Failure to Launch? The Role of Land Inequality in Transition Delays[*]

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Abstract

Recent work in the growth literature has provided various explanations for transition delays and the great divergence. This paper provides empirical support for one theory of transition delays: initial land inequality. Our analysis is designed to elucidate the channels via which land inequality can affect long-run economic performance. Using a new historical data set for land inequality (Frankema (2009)) we employ duration analysis to investigate whether higher levels of land inequality lead to longer delays in the extension of primary schooling. We then investigate whether such delays affect long-run economic performance via their effect on contemporaneous schooling. Our findings suggest that land inequality is a key determinant of delays in schooling, and that such delays have a significant negative impact on long-run output.

Keywords: growth takeoffs; schooling; duration analysis; model uncertainty; institutions.

JEL Classification Codes: C59, O40, Z12.

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1 Introduction

The transition from economic stagnation to growth and the associated phenomenon of the great divergence has been the subject of intensive research in the growth literature. In particular, there has been a large body of work that is concerned with the issue of economic take-offs. This work describes the transition of economies from a state of economic stagnation to a modern industrial economy with positive growth rates. Notable examples include Galor and Weil (2000), Hansen and Prescott (2001), and Desmet and Parente (2009).

Recent work in the growth literature has focused on the effect of fundamental theories (associated with slow moving determinants) such as geography and institutions on variations in long-run economic performance across countries. We are interested in whether these fundamental determinants are also important explanations for delays in countries achieving economic take-offs. Specifically, this paper focuses on the empirical support for one theory of transition delays - initial land inequality.

Many researchers have highlighted the role that initial land inequality plays in terms of delaying the onset of economic take-off. In particular, the theory has highlighted the deep connection between land inequality and human capital accumulation. In Galor, Moav, and Vollrath (2009), henceforth GMV, land inequality negatively affects the implementation of educational reforms that lead to the extension of educational opportunities to the general population.[1] In particular, due to the low complementarity of human capital and land (see also, Galor and Moav (2006)), an increase in the level of human capital increases productivity in industry more than the agricultural sector, causing a decrease in the returns to land and a rise in wages. Consequently, political elites who initially derive most of their income from land have no incentive to support educational reforms. However, since productivity growth in the industrial sector outstrips that in the agricultural sector, the returns from the capital holdings of political elites increase as a proportion of their total income as the economy advances. Their objection to education reform therefore declines over time such that a critical time is reached whereby human capital-enhancing policies (e.g., compulsory schooling) are enacted.

While GMV posit a direct effect of land inequality on transition delays, other work in the

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[1] Several other works have also documented the relationship between land inequality and the lower provision of other forms of public goods (including financial development), such as Banerjee and Iyer (2005) and Rajan and Ramcharan (2010).

literature also propose an indirect effect whereby land inequality influences the evolution of political institutions, and it is these institutions that then determine the delays in transition. Parente and Prescott (2000), Acemoglu, Johnson, and Robinson (2006), and Engerman and Sokoloff (2002) have all pointed out the important role that land inequality plays in determining the evolution of political institutions. The difference between these works and that of GMV is the emphasis on an independent role for political institutions and their persistence in determining delays in enacting human capital promoting initiatives. For example, as Acemoglu, Johnson, and Robinson (2006) point out, if there are rents to staying in power, then, the politically powerful landed aristocracy would have a strong incentive to block the introduction of new technologies and institutions in order to protect their power and profits, delaying at the same time the industrialization process. The suggestion here is that the autonomous nature of political institutions may require direct reforms to these institutions in order for welfare enhancing outcomes to be achieved. In contrast, in GMV's framework, economic progress automatically leads to a shift in incentives faced by the elites, and to their willingness to adopt human capital enhancing policies.

Our contribution in this paper is threefold. First, we ask the question of what factors determine the delay of a country in achieving a particular educational threshold (e.g. 50% primary schooling enrollment). Specifically, do higher levels of land inequality lead to longer delays? We exploit a new historical data set for land inequality by Frankema (2009) to investigate this question in the context of hazard rate models. This is a departure from the standard empirical work that is carried out in the growth literature. Methodologically, empirical work in the growth literature focuses on the effects of various covariates on long-run per capita income or growth. In this paper, we focus instead on a more direct prediction of the theory - what are the effects of various fundamental determinants on delay in schooling?

