A tale of two regimes: Educational Achievement and Institutions in Portugal, 1910-1950

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Abstract

Studies have argued that countries which lack democratic forms of government and where the suffrage is not widespread have lower literacy rates and school enrolment as a consequence. In this paper we question the generality of this result. While we consider the role of insitutions we also take into account demand for human capital accumulation.

We use individual-level data from military archives in Portugal in an ordered probit regression in which literacy levels are the dependent variable. Our data provides information of males of 20 years of age and we restrict the study to rural Portugal; but for these individuals, there is no selection because everyone had to go through a military inspection at age 20, and this was enforced by the state. We conclude that all else constant, under Portugal's authoritarian Estado Novo an individual of average stature (wealth) was almost twice as likely to end up literate than under the more democratic Republic which preceded it. This result controls for a host of factors including stature (economic growth), school density, time, and standard errors adjusted for year-level clusters.

If instead we allow school density to vary with the Estado Novo but control for growth by keeping stature constant we estimate the impact of education policy promoted by the Estado Novo to have been about the same as under the previous estimation method, all else constant. In addition, the effect of the Estado Novo on literacy was stronger for poorer individuals.

1 Introduction

An active debate has been taking 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 recently. 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, the prevailing view is that political and institutional factors are of prime importance. Studies have argued that countries which lacked democratic forms of government and where the suffrage was not widespread have been apt to have lower literacy rates and school enrolment. The link is that the supply of publicly funded mass education is a political decision and the elite minorities which hold political power do not favour a wide dissemination of human capital. Conversely, the story goes, the majority, who aspire to more education, lack the "voice" that will make this situation change (Engerman, Mariscal and Sokoloff 2009, Gallego 2008, Lindert 2004, 2010).

This literature suffers from several shortcomings. It tends to underplay the fact that human capital is not just the consequence of policy decisions but also of investments made by families whose decisions are strongly influenced by a variety of economic circumstances (Boucekkine et al. 2007). 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 will cause the appearance of more and better facilities but these expanded opportunities will not necessarily involve students more unless their families also want to send their children to them, and are able to do so. In fact, the historical record registers only few cases where the state was successful at coercing families in this matter[1]. This suggests a need to consider the positive incentives which can determine individual decisions to invest in human capital and make the latter come into existence. There is a related debate in the development literature. Jeffrey Sachs considers poor countries need to have good schools provided by the government, even if market conditions for their provision do not exist (see for instance Sachs 2005). In opposition, William Easterly argues what is important is that there is strong demand for education driven by increasing returns to human capital, and that unless these conditions are in place there is no point in government supplying education (Easterly 2001). Banerjee and Duflo (2011) have a more nuanced view, arguing that some state provision is necessary but conceding that the role of underlying demand is also critical. Indeed, a number of 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 [Foster and Rosenzweig (1999), Jensen (2012), Oster and Millett (2010)].

As far as the economic history literature is concerned, 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 often have to be aggregated and therefore miss out a lot of

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[1]The classic case is that of 18th century but it must be noted that this was done indirectly, was protracted and made use of the mobilization of religion and religious institutions.

information. Dependent variables are all too often of the input variety, such as school enrolment or educational expenditure as a percentage of total expenditure or of GDP, and it is unclear whether they should not be treated as explanatory ones instead. 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[2].

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 several thousand individuals, as well as about the circumstances facing their families during childhood. We consider different generations and gather observations at benchmark years using a new source: unpublished military recruitment registers. This allows us to employ a dependent variable which measures years of schooling as well as exam results directly, an attractive feature relative to the more ordinary usage of instead 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. Another advantage is that it invokes a useful though generally ignored discussion on the literacy versus illiteracy dichotomy and draws attention to the diversity of contents which can be present in the concept of being "literate".

The choice of Portugal as a case-study is justified by two circumstances. One is that ever since official statistics have been gathered, it has been one of the worst underperformers in the field of educational attainment in the Western world (Lindert, 2004; Reis, 1993; Amaral, 2002). At the beginning of the 20th century, its illiteracy rate of 75% of the population over 7 years of age was among the highest in Europe – in Spain it was only 53%, in Italy it was 46%. In 1940, this was still 50% and only fell to a quarter as late as 1970. The other is the succession of political regimes which it experienced during the 20th century, which assumed disparate stances on the questions of schooling and the extent of permitted political participation. In this context, an especially significant contrast opposes the 1st Republic (1910-26), a "limited" parliamentary democracy with an elected head of state; to the corporatist dictatorship of the Estado Novo (1926-74), which denied the population any possibility of freely exercising the suffrage. For Portuguese historians and public opinion, this opposition between the two regimes is the most important of all and epitomizes the main political and ideological struggles which have marked the 20th century.

We have chosen for the present exercise the period 1910-1950, a period in which there was a marked rise in literacy in Portugal. This enables us to compare the efforts at producing human capital by these two regimes over similar time spans (16 and 24 years, respectively), while controlling as much additional factors as possible. Interestingly, during the entire period of our sample, the skill premium is falling: from 2.2 in 1924, 1.84 in 1931, 1.6 in 1941 and down to 1.53 in 1950[3]. The fall in skill premium is suggestive evidence that fast accumulation of human capital does not need to be driven by rising returns to human capital. It is seems possible the number of people accumulating

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[2]Lindert (2010) presents a more developed critique.

