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

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Abstract

Do countries with less democratic forms of government necessarily have lower literacy rates as a consequence? Using a random sample of 4,600+ individuals from military archives in 20th century Portugal, we show that 20-year old males were about 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.

Key words: Anthropometrics, economic history of education, public schooling provision, political economy of development.

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

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1 Introduction

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

Our story differs from the narratives which usually appear in the literature. These are typically either primarily demand-based explanations, placing emphasis on families’ desire to endow children with human capital, and those based on supply of public schooling. We show that the nondemocratic regime actively worked for and was successful in providing basic literacy to the masses, which contrasts with the way in which nondemocratic regimes are typically perceived. In order to arrive at these results, we rely on a new military dataset of over 4,600 individual-level observations. Our data is not subject to sample selection as it does not refer to conscripts; instead, our 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 twice as likely to end up literate than under the more democratic regime (the Republic) which immediately preceded it, even after controlling for other covariates. The fact that the policy changes of the Estado Novo were causal can be illustrated by the strong discontinuity which coincides with its establishment. While during the Republic there was little improvement in literacy, the appearance of the Estado Novo coincides with a marked discontinuity as seen in Figure 1.¹ No similar phenomenon took place in Spain over the same period, for example (Carreras and Tafunell, 2005).

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

¹Figure 1 relies on an average sample of 4,600+ observations, and shows the results for 20-year olds of median height.
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 involve students more unless their families also want to send them and are able to do so. Nonetheless, the historical record registers a few cases where the state was successful at coercing families in this matter.\(^2\) This suggests a need to consider the positive incentives which can determine family decisions to invest in human capital.\(^3\) Furthermore, it is well-known that

\(^2\)The classic case is Prussia, but it must be noted that this was done indirectly, was protracted and made use of the mobilization of religion and religious institutions. Eighteenth century Sweden, the Soviet Union, Cuba and China present other examples.

\(^3\)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
nondemocratic elites in parts of Asia and elsewhere invested heavily in education; a literature review is provided by Andersson and Berger (2018) who write: “there is mounting evidence that elites often played an important role in promoting universal schooling in less democratic countries.”

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 4,600+ adult 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 usage of enrolment data. Our dataset therefore evaluates “scholastic achievement” rather than the system that produces it and thus brings the analysis closer to the ultimate issue of relating education to economic performance.

The choice of Portugal as a case-study is justified by two circumstances. Firstly, ever since official statistics have been gathered, Portugal has been one of the worst performers in the field of educational attainment in the West (Reis 1993, Amaral 2002, Lindert 2004). At the beginning of the 20th century, its illiteracy rate of 75% for the population over 7 years of age was among the highest in Europe – in Spain it was only 53%, in Italy it was 46%. In 1940, this was still 50% and only fell to 25% as late as 1970. The other is the succession of political regimes which it experienced during the period under consideration, which assumed disparate stances respectively on the questions of schooling and the extent of permitted political participation. In this context, a significant contrast opposed the Republic (1910-26), a limited parliamentary democracy, to an authoritarian Military Dictatorship (1926-33) which eventually morphed into the corporatist dictatorship of the Estado Novo (1933-74). The latter denied the population any possibility of freely exercising the suffrage. For historians and public opinion, this opposition between the two regimes epitomizes the main political and ideological struggles which marked much of the 20th century in Portugal. We have conceded that the role of underlying demand is also critical. Indeed, empirical studies have confirmed the role of market conditions in providing the required incentives for people to choose to endow their children with higher human capital levels (e.g. Foster and Rosenzweig 1999).

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

The Republic was more democratic than the Estado Novo, but was not a democracy in the modern sense (Ramos 2001, p.350, 364; Ramos et al. 2009, pp.577-665). In Peter Lindert’s (2004) nomenclature, it was a limited democracy.
chosen for the present exercise the period 1910-1950, a period 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. The considerable progress in literacy during the second quarter of the century was an important contribution to a golden age of Portuguese economic growth together with catch-up to the European core from approximately 1950 (Amaral 2002). We hence also contribute to the literature which considers the human capital preconditions for the take-off of sustained growth.

In this paper we consider three issues. The first is whether institutional conditions, in particular the openness of the political process, had an effect on educational policies. The common political economy view is that less democratic systems should be strategically less interested in educating the masses.\textsuperscript{6} The second is whether family-based decisions provide a useful complementary explanation for variations in the supply of human capital over time compared to institutional and political conditions. 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. In this paper we suggest and implement procedures which take into account each of these concerns.

The conclusion we draw shows that both the economic influences which shaped family decisions on education and the state were critical. But, while neither can be dismissed, the latter mattered the most. Indeed, changes in institutions and associated policies explain over 70\% of the considerable increase in literacy observed during 1911-1950.\textsuperscript{7}

2 Political regimes and educational policies

The overthrow of the Portuguese monarchy in 1910 ushered in a new political situation which was characterized ideologically as republican, Jacobin, and fiercely anti-clerical. It was strongly influenced by the Free-masonry.\textsuperscript{8} 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, \textsuperscript{6}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.  
\textsuperscript{7}This is in fact a lower bound because it assumes that the Estado Novo had nothing to do with the observed increases in heights and improvements in the disease environment as reflected in increases in life expectancy at birth.  
\textsuperscript{8}Recent research has shown that half the ministers and half the members of parliament during the Republic were free-masons (Ventura 2010).}
the Democratic Party). In Peter Lindert (2004)’s nomenclature, this was a “limited parliamentary democracy” of the kind unlikely to promote the tax-financed education of the masses.