In addition, we explicitly address the issue of model uncertainty in investigating how fundamental determinants, such as land inequality, affect the extension of schooling opportunities. Our analysis does not assume that the GMV theory is necessarily the true one but rather it provides findings that are robust to alternative theories and their proxies. More precisely, we employ a Bayesian model averaging technique that aggregates the findings across different plausible model specifications using the posterior evidence as weights for each model; see for example Durlauf, Kourtellos, and Tan (2008).

Consistent with the theory proposed by GMV, we find that increased levels of land inequality lead to more delays in reaching the 50% primary schooling enrollment rate threshold. This result is robust to variations in the specification of the hazard model, and also holds true for other primary schooling threshold levels that are consistent with a substantial extension of schooling opportunities to the population. Interestingly, initial values of political institutions (as measured by an executive constraint variable) do not appear to be important in determining delays in schooling.

Second, we explore the question of how delays in schooling affect contemporaneous measures of schooling and institutions. We find strong evidence that historical delays in achieving particular educational thresholds determine not only current schooling but also current executive constraints. This evidence suggests an alternative channel for the effect of land inequality on long-run economic performance via schooling delays. Therefore, our third contribution investigates whether schooling delays are transmitted to long-run income via their effect on current institutions and schooling. Like Glaeser, La Porta, Lopez-De-Silanes, and Shleifer (2004), our results suggest that the historical evolutionary path of human capital is a fundamental determinant of long-run economic outcomes.

The paper is organized as follows. Section 2 lays out the econometric framework and discusses our data and results for the hazard analysis. Next we investigate the potential implications of our findings for current schooling, institutions, and income in Section 3. Section 4 concludes.

2 Econometric framework

2.1 Implementation and data

We employ the static Cox (1972) proportional hazard (Cox-PH) model to study the probability of the event that a country moves from a low education state to a high education state. In GMV's theory, these two states correspond to a state of economic stagnation and a state of sustained economic growth, respectively. Higher hazard rates correspond to higher risks of transitioning out of the low education/stagnation state therefore implying shorter delays in the extension of schooling opportunities.

The Cox-PH model decomposes the hazard function into a part that depends on the time already spent in stagnation and on a set of explanatory variables X_i. So we can write the hazard function for country i at time t as

$$\lambda(t|X_i;\theta) = \frac{f(t|X_i;\theta)}{S(t|X_i;\theta)} = \lambda_0(t)\exp(X_i'\theta), \tag{2.1}$$

where $\lambda_0(t)$ is the time dependent part also known as the baseline hazard function. We estimate (2.1) using a partial likelihood method. The Cox-PH model is a semi-parametric model in the sense that while it makes no assumption about the form of the function $\lambda_0(t)$, it assumes parametric form for the effect of the predictors on the hazard.[2]

In terms of the data, we construct a historical dataset spanning from 1700 to 1995 for a sample of 53 countries. A detailed description of the data and our sources is given in the Data Appendix A1.

The dependent variable in this case is the delay in schooling, measured as the time it takes for each country to first reach a threshold level in primary schooling enrollment, minus the time it took the first country to pass that threshold. For example, the United States was the first country to pass the 50% primary school enrollment threshold in 1831. The reason for constructing the delay variable as a measure that relates primary schooling enrollment in one country relative to the first country to pass the threshold is so as to overcome the left censoring problem. Since all other countries achieve the threshold at later dates than the first country to do so, left censoring is eliminated. The threshold levels we consider have to fulfill two conditions: (i) they have to be high enough to capture the GMV idea of a large scale extension of public schooling opportunities to the population, and (ii) they have to be low enough so that enough countries attain the level within the sample so that we do not have too many instances of right censoring in the data.

The actual construction of the primary schooling data follows Comin and Hobijn (2004) who construct historical primary schooling data for 23 industrialized countries, measured as the number of students in primary school as a fraction of the population, in the age range 5-14. We extend the primary schooling data set to a larger set of 53 countries for this analysis. The number of students enrolled is taken from Banks (1999), while the population in the age range 5-14 is taken from Mitchell (1998). Table 1 lists the countries in our sample.

We now discuss the set of explanatory variables, X_i. For our analysis to correspond

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[2] For robustness purposes we also investigated parametric methods such as the Exponential, Log Logistic, and Weibull without finding substantial differences.