[3]This is related to the fact that the real wage for raw labor, fell from a mean of .38 in 1924 to .33 but then rose to .48 in 1941 and again to .55 in 1951.

human capital at this time grew faster than did the available jobs requiring such skill. Our proxy for the school premium is the ratio of a worker on the textile sector relative to the raw labor wage rate. Hence is a real measure. While this is evidence for one sector only, textile sector output grew in real terms 63% between 1924 and 1940, while male literacy for those of 10 or older years old grew from 1.6 to 2.9 million during the 1920-40 period, which corresponds to a net growth of 81.25%. So perhaps the decline in skill premium is not that surprising. We still need to know what caused it, and in below we suggest that some of Estado Novo's policies targeted towards expanding the educational opportunities of the poor worked, and hence led to some social convergence.

We consider if institutional conditions, in particular with regard to the openness of the political process, had the effect on educational policies which the common political economy view leads one to expect. A related question is whether a model which comprises both policy and family-based decision approaches provides a valid complementary explanation for variations in the supply of human capital over time than one that is focused mainly on institutional and political conditions. The evidence shows that the more "democratic" Republic was substantially less successful than the authoritarian Estado Novo in expanding elementary education (even if under the dictatorship average quality of provision may have been lower). It is also the case that poor individuals which had limited political voice under both regimes benefited the most from new educational opportunities, but this effect is much stronger for the Estado Novo. Finally, we find that the economic elements which shaped family decisions on education were critical as well and cannot be dismissed.

2 Political regimes and educational policies

The military overthrow of the monarchy (aided by civilian groups) in 1910 ushered in a new political situation which was characterized ideologically as republican and jacobin, fiercely anti-clerical and anti-monarchical, and rationalist and strongly influenced by the Free-masonry[4]. Although one of its earlier promises had been the establishment of a universal suffrage, the republic soon retreated and by 1913 had restricted the vote to adult males who could read and write. The number of registered voters was 26% of all adult males, while those who actually voted were only around 10% of them, a lower proportion than was seen in the last decades of the monarchy (Marques, 1991). Moreover, elections were far from free and fair, and their results were frequently distorted by dominating influence the founding party of the regime, the Portuguese Republican Party (and its later de facto continuator the Democratic Party). In Peter Lindert (2004)'s nomenclature, this was a "limited parliamentary democracy" of the kind unlikely, in his view, to promote the tax financed education of the masses.

The republican militants who took over in 1910 elected education as one of their finest banners. The country's outrageous illiteracy rates were blamed on the departed monarchy, which had failed to supply the schools and to train and adequately pay the teachers, and had submitted to the

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[4]Recent research has shown that half the ministers and half the of parliamentoduring the Republic were free-masons. (Ventura, 2010)

obscurantist influence of the Church. Their project was to reform the mentality of the Portuguese, by creating a completely secular Republican School from which would emerge a "Republican Man", imbued with healthy nationalism, mental and physical vigor and a strong inclination to defend the regime from its many opponents. Eradicating illiteracy was declared the highest priority.

In practice, republican educational reform was less impressive than its rhetoric. It involved the creation of a previously non-existent ministry of Instruction and a bold transformation of the primary education sub-system, most of which did not get beyond the stage of planning. The most significant changes were the implementation of three year compulsory primary education (later extended to five, in 1919), the strengthening of teacher training and the improvement of their pay, and the launch of an energetic expansion of infrastructure, which fizzled out, however, soon after it had started (Carvalho, 1986; Ramos, 1994). New universities were created, secondary and technical schools were reformed but none of this had any great impact. On balance, some progress was made, but was concentrated in the field of primary instruction. It was better than the monarchy had achieved but still a far cry from the hopes of the regime's early years.

The Estado Novo, which replaced the Republic in 1926, represented an overt ideological rejection of its predecessor. It was authoritarian and anti-liberal, nationalist and Catholic, and embarked on a thorough re-organization of both the economy and the society of Portugal into a so-called corporatist state[5]. It was also ferociously anti-communist. In terms of political representation, its approach was radical. Only one party was allowed to exist and to participate in elections, which nominally continued for parliament. Votes had little chance of influencing a system in which major decisions were taken by a small and unrepresentative elite or by the dictator himself. They were enforced without public discussion, with the unfailing support of a secret police and a panoply of special courts to judge political dissenters. In terms of degree of democracy, it was far from the Republic, even though the latter in turn was quite distant from the standards set by fully participatory regimes[6].

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 concerned above all 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 influenced and moulded. Obviously, the message poured into this mould by the Estado Novo was completely different. The same can be said of the pronouncements issued by some of the stalwarts of the regime on the issue of education which reflected a serious fear of the social repercussions produced by increased schooling. Typical of these were statements like: "Blessed are those who forget their first letters

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[5]The latest and possibly the best account of Portuguese 20th century history is Ramos, Sousa and Monteiro (2009). The Estado Novo as such did not come into existence until 1933. It was preceded by a militarised National Dictatorship (Ditadura Nacional) which started in 1926 and prefigured in many ways the civilianized Estado Novo created later under the aegis of Dr. Salazar, a university professor from Coimbra.

