to 1910. Prior to 1926, Vale de Cambra was known as Macieira de Cambra. There was also a small number of private teachers in a few locations but with no clear trend over time. Source: Anuário Comercial de Portugal, Ilhas e Ultramar (1914, 1920, 1930, 1940).

DEP: Literacy (binary)	Probit (1)	Probit (2)	Probit (3)	Probit (4)	Probit (5)	Probit (6)	LPM (7)
Estado Novo = 1	0.447***	0.576***	0.548***	0.319***	0.432***		0.164***
	(0.0646)	(0.0642)	(0.0486)	(0.0941)	(0.0632)		(0.0254)
Year = 1930						-0.0256	
						(0.0731)	
Year = 1940						0.409***	
						(0.0673)	
Year = 1950						0.501***	
						(0.0998)	
County Stature	9.232***		7.826**	14.83***	7.454***	8.554***	2.935***
	(2.770)		(3.188)	(4.216)	(2.891)	(3.016)	(1.016)
Life Expectancy (Males)	0.0105*	0.00564		0.0186**	0.0102*	0.00880	0.00407*
	(0.00593)	(0.00634)		(0.00813)	(0.00597)	(0.00641)	(0.00219)
School Density					0.691*		
					(0.405)		
AME of Estado Novo	0.163***	0.210***	0.200***	0.122***	0.157***	0.164***	0.164***
	(0.0236)	(0.0230)	(0.0175)	(0.0377)	(0.0231)	(0.0254)	(0.0254)
MEM of Estado Novo	0.176***	0.226***	0.215***	0.126***	0.170***	0.164***	0.164***
	(0.0250)	(0.0244)	(0.0186)	(0.0371)	(0.0245)	(0.0254)	(0.0254)
ME at 80th pct of st.	0.164***	0.226***	0.200***	0.122***	0.158***	0.164***	0.164***
	(0.0236)	(0.0244)	(0.0176)	(0.0378)	(0.0231)	(0.0254)	(0.0254)
ME at 20th pct of st.	0.166***	0.226***	0.203***	0.125***	0.160***	0.164***	0.164***
	(0.0237)	(0.0244)	(0.0172)	(0.0375)	(0.0231)	(0.0254)	(0.0254)
County FE	YES	YES	YES	NO	YES	YES	YES
Observations	9,084	9,084	9,084	9,084	9,084	9,084	9,084

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

Table A2: Probit regressions with average stature as a control. Source: see text.

County	Interactive Effect	County	Interactive Effe
Estado Novo * Arraiolos	-0.651***	Estado Novo * Vidigueira	0.233***
	(0.0348)		(0.00747)
Estado Novo * Aveiro	0.0676**	Estado Novo * Vila Franca de Xira	0.116*
	(0.0273)		(0.0664)
Estado Novo * Cantanhede	0.116***	Estado Novo * Vila Real	0.0874***
	(0.0165)		(0.0170)
Estado Novo * Chaves	0.227***	Estado Novo * Amares	0.153***
	(0.0150)		(0.0543)
Estado Novo * Góis	0.316***	Estado Novo * Armamar	0.230***
	(0.0265)		(0.00183)
Estado Novo * Ílhavo	0.520***	Estado Novo * Baião	0.0936***
	(0.0276)		(0.00116)
Estado Novo * Mafra	0.332***	Estado Novo * Barreiro	0.187**
	(0.0570)		(0.0782)
Estado Novo * Mesão Frio	0.281***	Estado Novo * Carrazeda de Ansiães	-0.285***
	(0.0146)		(0.00365)
Estado Novo * Murça	0.108***	Estado Novo * Lamego	0.461***
	(0.00896)		(0.00376)
Estado Novo * Ribeira da Pena	0.290***	Estado Novo * Lourinhã	0.412***
	(0.0145)		(0.0567)
Estado Novo * Sintra	0.221***	Estado Novo * Mação	0.0354
	(0.0623)		(0.0295)
Estado Novo * Tavira	0.0304	Estado Novo * Vale de Cambra	-0.0233
	(0.0229)		(0.0255)

Table A3: County interactive effects from column 4 of Table 5 (with Amarante as the baseline)

	% migrants 1924	% migrants 1930	% migrants 1940	% migrants 1950
Amarante	12.6	4.5	9.7	9.1
Amares	0.0	0.0	11.7	11.4
Armamar	4.0	8.0	2.3	2.1
Arraiolos	0.0	0.0	9.4	4.2
Aveiro	0.0	0.0	1.0	2.6
Baião	12.7	0.8	22.0	8.7
Barreiro	2.9	4.0	7.1	12.0
Cantanhede	0.0	0.0	0.0	2.0
C. de Ansiães	8.6	0.0	2.0	3.3
Chaves	0.6	0.0	0.0	0.6
Góis	0.0	0.0	22.7	10.0
Ílhavo	0.0	0.0	0.0	0.0
Lamego	13.3	0.0	5.6	6.4
Lourinhã	5.0	1.7	6.3	18.3
Mafra	8.4	8.7	4.0	7.1
Mação	4.0	0.0	13.6	1.4
Mesão Frio	10.3	8.3	3.0	8.0
Murça	8.5	0.0	0.0	0.0
Ribeira de Pena	0.0	1.0	0.0	4.0
Sintra	16.0	0.0	16.8	20.8
Tavira	0.0	0.8	4.9	4.9
Vale de Cambra	0.0	0.0	0.0	6.8
Vidigueira	10.5	6.8	0.0	3.7
V. F. de Xira	0.6	2.5	4.0	3.8
Vila Real	4.6	6.9	5.2	1.5

Table A4: Percentage of migrants across the counties in our sample