Table 1: List of Countries

This table presents the list of countries. In the bracket we note the date of the actual starting date of each country.

Europe

Austria (1919)
Belgium (1860)
Denmark (1882)
France (1851)
Greece (1870)
Ireland (1926)
Netherlands (1899)
Norway (1855)
Portugal (1864)
Romania (1899)
Sweden (1882)
UK (1860)

Offshoots
Australia (1946)
Canada (1865)
N. Zealand (1907)
USA (1830)

Sub-Saharan
Ghana (1960)
Kenya (1969)
Mozambique (1975)
South Africa (1946)
Zambia (1969)

Latin America

Argentina (1895)
Brazil (1872)
Chile (1895)
Colombia (1938)
Costa Rica (1883)
Dom. Rep (1844)
Ecuador (1950)
El Salvador (1930)
Guatemala (1950)
Honduras (1930)
Nicaragua (1950)
Panama (1950)
Paraguay (1950)
Peru (1961)

East Asia and Pacific
China (1953)
Indonesia (1961)
Japan (1815)
Korea Rep. (1960)
Malaysia (1957)
Myanmar (1948)
Philippines (1948)
Thailand (1929)

Middle East and North Africa

Algeria (1962)
Egypt (1951)
Iran (1887)
Iraq (1957)
Morocco (1956)
Tunisia (1956)

South Asia
India (1947)
Pakistan (1961)
Sri Lanka (1948)

Central Asia
Turkey (1935)

closely with the theory, we imagine that countries always existed, but have different structural characteristics and historical experiences that influence when they achieve a particular threshold level in schooling. These factors then explain why a particular country experienced a delay in schooling attainment vis-à-vis the US experience. We think of these factors as controlling for two kinds of country-specific heterogeneity.

The first type of country-specific heterogeneity corresponds to factors that are invariant to the particular political elites that are in power at the time when schooling policy decisions are made. These factors largely correspond to country-specific fixed effects as well as the time it took for the relevant political elites; that is, the political elites who would make policy decisions about schooling and who would see these through, to come to power.

One reason why a country might have experienced a delay in schooling attainment vis-à-vis the US may be because of its colonial history. We do have information about whether a country was historically a European colony. To the extent that we can think of the initial conditions of a colony as being substantially influenced by the European metropolis, we can control for country-specific heterogeneity by including colonial dummy variables (specifically, whether a country was a British colony, a Spanish or Portuguese colony, a French colony, or Other European colony).

Another reason why a country may take more time than the US to attain a particular schooling threshold may be that the relevant elites took longer to attain power and therefore control over schooling policies. To control for the variation in the time it took a country's elites to attain autonomy over policies relative to the US, we include an Independence variable that measures the additional years it took for each country to declare independence relative to the US, who declared independence in 1776. This variable takes the value zero for metropolis countries, and positive integers for colonies.

We also control for the elites' hold on power by including a measure of Political Instability due to Miller (2011). The idea is that elites who cannot secure their hold on power may have less ability to influence policy outcomes (or, alternatively, face different incentives in enacting particular policies) hence leading to variation in delays in achieving particular schooling thresholds. Political Instability is measured as the average of the first differences (in absolute values) of the Polity2 variable from Polity IV. The Polity2 variable is a measure of the degree of democracy in a country with a score of +10 representing most democratic and -10 signifying most autocratic. The averages of the first differences are calculated as follows: for colonies we average values of the (absolute) year-to-year changes in the Polity2 variable from the year of independence to the year the colony achieves the schooling threshold, while for non-colonies, we take the corresponding average values from the earliest available observation until the year the country achieves the schooling threshold.

The second set of variables corresponds to factors that influence the incentives of political elites to extend primary schooling opportunities to the population according to the theory. As detailed in the Introduction, our main aim is to investigate how land inequality affects the transition from economic stagnation to the sustained growth era, through the human capital channel. To do so, we use land inequality data from Frankema (2009). The variable is expressed in Gini coefficients, and it is compiled on the basis of the decile distribution of the total number of land holdings (farms), and the total amount of agricultural land (nationwide), excluding communal pastures and forests.[3] Here, a holding refers to "all agricultural land assigned to a "holder" that is one or two persons, but no group, community or state, or to a distinct "management unit", i.e. a farm. The total agricultural area includes all land that is part of a holding, i.e. arable land, land under permanent crops, land under permanent meadows and pastures, wood and forest land and a category of all other land. In the case of shifting cultivation the total area of the holding consists of the total area under crops and the area that is prepared for cultivation [Frankema, 2006, p. 3]". The primary data sources that Frankema uses to calculate the land distribution data comes from the IIA and FAO World Census of Agriculture. For our analysis, we use the earliest available land Gini observation for each country.