[6]This is underscored by their respective valuations on the Polity IV Project ranking, which are, on a scale of -10 to + 10, 7 for the Republic and -9 for the Estado Novo.

and return to the shovel"; or "To teach how to read is to corrupt the essence of our race"[7].
In practice the regime proved far from monolithic and, as recent revisionist studies have shown, others in the Estado Novo, (probably including Salazar) saw the issue in a rather different light (Amaral 2002; Carvalho 1986; Rias 1997)[8]. As a result a series of important reforms in the field of basic education were pursued, which aimed at guaranteeing "the minimum of culture essential for life and to fight illiteracy in an energetic and efficient manner"[9]. From the late 1920s to the mid 1930s, they involved the reduction of time of compulsory education, as well as a drastic simplification of the (now) national educational programmes. From the mid 1930s onwards there was spread on a considerable scale of the school grid. All of this was done in a spirit of parsimony which probably affected negatively the quality of the output. The status and qualification requirements of teachers were reduced, and a significant number of pupils in the country's more remote regions were placed in rudimentary installations (postos) where they received the simplest tuition from barely literate assistants (Rias, 1997)[10]. Judging by this summary of the ideological and political dimensions of the two regimes, one might have been tempted to expect a great deal more, in terms of promoting literacy, from the Republic than from the Estado Novo. In fact, the indicators in table 1 point in the opposite direction.

<div align="center">TABLE 1 HERE</div>

The state provided one school for every 94.4 children of school age in 1930 and had nearly halved by 1950, to 52.5. The conventional wisdom is clearly at odds with Portugal's actual educational experience during the first half of the 20th century. Before we try to resolve this paradox by estimating a model that can control for a host of factors, we now present the data on which our exercise will be based.

3   The data and the variables

We use data of different types and levels of description, with the lower ones being nested in the higher ones. The most important and largest of these inputs comes from the archives of the Portuguese army. Others are from various published compilations of official statistics[11]. All of them were gathered for the following benchmarks: 1924[12], 1930, 1940 and 1950. The primary source data provides information on the full population of interest, and from this we have taken a random sample.

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[7] Quoted in Carvalho (1986: 727). For a number of similar statements, see Mónica (1978) and Sampaio (1975-7).

[8] Carvalho (1986: 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.

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

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

[11] For some variables this introduces a source of measurement error which we need to be cautious about. In particular, life expectancy, the raw wage and the (real) wage premium are measured at the aggregate (national) level.

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

Military data comes from the many hundreds of thousands of individual observations made in the course of the process of military recruitment which took place every year in the country's district capitals since the early nineteenth century. The procedure was organized to ensure that all young men aged 20 complied with their obligation to perform national service. To this end, each potential conscript had to be identified by name, place of birth and residence, as well as those of his parents, and occupation. Anthropometric characteristics were taken down too, namely height, weight, the perimeters of the thorax and the right arm and any unusual physical signs or relevant medical conditions. Starting in 1924 the scholastic achievement of the youths in question was also recorded by the board[13].

The first thing that comes out is the high quality of this data. They were collected by a board composed of three highly literate individuals – two officers and a medical doctor. Since the final results of the inspection were subject to publicity, the probability of being tampered was therefore reduced. Finally, the youths under inspection had strong reasons to be truthful and accurate since they would normally stand in awe of the inspectors, besides being responsible for their declarations before military authority.

A second positive aspect for the particular period we are studying is that the original data base is practically universal and the selection bias was therefore minimal. In fact, our sample is in fact for practical purposes the population of interest (adequately defined; see below). In the wake of the First World War, in which Portugal participated, conscription became universal, most exclusions having been forbidden and thus very few young men were able to escape the net of the military examination[14].

Thirdly, here recruitment data provides detailed information on the educational attainment of each individual which is unobtainable from any other source. Moreover, they allow us to relate it to important economic, social, demographic and occupational features of the population under observation.

Owing to the fact that only males aged 20 were observed, two faults are also present and suggest a not insignificant probability that they will not offer us a perfectly accurate picture of the situation under consideration. One is that the records exclude everybody under 20 or over this age. This could cause an underestimate of the literacy levels, given that during this is period this attribute was acquired out of school by people in their twenties or early thirties (Ramos 1994, Candeias 2004). On the other hand, gauging the capacity to read and write of the under 20s by this yardstick could lead to an overestimate. The second problem arises with the exclusion of females. This would cause bias since, rather than being constant during these decades, women were on the whole catching up on men in this respect, though at differing convergence speed through time. At present, it is difficult to see how these problems can be corrected. The most cautious option seems to be to simply define the population of interest as rural males of age 20. In any rate it was in the rural

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[13]See Reis (2009) for details of the contrasting situation before the First World War.

[14]It is important to distinguish here the difference between two notions: conscription, which registered all those liable to be called-up for service; and recruitment, which encompassed only those who were actually obliged to serve.

areas that the most progress was made during this period.

The restriction of the draft to males of a certain age does have advantages even when interpreted to represent a picture for the country. In addition to the absence of sample selection bias as noted above, it is suggestive of a high degree of homogeneity in terms of social, economic and institutional circumstances across the entire sample at a stage of life. In addition, the information on scholastic achievement by the age of 20, though no more than a "snapshot" at that moment of the aptitudes accumulated over several years, provides us with a full history of each individual's interaction with the educational system during the critical period of this relationship, starting point at age 7. It is therefore a valuable pointer for the impact of institutions on human capital formation.

TABLE 2 HERE

Table 2 displays the different variables which have been constructed from the manuscript data on military recruitment, as well as from printed official sources. They pertain to both the year in which they were measured and to that in which they had their effect. We start with literacy (Lit), the classical measure of human capital and our dependent variable. There are two ways of expressing the presence or absence in an individual of the essential reading, writing and counting skills imparted by primary schools normally between the ages of 7 and 11. The conventional one is a dichotomous variable which reflects the presence ($=1$) or absence ($=0$) of the attribute of "being able to read and write". Using a binary variable does conceal disparate packages of skills under the same cover and therefore implies a considerable loss of information.