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

In practice, republican educational reform was less impressive than its 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.

The Republic was toppled in 1926 by a military coup, but the Estado Novo was proclaimed by plebiscite only in 1933. In between, the regime which ruled Portugal was authoritarian and anti-Republican, and Salazar, the country’s future dictator, played an increasingly powerful role since 1928 (Meneses 2010). The military dictatorship and the Estado Novo represented an overt ideological rejection of the Republic. 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 a mere formality. Decisions were taken dictatorially and were enforced without open discussion. A secret police and special courts to judge political dissenters were instrumental in keeping the institutions stable. In terms of degree of democracy, it was an autocracy, unlike the more democratic Republic, even though the latter was in turn distant from the standards set by fully participatory regimes.

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

10 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) leads to the same qualitative results: both regimes appear much less democratic than modern democracies, but the Republic appears considerably more democratic than the Estado Novo.
The approach of the Estado Novo to education could not have been more opposed to that of the Republic, except in two respects. Both saw it as a profoundly ideological question and openly sought to use schools as an instrument to change the minds of the Portuguese. Both were deeply concerned with the eradication of illiteracy, partly for reasons of national prestige, and partly because it was through the primary school that the greatest number of minds could be moulded. Obviously, the programatic message of the Estado Novo was completely different. Indeed, the pronouncements of some of its most reactionary stalwarts reflect an intense fear of the social repercussions produced by increased schooling. Typical of these were statements like: “Blessed are those who forget their first letters and return to the shovel”; or “To teach how to read is to corrupt the essence of our race”.11

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).12 In fact, overall its major educational reforms aimed at “the minimum of culture essential for life and to fight illiteracy in an energetic, efficient manner.”13 In this context, efficiency gains were sought by reducing the time of compulsory education and simplifying the newly-instituted national education programmes. The struggle to eradicate illiteracy was pursued by expanding the school grid but at a minimum of cost, even if parsimony meant having to lower standards. For this, it was necessary to lower teachers’ status, pay and qualifications. In the country’s more remote regions this went further: a significant number of pupils were placed in rudimentary installations (postos) rather than schools, where they received the simplest tuition from barely literate assistants (Rias, 1997).

Judging by this summary of ideological and political dimensions of the two regimes, one might be tempted to expect much more, in terms of the promotion of literacy, from the Republic than from the Estado Novo. National-level indicators point in the opposite direction, however. The share of public expenditure used during the Estado Novo for education was 12%, almost double what it had been during the Republic (7%).14 Mean literacy increased from 38.2% in 1926 to 58.6% in 1950. It had been 31.1% in 1911 (Candeias 2004). Between these two moments the number of children of school age per state school declined from 95.4 to 52.5. The annual growth of the literacy rate increased from an average of 1.4% during the Republic to 1.8% during the Estado Novo. To resolve this paradox we must now turn to a detailed consideration of the dataset and the model

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11Quoted in Carvalho (1986, p. 727). For similar statements, see Mónica (1978) and Sampaio (1975-7).
12A critic of the regime, Carvalho (1986, p. 728) argues that Salazar opted for teaching the masses to read while seeking to control what they read rather than not educate them at all. The efforts of the Estado Novo continued beyond the period we cover in this paper. These culminated in 1952, with a vast multi-pronged Plan for Popular Education intended to finally extirpate illiteracy and put into school every child of school age. This plan included fines for parents. Eventually Portugal succeed in pulling itself out of the educational abyss in which it had long found itself (Candeias 2004); by 1950 illiteracy among children (10-14 yrs of age) had fallen to 24% (from 76% in 1900).
13From the preamble to law DL 27279, November 24th, 1936.
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. Other sources for our covariates are published compilations of official statistics. Our data were gathered for the following benchmarks: 1924, 1931, 1941 and 1950. The primary source data provides information on the population of interest, and from this we have taken a random sample of 4,600+ individuals.

Our military data are drawn from the many thousands of individual observations made every year since the mid-nineteenth century in the course of recruiting young males for the Portuguese armed forces. 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. 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. Starting in 1924, the scholastic achievement of these subjects was also recorded.

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15 Arquivo Geral do Exército, Lisbon. The data are part of the collection entitled "Exército Portugês, Relatórios de Inspeção".
16 Life expectancy at birth, the raw wage and the wage premium are measured at the aggregate (national) level.
17 We have missing covariates for a few individuals in 1924, but otherwise our record is complete. The source are: Bandeira (1996); Rodrigues (2008).
18 In the period 1908-1930, the only one for which such national data are available, a total of 1.7 million twenty year-olds were processed in the manner described here (Marques 1991).
19 The regulations for military recruitment under the Republic and the Estado Novo were essentially the same. For the former, see Lei do Recrutamento Militar, Diário do Governo (1911), n. 56, 10th March 1911, pp.1027-31. For the latter, see Ministério da Guerra (1937), Lei N. 1961, Lei do Recrutamento e Servico Militar (1937). Before the Republic, the system was different (Reis 2009). Under the monarchy, when all liable individuals were listed prior to the inspection, the local civilian authorities were permitted to exclude, on compassionate or functional grounds, a substantial number of individuals. This introduced a significant element of bias in the selection process since it 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.
20 From the 1910s to the 1950s, children were getting brought up in increasingly better-off environments, with greater economic resources. Median statures rose by about 2 centimeters during these years. According to our sample, the median height increased from 163 cm. to 165 cm. during this period. As Allen (2008) writes, “As a rough guide, a mean height of 160 centimeters is “short” with few societies having a lower mean height for men. Indeed, 160 centimeters is characteristic of a bare bones subsistence wage like eighteenth century China or Italy” (See also A’Hearn 2003). For a long-term view of Portuguese statures, see Cardoso and Gomes (2009), and Stolz et al (2013). Hatton (2011) also finds growth of half a centimeter per decade for the first half of the 20th century in Britian, which is similar to the increases we see in Portugal (from a lower base).
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 (see Carrilho 1986).