One concern with using land Gini as a variable is that it may be proxying for other forms of wealth or income inequality. Some forms of wealth inequality may in fact imply dramatically different theoretical outcomes from those of GMV. For example, if inequality was a result of inequality in capital holdings and not of land holdings by elites, it may be the case that elites would prefer higher levels of schooling for the population since human capital is complementary to physical capital. However, if we fail to include a proxy variable for capital holdings inequality then the estimates for the effects of land inequality on schooling outcomes are likely to be biased. Alternatively, the precise nature of the inequality responsible for lower schooling levels may be misspecified. For example, land Gini may be proxying for income inequality (instead of land inequality) which has also been shown to be associated with poor education outcomes across countries. In fact, Goldin and Katz (1997) find evidence that supports this proposition for the case of the US. To safeguard against these possibilities, we obtain data for the number of automobile registrations per person to proxy for other forms of inequality not associated with land. We use the earliest available value for automobile registration for each country and note that all values were taken at dates that preceded the year in which the country reached the schooling threshold that defines the dependent variable. However, the use of per capita automobile registration is potentially a very imperfect measure of income inequality. Historically, it is probably most informative only in the very particular historical situation of the early 1900's in the US or Europe, and may therefore not be a very good measure of inequality for other regions of the world. We therefore consider a new dataset of global inequality (BFLZ Gini Index) that has recently been introduced by Van Zanden, Baten, Földvari, and Van Leeuwen (2011). This

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[3] The land Gini coefficient is defined as, $G = \sum_{i=1}^{n} \sum_{j=1}^{n} |z_i - z_j| \ / \ 2n^2\mu$, where z_i and z_j are the percentage shares of land of n deciles ($n = 10$) and $\mu = 1/n$.

new dataset is available for a large set of countries spanning from 1820 to 1995 and improves the Bourguignon and Morrisson (2002) dataset in several ways. In particular, it is calculated using a much larger number of observations of within country inequality and it is based on the new 2005 PPPs of the World Bank's ICP project, which gives a more accurate picture of disparities in GDP per capita than the previous ICP rounds.[4]

GMV also theorize that land abundance that would benefit agriculture in the early stages of development would lead the landowning elite to be more reluctant to enact human capital enhancing policies that disproportionately benefit capitalists and workers. We include therefore a measure of land abundance, the log of arable land (absolute) in hectares, in 1700, and investigate whether more land abundance leads to greater delays in schooling.

GMV's theory also requires that we control for other developmental differences between countries. The reason is that for a given level of land inequality, all else equal, higher levels of economic development corresponds to capital holdings constituting a larger proportion of the asset portfolio of elites. Since elites in more developed economies would derive a higher portion of their income from the industrial sector, they would be more willing to enact human capital-friendly policies. We control for initial development differences between countries using the log of GDP per capita (Initial Income; Maddison (2009)). For non-colonies, we take the average of log GDP per capita values from the earliest possible data point until 1831, while for colonies, we use the data on independence day or, if this is unavailable, the earliest data point after independence. We should note that in all cases, the income data occurs prior to the country achieving the schooling threshold. The timing of the variable is meant to capture the level of development that was relevant to the elites that are in power at the time when schooling policies are enacted.

The main alternative theory for schooling delays, as noted in the Introduction, is political institutions. We proxy initial political institutions using historical executive constraints data from Polity IV (Initial Executive Constraints). This variable lies between zero and one, with higher values indicating more constraints on the power of the executive. Similar to the Initial Income variable above, we take the average of executive constraints values from the earliest possible data point until 1831 for non-colonies and use the data on independence day or, if unavailable, the earliest data point after independence for colonies. In all cases, the data for executive constraints occurs prior to the country achieving the schooling threshold, and is

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[4] We are very grateful to Bas van Leeuwen for very kindly sharing the global inequality data from Van Zanden, Baten, Földvari, and Van Leeuwen (2011) with us.

meant to capture the relevant degree of executive constraints that apply to elites empowered to determine schooling outcomes.