The richer alternative which we adopt for this study takes advantage of the fact that the conscription boards laboriously distinguished between a variety of outcomes. These could range from 1 to 5 years of school attendance, as well as approval in the 3rd, 4th or 5th year of primary school exams; and, in the absence of either information, "being able to read and write well", "regularly" or "badly". We have converted all these indications into a scale from 1 (for illiteracy) to 6, for those who passed the 4th or higher (5th) year exams.

Stature (st) is given for every candidate in our source and is measured in centimeter. In keeping with the principles of Anthropometric History, it is taken as a proxy for the social and economic status and 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 his birth (here rounded to 10).

The preceding variables refer to individuals. In addition, our study also employs a set of environmental evidence which is represented by aggregate indicators, either of policy input, or of general economic conditions, both of which could have shaped these family decisions. The first of these indicators is the total number of primary schools in each administrative division (município) relative to its respective area. It is designated "inverse of school density" ($ischde$) and proxies the average distance that children had to cover in order to reach their place of instruction. This was

the main out of-pocket-expense of schooling which families had to bear, attendance being free in the dominant state system[15]. This is a measure of volume.

The last three explanatory variables have to be quantified at national level, which unfortunately is the only available. At present, it would be difficult to estimate with reasonable success the rate of return on investment in schooling, an indicator which families might have found useful in taking their educational decisions[16]. Instead, we adopt the skill premium (*skillp*) as a proxy for the economic advantage of constituting basic human capital. It is measured at the time when roughly (T-10) the examinee would be going into school. It the ratio of the raw to skilled labour wage in an occupation presumed to require a minimum degree of literacy: textile workers. These constituted a large part of the industrial work force and were often literate at the time[17]. A second variable of this sort is the opportunity cost of going to school. Although we cannot know the wage of child labour, we assume, reasonably, that it can be proxied by that of adult men working in the countryside and deflate it by a standard CPI (Valerio et al. 2001). The third is life expectation at birth, which is a standard component of any model used to analyze investment decisions in human capital (Boucekkine 2007) and is obtainable from national demographic tables. It is refers to the moment in which school enrolment first takes place, i.e. approximately T-10.

Individual entries were collected for a sample consisting of the city of Lisbon, seven rural counties in the hinterland of Lisbon, and N counties in the northeast of Portugal (Trás-os-Montes). In the event, data for Lisbon could not be used. National education statistics for this period do not take private establishments into account and in Lisbon and Oporto these formed the majority of all schools, hence making it impossible to estimate input variables for these two major centres of population. Our study is consequently restricted to rural Portugal. During the time span we are considering, this corresponded to between 75 and 60 percent of total population and is of the greatest interest here in that it was the part of the country which displayed the highest and most persistent illiteracy rates. The combination of rural areas which we have adopted also ensures a reasonable balance between more advanced and more backward rural zones[18]. Table 3 displays some summary statistics.

<div align="center">TABLE 3 HERE</div>

4 Baseline model

Our model describes the circumstances which influenced families in their decisions on whether to endow with basic human capital their young male offspring and if so by how much. Its aim is also

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[15]The cost of appearance, meaning 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.

[16]This was attempted for a later period by Amaral (2002), though with mixed results.

[17]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.

[18]Illiteracy rates for NW and Lisbon hinterland in 1930.

to establish the extent to which, by means of their educational policies, the political regimes under which these decisions were taken affected such decisions.

Our study provides some answers to questions raised earlier by Portuguese historians of education, while casting them 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 freely by families, who acted rationally, on the basis of a relevant stock of information with the aim of maximizing their progeny's benefits from education. Recent studies have concluded families were aware of the possibilities of upward mobility which education might confer[19]. Equally important is the presumption that school enrolment, though compulsory by law, was in practise voluntary. Officially, elementary schooling was provided predominantly by the state and was therefore a free good, a notion which corresponded to reality.

We now present the baseline model, which has a more direct interpretation than the model with interaction effects we present next. Our first step is to estimate an ordinal probit in which the dependent variable (human capital) is the *Lit* variable. All measurements have as their reference time T, when the subject had his stature determined by the army board. Height, which proxies economic conditions soon after birth, should explain in part the human capital stock observed at time T, though acquired roughly around time T-10. The economic conditions it reveals materialized at time T-20 and helped to decide, at about time T-10, whether or not the subject went to school and the amount of time spent there. Similarly, the relevant value of the inverse of school density (*ischde*) (proxying how far away schools were from home) is from time T-10 because that was when it became significant for the decision to enrol the youth in question. We estimate the effects of different political regimes by including a dummy: en=1 for Estado Novo and =0 for the Republic[20]. In order to control for correlation within observations at each year, we allow for clusters at the year level. We also include a time dummy which should absorb the effects of economic growth not already visible through the other explanatory variables. We are unable to include the skill premium because being available only at national level, it does not vary much through time and at all within individuals in a given cohort and for these reasons it turns out to be collinear with

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[19]Fonseca and Guimarães (2009a and b), use also micro data but of a completely different nature: marriage records.

[20]We argue that the reasons for regime change and continued survival have an exogenous element to them: for instance, the 1926 coup which initiated the military dictatorship which would eventually morph into the Estado Novo was modelled after the Musullini's march over Rome which had occurred three years earlier; and while we do not wish to overemphasize the similarities between these regimes, Portugal's limited size and international influence suggest that the rise of right wing authoritarian regimes elsewhere in Europe set the tone for regime change independently of internal developments, just as the cold war later contributed to regime survival.

other variables. Not including interest also implicitly assumes credit constraints were sufficiently powerful for people not being able to borrow at all levels. Besides the variables presented earlier, we also consider interaction effects by using multiplicative variables: We define $enst = en * st$ and $enischde = en * ischde$.