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

<table>
<thead>
<tr>
<th>Variable</th>
<th>Content</th>
<th>Data level</th>
<th>Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Literacy</td>
<td>5 degrees of proficiency (from 1= cannot read, to 5 = passed at least the 1st degree exam)</td>
<td>Individual</td>
<td>T</td>
</tr>
<tr>
<td>2. Stature</td>
<td>Measured in meters at age 20</td>
<td>Individual</td>
<td>T</td>
</tr>
<tr>
<td>3. Inverse school density</td>
<td>Average number of square kilometers per school</td>
<td>County</td>
<td>T-10</td>
</tr>
<tr>
<td>4. Life expectancy</td>
<td>Number of years, national</td>
<td>National</td>
<td>T-10</td>
</tr>
<tr>
<td>5. Estado Novo</td>
<td>Regime dummy, 0=Republic, 1=Estado Novo</td>
<td>National</td>
<td>T-10</td>
</tr>
</tbody>
</table>

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

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21It 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.

22We 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.
demographic studies. They are related to the year in which they were observed. Figure 2 shows the timeline for the events of our study. Individuals are born at time 0 and from the age of 7 their family decides whether they go to school and for how long they stay there. We observe them at age 20, which corresponds to time period $T$ in Table 1. As Table 1 shows, we use measures of inverse 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. But using a binary variable conceals disparate packages of skills under the same cover and therefore implies a considerable loss of information.

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

Stature ($st$) is available in our source for every candidate and is measured in meters.\textsuperscript{23} In keeping with the principles of Anthropometric History, it is taken as a proxy for the economic and

\begin{figure}
\centering
\includegraphics[width=0.8\textwidth]{timeline.png}
\caption{The timeline for events in our study. (Source: See text)}
\end{figure}

\textsuperscript{23} Throughout preindustrial human history, the heights distribution was close to invariant (Köepke and Baten 2005). Heights are kept in check in poor societies due to a physiological check: when body size increases, subsistence requirements also grow, which limits further nutritional advances (Dalgaard and Strulik 2015). Only with industrialization did a reduction in family size and an intensification of nutrition per child take place (Dalgaard and Strulik 2016).
Table 2: Categorization of literacy levels. Source: see text.

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

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

The preceding variables refer to individuals. In addition, our study employs a set of environmental factors which is constituted by aggregate indicators, either of policy input, or of general economic conditions, both of which could have shaped family decisions on education. The first of these is the total number of primary schools in each administrative division (município) relative to its area. It is designated “inverse of school density” (ischde) and proxies the average distance

\[ \text{ischde} = \frac{1}{n \cdot s} \]

where \( n \) is the number of primary schools and \( s \) is the area of the administrative division. This indicator captures the density of school availability, which is expected to influence family decisions on education. Integrating this and other factors into a regression model allows us to examine the relative importance of these environmental influences on literacy levels.

Sources: Direcção Geral de Estatística (1913), (1923), (1933); Instituto Nacional de Estatística (1945), (1952); Ministério das Finanças (1919), (1923), (1925).
that children had to cover in order to reach their place of instruction. This was the main cost of schooling which families had to bear, attendance being free in the dominant state system.\textsuperscript{27}

Life expectancy, which is a standard component of any model used to analyze investment decisions in human capital (Boucekkine et al 2007), is measured at the national level and is obtained from national demographic tables (Bandeira 1996, Rodrigues 2008). 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 collected a random sample of 4,600+ individual entries from twelve counties, for four benchmark years. Our counties happen not to include the country’s two biggest cities, where private schooling existed and represented a sizable part of the supply of schooling. This is convenient because national education statistics for this period do not take private establishments into account. This would make it impossible to estimate school density for such major centres of population. Hence our study is restricted to rural Portugal, including rural towns, i.e. the entire country except Lisbon and Porto. During the time span we are considering, this corresponded to between 90\% (1911) and 87\% (1940) of the total population.\textsuperscript{28} The population of rural Portugal is also of the greatest interest here in that it was the part of the country which displayed the highest and most persistent illiteracy rates.\textsuperscript{29}

Table 3 displays some summary statistics for both regimes, regarding the counties that are used in the regressions. We can see that literacy,\textsuperscript{30} 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.

\textsuperscript{27}The cost of clothing and shoes that had to be used for going to school, was probably non-negligible but we lack this information either on an individual or collective basis.

\textsuperscript{28}The populations of Lisbon and Porto were comparatively small at the time (never higher 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 case of Lisbon. Owing to the fact that only males aged 20 are observed, two shortcomings are present. One is that the records exclude everybody under or over 20 and could cause an underestimate of the literacy levels, given that during this period this attribute could be acquired out of school by people in their twenties or early thirties (Ramos 1998, Candeias 2004). The second problem arises with the exclusion of females. Rather than 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.

\textsuperscript{29}The counties used are: Aveiro, Cantanhede, Chaves, Ilhavo, Loures, Mafra, Mesão Frio, Murça, Ribeira da Pena, Sintra, Vila Franca de Xira and Vila Real. These regions represent the country well, with both coastal and interior locations represented, and 4 being located in the South of the country, 3 in the Centre, and 5 in the North.