Following the empirical growth literature, we also control for a set of new growth theories that have potential implications for human capital accumulation. The first such theory argues that a detrimental climate may have negative effects on human capital accumulation (see, Sachs, Gallup, and Mellinger (1999)). We proxy climate using a variable (Tropics) which measures the percentage of a country's land area that is classified as tropical or subtropical. Finally, another theory requires that we account for the effects of ethnic heterogeneity on delays in schooling. Alesina, Baqir, and Easterly (1999) suggest that higher levels of ethnic heterogeneity potentially result in political disagreements over the provision of public goods (such as schooling), and its subsequent under-provision. To control for the effect of ethnic heterogeneity on delays in schooling, we include a measure of ethnic fractionalization due to Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003) in X_i.

Table 2 presents summary statistics while Table A1 of the Appendix provides a detailed descriptions of all the variables.

2.2 Model averaging of hazard models

Standard duration analysis estimates a baseline PH-Cox model in equation (2.1), which is closest to the theory in question and then reports a few robustness exercises that include some additional controls. An alternative approach to evaluate the relative evidentiary support of competing theories includes a large number of variables and those variables that prove to be significant are then rendered as the important determinants. This approach is often referred as a 'kitchen sink' approach.

However, both approaches do not systematically address the problem of model uncertainty and do not provide robust evidence but rather rely on strong priors of the econometrician. As Brock and Durlauf (2001) and others have argued, the inherent open-endedness of new growth theories presents unique challenges to researchers in exploring their quantitative consequences on growth. Because the inclusion of one set of growth theories says nothing about whether other possible growth theories should be included (or not) in the model, growth researchers face substantial model uncertainty in their work. The fear is that the inclusion or exclusion of growth variables may significantly alter the conclusions one

Table 2: Descriptive Statistics

This table presents the summary statistics for the 53 countries of our dataset.

	Mean	St. Dev.	Min	Max
Initial Income	7.010	0.482	6.116	8.583
Income in 1995	8.525	1.016	6.452	10.11
Initial Schooling	0.378	0.229	0.000	0.910
Schooling, 1965-95	0.298	0.794	-2.291	1.685
Schooling, 1985-95	0.643	0.702	-2.034	1.790
Initial Executive Constraints	0.370	0.399	0.000	1.000
Executive Constraints, 1965-95	0.570	0.341	0.000	1.000
Executive Constraints, 1985-95	0.686	0.309	0.000	1.000
Political Instability	0.278	0.385	0.000	2.375
Auto Registration	0.037	0.106	0.000	0.752
BFLZ Gini Index	0.491	0.110	0.276	0.794
Land Gini	0.636	0.144	0.307	0.863
Arable Land	6.934	1.573	3.367	11.27
Independence	84.00	73.10	0.000	199.0
Tropics	0.376	0.417	0.000	1.000
Ethnic Fractionalization	0.373	0.247	0.012	0.859
Frecivil	0.528	0.504	0.000	1.000
Britcommon	0.327	0.474	0.000	1.000
British Colony	0.302	0.463	0.000	1.000
French Colony	0.057	0.233	0.000	1.000
Span./Port Colony	0.302	0.463	0.000	1.000
Other Colonies	0.113	0.320	0.000	1.000

had previously arrived at for, say, the effect of land inequality on delays in schooling based on a particular model in the model space. In this case, the model space refers to the set of all possible models generated by the set of growth regressors, denoted by $M = M_1, \ldots, M_K$. How can we obtain robust conclusions about the effect of land inequality in equation (2.1) and more generally about the structural parameters θ that do not condition on the model choice?