<div align="center">TABLE 4 HERE</div>

Notice that due to the nonlinearity of the model these coefficients have no direct interpretation but the sign for each individual coefficient does show the qualitative effect on latent utility, all else constant. Stature and life expectancy have the predictable signs, but the latter is not individually significant at conventional levels. Two have signs that are not obvious: *ischden*, average number of Km^2 per school, and the time trend, which is not individually statistically significant as well. The Estado Novo dummy has a positive, individually significant effect. Any combination of variables not individually statistically significant at conventional levers is so jointly.
We now discuss the relationship between variations in (inverse) school density and literacy. The likely reason for the "wrong" sign is that the government decides to increase school density where people are more illiterate. This leads to a selection or endogeneity problem and the negative contemporary correlation between school density and literacy which we observe in the data. Even if by the time the individuals are observed some of the effects of increased school density has had an effect on original literacy levels in a given area, the previous underdevelopment could easily be sufficiently large that the dominant effect is negative correlation at the time of observation. If interpreted causally this would suggest that decreases in *ischde* cause more illiteracy, a result which can hardly make sense[21].

4.1 Marginal and discrete effects

We now use the coefficients above to calculate some representative magnitudes analogous to elasticities in a linear estimation model. Combining the sample average for the covariates with the parameters estimated above are able to calculate (local) elasticities, for each possible level of the dependent value. Consider the predicted probability that an individual is illiterate, for the average value of independent variables. Consider, for an individual facing $\bar{\mathbf{x}}$, the marginal effects on the probability that $y = 1$[22]

<div align="center">TABLE 5 HERE</div>

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[21] If some of the expansion was primarily politically motivated and driven by low quality of provision perhaps it would have a negligible effect, but it could hardly have the negative magnitude as well as statistical significance we see.

[22] An alternative is to considering the marginal effect on the average individual is to consider the average of the marginal effects (AME). This is actually a more modern approach, which we will consider in a future version of this paper.

<div align="center">11</div>

The magnitude of coefficients for continuous variables are not interpretable as variations in response to a unit change in that variable, due to the nonlinearity of the model. The variable *Scholde* is km² per school and it decreased during the Estado Novo. It has the "wrong" sign but, as we can see above, once we control for other factors (in particular the Estado Novo) it is not individually significant. This is because most of the variation in density happened in association with the Estado Novo. In fact, although all other variables (except the time dummy) have the expected signs, only the Estado Novo is individually significant at conventional 95% levels. The variable *ischde* has a puzzling association with illiteracy. The magnitude of this coefficient cannot be interpreted directly as it corresponds to a continuous variable, but it is nevertheless small, and not individually significant at the 10% level. This is nevertheless unexpected from a prior point of view, and is likely to be related to the endogeneity problem mentioned above. It is however consistent with the positive effect on latent utility which we noted following table 4. We discuss why this is likely to be so below. In order to asses the possibility of endogeneity in *ischde* affecting the results, in the appendix we estimate the model without *ischde*. We are aware that parameter estimates can potentially suffer from resulting inconsistency but we can see the results don't change much.

We cannot vary the Estado Novo dummy alone, as it would not make sense to keep its interaction with stature and inverse of school density constant due to the two interaction variables. And since these variables are continuous, their coefficient is not directly interpretable either. But what we can do is to predict the probability of illiteracy for the Estado Novo while keeping stature and school density at sample mean levels. This probability is .381 (from an omitted estimation similar to the previous, where we set the Estado Novo dummy equal to one and account for the corresponding change in interaction variables). We conclude the total difference in predicted probability associated with the Estado Novo for an "average" individual was about $72.3\% - 38.1\% = 34.2$ percentage points. In other words, if we intrepret the estimate causally, the Estado Novo reduced the probability of illiteracy to $\frac{0.381}{0.723} = 53\%$ of what it was before. That is, under the Estado Novo such an individual becomes only about half as likely to end up illiterate, compared with the Republic. This magnitude is quite large and also statistically significant.

5 Breaking up the Estado Novo effect: Market demand and political institutions

5.1 The total Estado Novo effect

The 34.2 percentage point difference does not reflect the full variation empirically associated with the Estado Novo. While through the interaction effects it does allow the effect of other covariates such as stature and school density to vary with each regime, is nonetheless a partial effect, which is holding stature and school density themselves constant. In table 6 we calculate the predicted probability of illiteracy under the Republic were all covariates are set at their observed mean values for this regime (except the time trend which is set at the full sample mean)

We now repeat the exercise for the Estado Novo, setting covariates at its own conditional averages (except the year dummy which stays constant at the full sample average). We obtain a estimated probability of illiteracy of .379 (output omitted). The difference in probabilities relative to the Republic case is then 32.3 percentage points. Compared with the previous 34.2 percentage point difference, this result seems puzzling. The reason it is lower is that school density is probably endogenous. We see this in further detail below.

5.2 Public provision of education

We know there is a temporal association between the Estado Novo and much lower illiteracy. We know the Republic itself had some moderate success in reducing illiteracy relative to previous levels. Can we say the Estado Novo was more successful as a result of its policies or was it just a temporal coincidence driven by events (namely economic growth) possibly exogenous to it? For far we have actually kept school density constant across the regimes, even if it's interaction effect with regime was present; we now allow it to change with each regime as it did.