\textsuperscript{30}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).
Republic (1910-1926)  Estado Novo and preceding military dictatorship (1926-1950)

<table>
<thead>
<tr>
<th></th>
<th>Republic</th>
<th>Estado Novo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy rate</td>
<td>40.3%</td>
<td>66.0%</td>
</tr>
<tr>
<td>Average stature</td>
<td>1.64</td>
<td>1.65</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>39.1</td>
<td>46.7</td>
</tr>
<tr>
<td>Inverse school density</td>
<td>10.5</td>
<td>7.2</td>
</tr>
</tbody>
</table>

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

4 Regression Results

Our model describes the circumstances which influenced families in their decisions to endow with basic human capital their young male offspring and by how much. Its aim is also to establish the extent to which the political regimes affected the families' decisions. Our study provides answers to 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 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. The critical one is that school enrolment was decided upon by families who acted on the basis of a relevant stock of information with the aim of maximizing their progeny’s benefits from education.\footnote{Fonseca and Guimarães (2009a and b), who also use micro data but of a completely different nature, i.e. marriage records.} Recent studies have concluded that families were aware of the possibilities of upward mobility which education might confer (Fonseca and Guimarães 2009a, 2009b). Equally important is the presumption that school enrolment, though compulsory by law, was in practice largely voluntary.\footnote{The first modern reform of education, in 1835, declared primary instruction compulsory for children over 7 and made parents responsible for the observance of this norm. In 1952, after many legislative efforts to render this effective by means of fines and threats of imprisonment, it was noted, in a ministerial report, that 20% of all children between 7 and 11 were still not matriculated in any school, despite inducements such as free meals, clothing and books for the poor ones. See preamble to Decree-Law n. 38968 of 1952 in Diário do Governo.} Furthermore, elementary state-provided schooling was free.\footnote{Law 1969 of 20 May 1938 in Diário do Governo, pp.845-47.}

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 as their measurement reference time T, when the subject had his stature measured by the army board. Height, which proxies economic conditions in the early years of life (or even during the mother’s pregnancy), should explain in part the human capital stock observed at time T. The economic conditions it reveals shaped the decision, at about time T-13, as to whether the subject would be sent to school, and subsequently the annual decision to stay or leave school. We set the relevant value of the inverse of school density (ischde) (proxying how far away schools were from home, hence how difficult it was for children to get to school 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: EN=1 for Estado Novo and EN=0 for the Republic.\footnote{We are hence assuming that the assignment of the regime (Estado Novo or Republic) was exogenous to each individual, conditional on height and the other covariates. It is safe to assume that the reasons for the timings of regime change and continued survival were exogenous to the individuals in our sample. The 1926 coup which initiated the military dictatorship which would eventually morph into the Estado Novo was modelled after Mussolini’s march on Rome, which had occurred three years earlier. While we do not wish to overemphasize the similarities between these regimes, Portugal’s limited size and international influence suggest that the rise of right wing authoritarian regimes elsewhere in Europe set the tone for regime change independently of internal developments, just as the cold war later contributed to the regime’s survival, as was the case in Spain.}

\subsection{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), X as the vector of covariates and \( \Phi \) as the cumulative normal distribution, the probability of a person being literate conditional on covariates can be written as follows:

\[
Pr(\text{blit}_{it} = 1 \mid X) = \Phi(\text{constant} + \beta_1 EN_t + \beta_2 stature_{i,t} + \beta_3 lifeexpectancy_{i,t} + \sum_{j=2}^{12} \alpha_j region_{i,j})
\]

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

Column 5 illustrates the effect of adding inverse school density to the model. School density is a policy variable for the Estado Novo (which is why we do not control for it in the baseline regression), and hence the interpretation of the effect of the Estado Novo dummy now changes: it captures the effect of supply-side policies of the regime except for changes in school density associated with this regime. However, the coefficient on inverse school density is only statistically significant at the 10\% significance level, and while it does have the expected negative sign, the effect of the Estado Novo dummy on literacy does not change much in this specification. Hence, it appears that the increase in literacy is not due to school density but due to other policies pursued by the Estado Novo. This result, which contrasts with the emphasis on school-building for other poor economies (Duflo 2001), will be further investigated in subsections 4.2-4.3.

These regression results do not incorporate year dummies, as these would confound the estimation of the Estado Novo effect (in this case they would be perfectly collinear). The regressions rest on the assumption that, once the demand-side and regional controls are included, the only effect that the year dummies should have is caused by the regime change.\textsuperscript{40} It is possible to test

\textsuperscript{36}In our regressions, we interpret life expectancy at birth as controlling for the share of the disease environment not explained by income, which we control using heights. We measure life expectancy at birth, since as is always the case in poor societies, the bulk of the increase in life expectancy at birth is due to declining child mortality.

\textsuperscript{37}This is calculated by dividing 20.5 p.p. over the 40 percent literacy rate of the Republic.

\textsuperscript{38}This effect turns out to be quite similar to the AME.

\textsuperscript{39}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.