We are able to explore the model with interactions to break down our previous results further. We now change in regime *holding stature and all else except for school density constant* (in fact, other "residual" factors are varying as well). We wish to separate these sources of variation in literacy associated with the Estado Novo. The idea is to consider the effect of a counterfactual Estado Novo where statures do not rise as they did, but school density does increase to what we have observed, while everything else stays constant at average levels. Still, the hope is that by doing this we are able to "keep economic growth constant" and hence be able to ignore income effects so that we can isolate the effect of direct educational policy. In fact this is only being done to the extent that: a) variations in stature capture well variations in growth b) inverse school density captures well government's efforts in this matter c) the conditional variation in stature, where the conditional variable stature is kept constant, is a full reflection of school policy (this is a strong assumption which we relax below) and finally e) higher literacy and consequently higher human capital level do not significantly economic growth within the period under study.

So for the Republic we now calculate the conditional predicted probability and marginal effects for illiteracy, for an individual who faces the Republic's average level of stature and school density, and keeping all other covariates at sample mean values:

Now we perform an analogous calculation for the Estado Novo, keeping stature constant at the Republic level but varying school density to the Estado Novo's levels of this variable. Everything else (time trend and life expectancy) is kept constant at unconditional sample average levels.

We can say that now the effect of the change in regime while keeping stature constant was $.694 - .378 = 31.6$ percentage points This is a higher bound because it is calculated under the implicit assumption that there were two separate channels: that of economic growth, as reflected in increased wealth of families (stature); and that of "everything else" directly or indirectly associated with development policy intervention, which we proxy with school density (below we also let life expectancy vary).

5.3 County-level fixed effects

In the data, variation in school density is negatively associated with literacy levels. For this reason, a causal interpretation of the relation between school density and increased literacy associated with the Estado Novo would lead to puzzling results: the effect of a change in regime while keeping school density constant would be $.694 - .343 = 35.1$ percentage points, so the contribution of decreased inverse school density to changes in probability of illiteracy would be $.342 - .351 = -0.9$ percentage points, which if causally intrepreted would imply additional schools on balance did more harm than good. This result is likely to make no sense because of sample selection: through policy, increases in school density are endogenous to previous literacy levels since the state is expanding schools into the more underdeveloped parts of the country. Ignoring different regional deveolpment levels as an ommited variable which affects policy would lead to inconsistent estimates.
Selection is being driven by an ommited variable, the development level of each region. One way to deal with the problem of the unobservable development level of each region is to use fixed effects at the county level.

5.4 Market demand

We now continue the methodology of changing one factor at the time so that the effect on predicted probabilities is clear. In the previous derivation, we have kept life expectancy constant. This is unreasonable since this variable is for sure influenced by changes in income caused by economic growth. In order account more fully for importance of demand, we now set life expectancy at its conditional mean under each regime, and do the same for stature. We keep school density and year constant at sample means. Doing this by following the same logic as above we conclude (output omitted here) that for this counterfactual Republic, probability of illiteracy is .745. For the Estado Novo, we set the demand variables to observed values, while school density and year are left at sample means. This brings us to a probability of illiteracy of .369. We can then see that under this analysis, demand comes out in an even better light: demand seems to be able to explain a difference in illiteracy probabilities of $.745 - .369 = 37.6$ percentage points. Notice however this is not directly comparable with the 34.2 percentage point difference associated with the Estado Novo because under that analysis life expectancy was being kept constant. They do, however, show demand played an important role as well.
In this subsection we have kept stature constant in an effort to derive a higher bound to the effects

14

of educational policy on literacy levels. We assumed once we discount growth-related effects as measured by higher stature and life expectancy levels, all else is likely have been a general equilibrium consequence of policy actions. Notice the demand side variables (stature, life expectancy) are themselves endogenous to growth which could be itself a result of Estado Novo's educational policies, since future growth is likely to be conditional on the educational policies of the present. The implicit assumption being made here is that these effects do not occur within the time span covered by the sample.

5.5 Educational opportunities for the poor

We presume that those in the lower quartile of height tend indeed to be the poorest (in the robustness section we control for unobserved, normally distributed individual heterogeneity). We now look at the probability of illiteracy, under each regime, for an individual which has height corresponding to the (full sample) 1st quartile and 12.5th percentile The following table summarizes the results

TABLE 9 HERE

In the sample poorer individuals have higher probability of being illiterate, and for these the marginal effect of Estato Novo effect is larger than previously and increasingly so. All these results are statistically significative at conventional levels.

Looking at the difference between columns, we can reach another conclusion. During the Republic, an individual in the 12.5th percentile of stature is 8 percentage points more likely to be illiterate than one in the median. During the Estado Novo, this difference is only 1.8 percentage points. We conclude the Estado Novo, directly or indirectly, promoted social convergence (below we show the direct contribution of educational policy was relevant).

It is important we keep in mind that through this analysis we are keeping stature constant at the full sample level. So the motor for this social convergence cannot be increases in stature during the Estado Novo relative to the Republic. Further during the Republic the first quartile of height is actually it is 1.59m, while for the Estado Novo, it was 1.61m. So because we are using full sample numbers in this exercise, this individual would actually have been slightly better off in relative terms under the Republic, which biases the above result against the Estado Novo. This further strengthens the result that the Estado Novo is associated with more educational opportunities than the Republic.

There exists the possibility that for higher levels of education there is measurement error caused by differences in quality, ie. criteria in what constitutes say $y = 3$ through the different regimes (in particular the Estado Novo may have lowered the average quality of educational provision, and possibly, with these, the standards). However, an illiterate person is always an illiterate person, and hence for those, there should be very little measurement error through time. Then our results show clearly that holding everything else constant, poorer people were a lot more likely to end up

illiterate under the Republic. We conclude the Estado Novo is not discriminating against poorer individuals (the same effect exists for the republic, but it is slightly weaker).