\textsuperscript{40}Our results are in fact likely to underestimate the true total Estado Novo effect by assuming that the observed changes in heights are independent from this regime (this matter is discussed in more detail in a subsection below).
<table>
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<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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<td>0.621***</td>
<td>0.677***</td>
<td>0.545***</td>
<td>0.536***</td>
<td>0.536***</td>
<td>0.204***</td>
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<tr>
<td></td>
<td>(0.125)</td>
<td>(0.125)</td>
<td>(0.0513)</td>
<td>(0.116)</td>
<td>(0.126)</td>
<td>(0.0419)</td>
<td>(0.0419)</td>
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<td>2.582***</td>
<td>3.159***</td>
<td>2.563***</td>
<td>2.594***</td>
<td>0.868***</td>
<td></td>
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<tr>
<td></td>
<td>(0.333)</td>
<td>(0.334)</td>
<td>(0.443)</td>
<td>(0.334)</td>
<td>(0.327)</td>
<td>(0.0419)</td>
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<td>0.0125</td>
<td>0.0136</td>
<td>0.00450</td>
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<td></td>
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<td>(0.0170)</td>
<td>(0.00571)</td>
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<td><strong>Year = 1941</strong></td>
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<td>0.611***</td>
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<td>(0.106)</td>
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<td><strong>Regional dummies</strong></td>
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<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td></td>
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<tr>
<td><strong>AME of EN</strong></td>
<td>0.205***</td>
<td>0.222***</td>
<td>0.239***</td>
<td>0.209***</td>
<td>0.189***</td>
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<tr>
<td></td>
<td>(0.0440)</td>
<td>(0.0442)</td>
<td>(0.0175)</td>
<td>(0.0464)</td>
<td>(0.0446)</td>
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<tr>
<td><strong>MEA of EN</strong></td>
<td>0.227***</td>
<td>0.243***</td>
<td>0.264***</td>
<td>0.214***</td>
<td>0.210***</td>
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<td>(0.0475)</td>
<td>(0.0472)</td>
<td>(0.0192)</td>
<td>(0.0472)</td>
<td>(0.0482)</td>
<td></td>
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</tr>
<tr>
<td><strong>ME of EN at 1st Quintile</strong></td>
<td>0.205***</td>
<td>0.243***</td>
<td>0.239***</td>
<td>0.207***</td>
<td>0.189***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0440)</td>
<td>(0.0472)</td>
<td>(0.0175)</td>
<td>(0.0446)</td>
<td>(0.0447)</td>
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<tr>
<td><strong>Pseudo R² / R²</strong></td>
<td>0.1372</td>
<td>0.1266</td>
<td>0.1368</td>
<td>0.0665</td>
<td>0.1384</td>
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</tr>
<tr>
<td></td>
<td>4,614</td>
<td>4,616</td>
<td>4,614</td>
<td>4,614</td>
<td>4,614</td>
<td>4,614</td>
<td>4,614</td>
</tr>
</tbody>
</table>

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

Table 4: Baseline probit regressions. Source: see text.
for the validity of this assumption using the following exercise. Firstly, year dummies should only be significant in the years of the Estado Novo, i.e. 1941 and 1950 (given that 1924 is the base year) and secondly, the difference in the coefficients across these two years should not be statistically significant. This formulation of the assumption makes it possible to test it, as we do in column 6 of Table 5. As expected, the coefficients are not significantly different between 1941 and 1950: A test of equality of coefficients fails to reject no difference at a p-value of 0.50. Moreover, the size of the effect of each of the two year dummies for the Estado Novo years, i.e. for 1941 and 1950, are similar to the estimates in the baseline regression, while the year dummy in 1931 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. Secondly, and relatedly, this provides evidence for the underlying assumption that the effect of each different regime on literacy did not change over time. These facts are also illustrated by Figure 4, shown at the beginning of the paper.

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

\textbf{4.2 Interactive effects}

The next question we turn to is whether the Estado Novo affected differently children of different heights. For this purpose, we interact the other covariates with the Estado Novo dummy, as shown in Table 5. The evidence points towards significant demand-side effects: Column 1 shows that stature has a positive interactive effect with the Estado Novo dummy, ceteris paribus.\textsuperscript{43} In contrast, the

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

\textsuperscript{42}Note, however, that inverse school density is no longer significant when controlling for interactive effects between theEstado Novo dummy and stature. See Table 5, discussed in the next subsection.

\textsuperscript{43}This is driven by those between quintiles 2 and 4, i.e. in the percentiles 20 to 80, as illustrated by Figure 3 of the ordered probit subsection, below. In any case, the Estado Novo raised literacy levels for everyone, though especially for those individuals that were around average stature. Levels of education rose for all and not just those who were economically better off. This will be shown and explored in greater detail using ordered probit regressions in subsection 4.4.
interactive effects with either inverse school density or life expectancy yield no significant results.\textsuperscript{44}

Column 2 shows the presence of significant heterogeneity across regions in the effect of the Estado Novo. In particular, the three regions in our sample which are close to the city of Lisbon correspond to three of the four highest estimated effects. These are, in decreasing order, Loures (Region 12), Sintra (Region 19), and Mafra (Region 13). This order also corresponds to how far away each is from Lisbon. A possible explanation for this is that enforcement of enrolment and school attendance rules by the regime was stronger close to the capital, as will be further explored in subsection 4.3.

We now perform an additional exercise (using our baseline results, column 1 of Table 5). How much greater a probability of ending up literate does the child gain by going from the 25th to the 50th percentile in stature? Our regression suggests that the above change in stature increases literacy by 2.2 percentage points under the Republic, but 4.9 percentage points for the Estado Novo. Alternatively, at the 50th percentile (the median), a 1 centimeter increase raises the probability of literacy by only 0.55 percentage points in the Republic (from 0.407 to 0.413), but 1.2 percentage points in the Estado Novo (from 0.663 to 0.675). This indicates that the policies of the Estado Novo were creating more human capital accumulation opportunities for the average (and median) citizen than had been the case under the Republic.\textsuperscript{45}

Figure 3 shows the marginal effect of the Estado Novo dummy on the probability of being literate across quintiles of stature. This follows the same specification as column 1 of Table 5, except that instead of a continuous measure of stature we group individuals into five quintiles of stature (i.e. where the 1st quintile includes the tallest individuals, from the 1st to the 20th percentile of heights, and so on; quintile 5 includes the shortest). 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 national estimate of life expectancy. The relationship is, for each regime, close to monotonic – taller people ended up more educated. A second fact is that, under the Estado Novo, the probability of literacy increased (compared to the Republic) across the entire height distribution. The results are striking. For example, the probability of an individual in the shortest quintile being literate during the Estado Novo was similar to that of an individual in the tallest quintile during the Republic.

Finally, instead of using the height specific to each regime, as we do in Figure 3, an alternative way to assess each regime is to consider an abstract person at some absolute level, i.e. at some

\textsuperscript{44}The results are not shown but are available on request.

\textsuperscript{45}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 50th percentile increases literacy by 2.2 percentage points under the Republic but 5.0 percentage points for the Estado Novo. Alternatively, at the median, a 1 centimeter increase raises the probability of literacy by 1.3 percentage points in the Estado Novo (from .593 to .606) but only by 0.55 percentage points in the Republic (from 0.408 to 0.414).
<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Estado Novo = 1</strong></td>
<td>-2.725*</td>
<td>0.361***</td>
<td>-2.653</td>
</tr>
<tr>
<td></td>
<td>(1.656)</td>
<td>(0.137)</td>
<td>(1.667)</td>
</tr>
<tr>
<td><strong>Stature</strong></td>
<td>1.550**</td>
<td>2.581***</td>
<td>1.531**</td>
</tr>
<tr>
<td></td>
<td>(0.636)</td>
<td>(0.331)</td>
<td>(0.638)</td>
</tr>
<tr>
<td><strong>Life Expectancy</strong></td>
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<td>0.0150</td>
<td>0.0108</td>
</tr>
<tr>
<td></td>
<td>(0.0164)</td>
<td>(0.0172)</td>
<td>(0.0165)</td>
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<tr>
<td><strong>Inverse school density</strong></td>
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<td></td>
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<td>(0.00884)</td>
</tr>
<tr>
<td><strong>EN * Stature</strong></td>
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<td>1.982**</td>
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<td></td>
<td>(0.996)</td>
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<td>(0.994)</td>
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<td><strong>EN * Inverse school density</strong></td>
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<td>-0.00446</td>
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<td>(0.00764)</td>
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<tr>
<td><strong>EN * Cantanhede</strong></td>
<td>0.0428***</td>
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<td><strong>EN * Chaves</strong></td>
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<td><strong>EN * Ilhavo</strong></td>
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</tr>
<tr>
<td><strong>EN * Loures</strong></td>
<td>0.811***</td>
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<td>0.167***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.0600)</td>
</tr>
<tr>
<td><strong>EN * Vila Real</strong></td>
<td>-0.0698</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.0511)</td>
</tr>
<tr>
<td><strong>AME of EN</strong></td>
<td>0.209***</td>
<td>0.204***</td>
<td>0.197***</td>
</tr>
<tr>
<td></td>
<td>(0.0430)</td>
<td>(0.0462)</td>
<td>(0.0451)</td>
</tr>
<tr>
<td><strong>MEA of EN</strong></td>
<td>0.233***</td>
<td>0.226***</td>
<td>0.117</td>
</tr>
<tr>
<td></td>
<td>(0.0463)</td>
<td>(0.0505)</td>
<td>(0.0986)</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>4,614</td>
<td>4,614</td>
<td>4,606</td>
</tr>
</tbody>
</table>

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.
height quintile, who faces life expectancy at the unconditional average level (43.0 years). We can then compare what were this person’s chances to be literate under both regimes (we allow school density to vary with each regime, from an average of 10.5 in the Republic to 7.3 in the Estado Novo as this was a policy variable). Table 6 shows the results. These results reject the idea that the poorest did not benefit from the Estado Novo, or even that the richest benefited the most. Instead, it turns out that everyone benefited, though it was the individuals around the middle of the distribution that benefited the most.  

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

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

46 In subsection 4.4., we reach a similar conclusion using a different methodology (see Figure 4).
4.3 Breaking up the effect of the Estado Novo

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

For this purpose, we calculate literacy in a counterfactual Republic, where we set EN=0 while changing the other covariates to the mean of the values in the years 1941 and 1950. Similarly, we estimate a counterfactual Estado Novo during the time of the Republic. Comparing the estimated probabilities of the counterfactual Republic and of the Estado Novo then allows us to isolate the effect that solely stems from the change of regime to the Estado Novo.\textsuperscript{47}

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

<table>
<thead>
<tr>
<th></th>
<th>Republic (1924 and 1931)</th>
<th>Estado Novo (1941 and 1950)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy under Republic</td>
<td>0.405</td>
<td>0.454</td>
</tr>
<tr>
<td>Literacy under Estado Novo</td>
<td>0.604</td>
<td>0.665</td>
</tr>
</tbody>
</table>

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

\textsuperscript{47}As any calculation of counterfactuals, this exercise rests on a number of assumptions. The most important here is that the estimated parameters are policy-invariant, such that they can be used for counterfactual analysis under the two regimes.
In order to further disentangle the effects of the demand side (life expectancy at birth and stature) and supply-side (school density), we calculate two further counterfactuals. Under Scenario 1, we only let (inverse) school density vary to the mean of the Estado Novo while keeping life expectancy at birth and stature at the mean value under the Republic. This isolates the effect of the change in regime which is not due to changes in the demand-side variables. Under Scenario 2, we let the two demand-side variables vary, while keeping (inverse) school density constant. This estimates the effect of the change in regime on literacy which is due to factors other than school density. The resulting calculations are quantitatively similar across specifications.