In the marginal effect on probabilities for other levels of education, still for an average individual, while the expected signs show up (for instance stature starts having a positive effect on y for $y > 0$), results are not individually statistically significative at the 95% level. This seems to be because the empirical density a lot more sparse for each of of the higher levels. We have qualitatively similar results all levels of education $y \geq 2$. All in all, the main association of the Estado Novo with educational outcomes seems to have been to at the most basic level, that is decreasing illiteracy. Of course conversely for all other groups *taken together* the Estado Novo had a noticeable effect, since everyone who was leaving illiteracy was entering some particular higher level.

6   Robustness analysis

See the appendix for a through robustness analysis which considers a number of alternative specifications, controls and tests, including estimating the model under unobserved individual heterogeneity and fixed effects at the county level.

7   Conclusion

Several conclusions can be drawn from this "tale of two regimes" which are of interest both to Portuguese historians of the 20th century and to scholars who are engaged in the international debate about the relations between institutions and human capital inequality. Our starting point is the important change which occurred in Portugal in the field of human capital formation during period of time which influenced the four cohorts considered here. From the 1910s to the 1950s, the children of the families were getting brought up in increasingly better off environments, with greater economic resources. Statures rose by about 2 centimeters during these years. Young men were migrating more and more. At the same time, the skill premium, while falling, was still significant. Opportunity cost, measured by the raw labor wage, was actually rising during the Estado Novo period. Real rates of interest didn't change much and there is no evidence that credit constraints were less binding during this period. All in all, it is far from clear it was a rise in return to human capital that was the motor for the educational demand from families[23].

Keeping all else constant, the Estado Novo has a consistently positive effect on predicted educational outcomes, relative to the first Republic for "average" individuals, that is those facing the average value of independent variables. Under our preferred estimate, an individual of average stature (wealth) under the Estado Novo was only about half as likely to be illiterate relative to the Republic. This result controls for a host of factors including stature, school density, and time (which absorbs

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[23]One possibility that should not be discounted is that there are direct utility gains from human capital accumulation which are orthogonal from the rate of return, so economic growth induces more people to purchase this "good".

growth-related effects not reflected in other covariates). Standard errors were adjusted for year-level clusters.

Although poor individuals had no direct political voice under the Estado Novo (and often under the Republic as well), controlling for time and all else constant, poorer individuals (those at the 12.5th and 25th percentile) benefited the most from new educational opportunities. This effect is also present for the Republic, but it is stronger for the Estado Novo.

We have further attempted to break down the Estado Novo effect into variation which can be attributed to institutional policy explicitly targeted towards raising human capital level versus growth. While the Estado Novo seems to have had a large effect, it would be unwarranted to conclude that government institutional policy directed at extending educational opportunities can explain the full magnitude of observed decrease in illiteracy levels. The main driver of increased schooling may have well been economic growth itself, associated temporally with the Estado Novo. We have also show there were decreases in illiteracy not linked to state education policy, that is linked to demand. Coversely, the picture is bleaker. We cannot fully discount the possibility of endogeneity in one of our variables, school density, which proxies for state educational policy. At the same time, increased school density during the Estado Novo explains up to -31.6 percentage point difference in probability of illiteracy relative to the Republic, all else constant. For sure, the model uses variation in literacy levels to estimate variation in schooling which lies outisde the empirical support.

The Portuguese state, claiming a pressing concern to eliminate illiteracy, took steps to improve the supply of education. It is 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. The latter was only possible with a hefty government subsidy in the form of provision of free schools. The previously described efforts from the Estado Novo to increase provision 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 who did not comply, and these were strictly enforced. By the late 1950s Portugal had succeed in pulling itself out of the educational abyss in which it had long found itself: illiteracy among children of school age virtually disappeared (Candeias 2004). Supply forces were at work in this process too and must be credited on par with demand forces for the final result.

During the first half of the 20th century, in Portugal two quite different and fiercely opposed regimes ministered to the mass educational needs of the country. If we are to follow the conventional wisdom of the literature on educational inequality in history, neither would have been expected to do much in this direction. Yet both made a serious effort in this regard. Still more remarkable is the fact it was the Estado Novo which finally turned the tide on illiteracy, not the more democratic Republic. Portugal thus fits uncomfortably into the accepted scheme which links the existence of democracy and popular participation in politics to the democratization of education[24].

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

For lack of satisfactory research, we can only speculate about the curious fact that the Estado Novo embraced enthusiastically and effectively the cause of mass education. Many of its supporters in fact opposed this. Yet others felt that widespread literacy had two advantages. One was the need to wipe away the shame of Portuguese cultural backwardness when confronted with the "civilized world". The Republic shared this sentiment. The other was that in the turmoil of the 1920s to 1950s, schools might not represent a threat to a dictatorship if they were properly controlled and if what people read was properly controlled. Indeed they could be a tool of social control, as evidenced by the fact that teacher recruiting was done by local politically-backed elites and based on individuals' "good morals and intellectual competence". Not until the late 1930s a formal exam was introduced (Carvalho 1988). Our point so far has been made by many critics of the Estado Novo regime but has not been taken further to its main consequence, which is the spread of literacy. Among the government elites discussion about the economic importance of producing human capital did happen occasionally, but was never a strong theme at government level before the 1950s. The Republic does not appear to have been concerned much about it either.

Compared with the Republic, there is one final reason why the Estado Novo ended by having a much bigger role in the field of human capital formation. Educating the masses in such a regime did not pose the risk of having to give them the vote afterwards and then losing political control, since the vote did not exist, and the Estado Novo did not expect literacy to lead to increased opposition from a generally conservative majority. To the republicans, the matter was different. 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 republicanism, secularism and the free masons.