Table 8 shows the estimated probabilities of literacy under the Estado Novo for these two scenarios. When holding demand-side variables (life-expectancy at birth and stature) as shown in Scenario 1 constant, the change in the probability of literacy under the Estado Novo is 4 percentage points lower than if all variables were allowed to vary. Hence, demand-side variables seem to explain some of the increase in literacy, but cannot account for the large observed increase by themselves. Under scenario 2 where inverse school density is held constant, the change in literacy is estimated to be 2 percentage points lower than in the baseline scenario. This points to the conclusion that increases in school density were not a defining factor in the increase of literacy experienced under the new regime.

<table>
<thead>
<tr>
<th>Probability of Literacy under Estado Novo</th>
<th>Difference to counterfactual Republic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline: All variables vary</td>
<td>0.6645941</td>
</tr>
<tr>
<td>Scenario 1: demand-side held constant</td>
<td>0.6230153</td>
</tr>
<tr>
<td>Scenario 2: inverse school density held constant</td>
<td>0.6463438</td>
</tr>
</tbody>
</table>

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

The counterfactuals imply that the effect of the Estado Novo on literacy is not explicable due to changes in economic wellbeing (as captured by stature and life-expectancy at birth) or by the provision of more schools. The counterfactual scenarios suggest that approximately 20% (4 percentage points) of the total effect of the Estado Novo on literacy is accountable by changing demand-side variables (changes in life expectancy at birth and in stature). Only approximately 10% (2 percentage points) of the effect is explainable by the change in school density. Hence, 70% of the observed increase in literacy is due to the institutional characteristics of the Estado Novo that are unrelated to the demand-side variables and to changes in school density. We interpret this

48 As with Table 7, we use column 3 of Table 5 to calculate these results.
effect as being caused by institutional changes under the Estado Novo. We discuss our hypotheses for why this was the case in the next section.

We are confident that the effect we estimate is not simply a change in time periods but rather caused by the Estado Novo. The reasons for this were explained in subsection 4.1: In an alternative specification where time dummies are included instead of regimes, they are only statistically significant as they coincide with regime change. In other words, having controlled for the changing family wealth and wellbeing (through stature and life expectancy at birth), the effect of the Estado Novo dummy variable only captures the institutional changes that arose with the new regime.

In our regressions we cannot include the skill premium or the opportunity cost of having children in school (the raw labor real wage) as they are collinear with other covariates, namely, the regime or time dummies. This is because we can only observe these at the national level. Their absence could be a problem if the skill premium was rising (or was expected to rise in the future), or if the raw labor real wage was falling, since either of these factors would mean increased differential incentives for parents to invest in human capital of their children. However, the bias resulting from their absence only makes our results stronger, because what in fact happened was that during our sample period the skill premium was falling and the real wage for unskilled workers was rising. The real wage paid to male agricultural workers went from an index of 100 in 1921 to 137 in 1930 and 163 in 1940, which is consistent with the observed rise in statures and with contemporary economic growth (Batista et al 1997).

As for the skill premium, it fell during the entire period of our sample. This fall suggests that fast accumulation of human capital was not driven by rising returns to human capital. Rather, it seems possible that the number of people accumulating human capital at this time grew faster than did the available jobs requiring such skills. We suggest that the Estado Novo’s policies were

\[\text{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 constituting basic human capital (Anuário Estatístico de Portugal, several years). It is measured at the time } T−10, \text{ roughly when the draftee would be going into school. It is the ratio of the raw to skilled labor wage in an occupation (textile workers) presumed to require a minimum degree of literacy. 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 (see Projecto Regional (1965), vol. 2).}

\[\text{50} \text{Although we cannot know the wage of child labor, we assume, reasonably, that it can be proxied by that of adult men working in the countryside and deflate it by a standard CPI. For the nominal raw labor wage, the source is Anuário Estatístico de Portugal (several years); for the CPI, the source is Valério et al. (2001).}

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

\[\text{52} \text{Our proxy for the school premium is the ratio of the wage of a worker in the textile sector relative to the raw labor real wage. It fell from 2.2 in 1924, to 1.84 in 1931, 1.6 in 1941 and down to 1.53 in 1950. This is related to the fact that the real wage for raw labor, fell from a mean of 0.38 in 1924 to 0.33 in 1931 but then rose to 0.48 in 1941 and again to 0.55 in 1951.}
targeted towards expanding the educational opportunities for the poor. These were successful, and hence led to some social convergence.

4.4 Ordered Probit Regression

The scores used to classify the literacy of individuals (see Table 2 lend themselves naturally for an ordered probit regression. The specification is similar to the previous 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. It becomes $lit = 5$ if the individual at least passed the first exam of primary school. Instead of predicting the conditional probability of a person being literate, the model now predicts the conditional probability of a person being in any one of the five categories of literacy. Note that even the highest level of literacy captured only corresponds to what would now be considered basic education.

Figure 4 plots the estimated marginal effects for this ordered probit regression. The increase in literacy observed under the Estado Novo seems to be driven by two developments. Firstly, the probability of being illiterate ($lit = 1$) decreased from 53% to 40% under the Estado Novo. Secondly, the probability of being in the highest category ($lit = 5$) increased from 20% to 30% (i.e. this 10% differential means a 50% increase over the initial 20%). The remaining categories did not change much. Hence, the regime brought illiteracy down and increased the proportion of people who passed the first final degree exam of primary school.

In our analysis in subsection 4.2, we found a positive interactive effect between stature and the Estado Novo dummy. In order to further investigate this effect, individuals are classified according to the quintile of stature they are in, for each regime, in order to take account of changing stature distributions. An interesting pattern emerges, as shown in Figure 5: individuals in the 2nd to 4th quintiles experienced most of the significant changes in literacy under the Estado Novo. These can be loosely interpreted as the middle class, spanning the 80th up to the 20th percentile of stature.

This “middle class” (which, in absolute terms, was poor from today’s perspective) experienced both the greatest decline in illiteracy and an increase in the highest level of literacy. We speculate that the reason was that on the one hand, there was less progress to be made among the tallest; and, on the other, that the shortest were too poor to benefit as much as those that were taller. Nevertheless, these are relative statements; in absolute terms, even the poorest benefited. Figure 5

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53 As before, standard errors are clustered by country.
Figure 4: Literacy categories across the two regimes. (Source: See text)

Figure 5: Literacy categories by quantiles of stature. (Source: See text)
shows that the Estado Novo did improve the situation of the very poorest since the the distribution of the lowest quintile in stature across values of literacy improved with the Estado Novo. Under this regime, the probability of illiteracy for the very poorest decreased from 60% to less than 50%, while the probability of reaching the highest level of education improved from about 18% to over 20%.

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 mattered marginally, it was secondary relative to other matters related 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 at least 70% of the large observed increase in literacy is due to the institutional characteristics of the Estado Novo that are unrelated to the demand-side variables (i.e. stature and life expectancy). Most of this effect is due to aspects of the institutional change under the Estado Novo unrelated to school density increases. Ultimately, it was the close alignment of the policies of the Estado Novo with the culture of the masses which (perhaps in part as an unintended consequence) led to remarkable increases in literacy.

For lack of satisfactory historical research, we can only speculate about the fact that the Estado Novo adhered effectively 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 a dictatorship if they were properly controlled and if what people read was properly monitored.

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

The education policy of the Estado Novo was constituted by what Nóvoa (1996) calls “pragmatic realism”: careful attention to what was feasible as opposed to more ambitious policies which would seem optimal under ideal conditions but impossible to implement given the state’s financial possibilities of the time. The Estado Novo reduced the years of compulsory schooling, introduced a national program of education, reducing and simplifying program content, and lowered the required level of teacher qualification. Furthermore, schools under the Estado Novo were more likely to have been under the control of the central government, while the Republic had a more decentralized policy. Under the Republic, many schools were managed by municipalities 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 was more credible at enforcing school enrolment and related measures which increased literacy, especially in regions close to the capital (see Section 4.2).

5.2 Culture and ideology

The Estado Novo’s ideology was more closely aligned with the culture of the population than had been the case under the Republic. Our view is that this led to an increase in the demand for education under the Estado Novo. The Republic had strongly promoted secularization and other values looked at with suspicion by the masses, while the Estado Novo was seen as a pro-Catholic regime, which would allow parents to worry less about the perceived indoctrination effects of sending their children to school. 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).

Figure 6 presents empirical evidence of the importance of this ideological alignment of the Estado Novo with the population. The figure shows the relationship between the marginal effect of the Estado Novo on literacy at median stature\(^{54}\) and the percentage of non-catholics in a given region away from the capital. There is a clear negative relationship between the percentages of catholics and the magnitude of the marginal effect on literacy of the Estado Novo. This suggests

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\(^{54}\)Note that the results are very similar when measured at the first or third quartile of stature instead.
that families in more catholic regions were more comfortable with sending their children to school during the Estado Novo.\textsuperscript{55}. 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.

In addition to the secular nature of education, another relevant ideological principle of the Republican school was co-education. The latter was pursued by the Republic from its early years, and reaffirmed in 1923 by J. Camoesas, a leading republican in the field of education (and minister for education).\textsuperscript{56} 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 enrollment numbers were falling at that time.\textsuperscript{57}, 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.\textsuperscript{58} By contrast, once the regime changed it was decided, significantly, that there should be full gender separation in school buildings and playgrounds. It was reiterated

\textsuperscript{55}Source for the percentage of catholics: Instituto Nacional de Estatística (1945)
\textsuperscript{56}In this parliament bill, Camoesas recognized many of the limitations of the Republic’s policies which were later addressed by the Estado Novo
\textsuperscript{57}Instituto Nacional de Estatística (1923)
\textsuperscript{58}The report did not mention the Spanish influenza flu as a motive.
that education was entirely free\textsuperscript{59} and that primary education was to be uniform and compulsory for all Portuguese children between ages 7-12. The aims were basic, but feasible: learning to read, write and count, and “moral and civic virtues”, together with a love for Portugal. Instruction was to follow a single national program.

5.3 Political incentives

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

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 policy was that it would be unlikely that the desire of consumers to accede to education would in itself have led, in such a poor country, to the spread of mass education paid for by users. During the first half of the 20th century, two quite different and fiercely opposed regimes ministered to the mass educational needs of Portugal. If we are to follow the conventional wisdom of the literature on educational inequality in history, the most democratic should have been more successful in this task. Both regimes made a serious effort in this regard, but what is remarkable is the fact it was the least democratic which finally turned the tide on illiteracy.

The Estado Novo succeeded because it worked with, rather than against, the prevailing cultural norms of the time. It had a differentially positive effect on educational outcomes relative to the

\textsuperscript{59}There were plans to eventually introduce a small fee for middle and higher income households, but this was never implemented (Law No. 1969, May 20 1938).
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.  

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

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


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