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APPENDIX

	Republic	Estado Novo
Educational Expendit/ Total Expendt (average)	7%	12%
Literacy rate	38.2% (1926)	58.6% (1950)
Children of school age per state school	95.4 (1926)	52.5 (1950)
Annual growth of literacy rate	0.45%	0.85%
Annual decline of # children of school age per state school	- 0.6%	-1.8%

Table 1. Comparative performance in Primary Education of Repubic (1910-26) and Estado Novo (1926-1950). Source: Candeias (2004)

Variable	Content	Source	Measured	Acquired
1. Literacy	6 degrees of proficiency (from 1= cannot read, to 6)	MA	T	T-10
2. Stature	Measured in cm. at age 20	MA	T	T-20
3. Inverse school density	Average Km^2 per school, county-level	OS	T-10	T-10
4. Skill premium	Ratio between skilled and unskilled wage, national	OS	T-10	T-10
5. Opportunity cost of schooling	Wage of raw labour deflated by CPI, national	OS	T-10	T-10
6. Life expectation	Numbers of years, national	RV	T-10	T-10
7. Estado Novo	Regime dummy, 0=Republic, 1=Estado Novo	-	-	-

Table 2. Variables used in the Literacy Regressions. T is the year in which young men were inspected by the Army. MA=Military archives. OS=Official statistics. RV=Rodrigues Viegas.

	Republic			Estado Novo		
	Observations	Mean	s.d.	Observations	Mean	s.d.
Literacy	999	1.83	1.456	1000	2.85	1.65
Stature	999	1.628	.061	1000	1.65	.062
Inverse of school density	998	12.95	3.78	956	6.56	3.08
Skill premium	999	2.02	.180	1000	1.56	.035
Opportunity cost	999	.354	.027	1000	.514	.033
Life expectancy	999	38.90	3.10	1000	46.70	1.90

Table 3. Summary of descriptive statistics for explanatory variables.

Dependent (ordered) variable: Literacy	Coefficient	Robust s.e.	p>|z|	95% Confidence Interval	
Stature	3.772	.283	0.000	3.217	4.326
Inverse school density	.040	.0043	0.000	.0323	.049
Life expectancy	.006	.0033	0.054	-.0001	.0125
Year	-0.006	.0032	0.085	-.0122	.0007
Estado Novo	6.27	1.432	0.000	3.466	9.082
Estado Novo ∗ Stature	-3.088	.798	0.000	-4.65	-1.523
Estado Novo ∗ Inverse school density	-.0322	.022	0.138	-.075	.0103

Table 4. Ordered probit regression. Standard errors adjusted for year-level clusters

Pr(literacy=1|last column)=.723	dy/dx	Robust s.e.	p>|z|	Evaluated at
Stature	-1.263	.197	0.000	1.64
Inverse school density	-.0137	.001	0.000	9.82
Life expectancy	-.002	.001	0.273	42.71
Year	.002	.002	0.229	1936.26
Estado Novo	-.723	.025	0.000	0
Estado Novo ∗ Stature	1.035	.119	0.000	0
Estado Novo ∗ Inverse school density	.011	.0002	0.000	0

Table 5. Predicted probability of illiteracy and marginal/discrete effects at the means during the Republic.

Pr(literacy=1|last column)= .702	dy/dx	Robust s.e.	p>|z|	Evaluated at
Stature	-1.30	.181	0.000	1.628
Inverse school density	-.014	.0005	0.000	12.95
Life expectancy	-.002	.002	0.264	42.71
Year	.002	.002	0.219	1936.26
Estado Novo	-.702	.024	0.000	0
Estado Novo ∗ Stature	1.06	.105	0.000	0
Estado Novo ∗ Inverse school density	.011	.00002	0.000	0

Table 6. Predicted conditional probability for the Republic, with year trend at sample mean

Pr(literacy=1|last column)=.694	dy/dx	Robust s.e.	p>|z|	Evaluated at
Stature	-1.36	.196	0.000	1.628
Inverse school density	-.015	.001	0.000	12.95
Life expectancy	-.002	.002	0.273	42.71
Year	.002	.002	0.229	1936.26
Estado Novo	-.671	.026	0.000	0
Estado Novo $*$ Stature	1.12	.116	0.000	0
Estado Novo $*$ Inverse school density	.011	.0001	0.000	0

Table 7. Predicted conditional probability of illiteracy and marginal or discrete effects at an artificial

"Republic"

Pr(literacy=1|last column)=.378	dy/dx	Robust s.e.	p>|z|	Evaluated at
Stature	-1.44	.104	0.000	1.628
Inverse school density	-.015	.0004	0.000	6.55
Life expectancy	-.002	.002	0.227	38.90
Year	.002	.002	0.181	1936.26
Estado Novo	-.616	.052	0.000	1
Estado Novo $*$ Stature	1.17	.037	0.000	1.628
Estado Novo $*$ Inverse school density	.012	.0008	0.000	6.55

Table 8. Predicted conditional probability of illiteracy and marginal or discrete effects at an

artificial "EN"

Stature	Republic	Estado Novo	Difference
Sample mean and median: 1.64m	.723	.381	$-.342$
Sample 25th percentile: 1.6m	.770	.391	$-.379$
Sample 12.5th percentile: 1.57m	.803	.399	$-.404$

Table 9. Predicted probabilities of illiteracy under the two regimes conditional on stature, and all
else at constant at mean levels