We do so by employing a Bayesian Model Averaging (BMA) approach by constructing estimates conditional not on a single model, but on a model space whose elements span an appropriate range of determinants suggested by a large body of work. A number of recent papers have documented the advantages of using BMA in constructing robust estimates primarily in the context of the linear model. See for example, Brock and Durlauf (2001), Fernandez, Ley, and Steel (2001), Sala-i Martin, Doppelhofer, and Miller (2004), Durlauf, Kourtellos, and Tan (2008), Masanjala and Papageorgiou (2008), and Ciccone and Jarocinski

(2010). Our BMA approach is closest to Volinsky, Madigan, Raftery, and Kronmal (1997) who employ BMA in the context of Cox-PH models to study the risk factors for stroke. Model averaging "integrates out" the uncertainty over models by taking the weighted average of model-specific estimates, where the weights reflect the evidentiary support for each model given the data, D, and which are constructed to be analogous to posterior model probabilities. Then the posterior distribution of θ given the data, D, is given by

$$\widehat{\mu}(\theta|D) = \sum_{k=1}^{K} \widehat{\mu}(\theta|M_k, D)\widehat{\mu}(M_k|D)) \tag{2.2}$$

where $\mu(\theta|M_k, D)$ is the posterior distribution of θ given a particular model M_k, and $\mu(M_k|D)$ is the posterior probability of model M_k. The former is a standard Bayesian object, which does not have a closed form expressions in the case of Cox-PH models. Following Volinsky, Madigan, Raftery, and Kronmal (1997) we approximate it by the maximum likelihood estimator, $\widehat{\mu}(\theta|M_k, D) \approx \widehat{\mu}(\theta|M_k, \widehat{\theta}_k^{MLE}, D)$.[5]

As for the model weights, $\widehat{\mu}(M_k|D)$ we use the Bayes' rule, so that each weight is the product of the integrated likelihood of the data given a model, $\widehat{\mu}(D|M_k)$, and the prior probability for a model, $\mu(M_k)$:

$$\widehat{\mu}(M_k|D) \propto \widehat{\mu}(\theta|M_k)\mu(M_k) \tag{2.3}$$

As standard in the literature, we assume a uniform prior so that the prior probability that any variable is included in the true model is taken to be 0.5. The integrated likelihood of model M_k is approximated by the Bayesian information criterion (BIC), $\log \widehat{\mu}(D|M_k) = \log \widehat{\mu}(D|\widehat{\theta}_k^{PLE}, M_k) - (p/2)\log n + O(1)$, where n should be the total number of uncensored cases.

The model averaging estimator of θ is given by the posterior mean defined by

$$\widehat{\theta}_{D,M}^{MA} = \sum_{k \in M} \widehat{\theta}_k^{PLE} \widehat{\mu}(M_k|D), \tag{2.4}$$

where $\widehat{\theta}_k^{PLE}$ is the partial likelihood estimator of each model M_k. We compute the

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[5] This posterior refers to the following integral $\mu(\theta|M_k, D) = \int \mu(\theta|\theta_k, M_k, D)\mu(\theta_k|M_k, D)d\theta_k$, where $\mu(\theta|\theta_k, M_k, D)$ is the likelihood and $\mu(\theta_k|M_k, D)d\theta_k$ is the prior density of θ_k.

corresponding standard errors using the posterior variance of θ

$$\widehat{V}^{\theta}_{D,M} = \sum_{k \in M} \widehat{V}^{\theta}_{D,k} \widehat{\mu}(M_k|D) + \sum_{k \in M} (\widehat{\theta}^{PLE}_{D,k} - \widehat{\theta}^{MA}_{D,M^S})^2 \widehat{\mu}(M_k|D) \tag{2.5}$$

where $\widehat{V}^{\theta}_{D,k}$ is the model-specific posterior variance of the partial likelihood estimator estimator. The first term in equation (2.5) is the average of the posterior variances within models and the second term is the variance of the posterior means across models (i.e. weighted average of the squared deviations of the model-specific from the model averaged estimates).[6] We also report the posterior probability of inclusion for each covariate, which is the sum of the posterior probability of all the models for which that variable appears. It is meant to capture the (posterior) probability that that covariate is in the true model after looking at the data.

2.3 Hazard results for delay in schooling

We present our findings for the Cox PH model in equation (2.1) in Table 4. The dependent variable, delay in schooling, is the time it takes for each country to first reach 50% in primary schooling enrollment, minus the time the first country (the US, in this case) passed the 50% threshold. We chose to focus on the 50% threshold for two reasons.

First, the 50% threshold level is an appropriate level as it is consistent with the GMV idea of a substantial extension of schooling opportunities to the population. However, to get a sense of the robustness of our findings, we also investigated various other schooling threshold values ranging from 40% to 60% primary schooling threshold levels. The 50% threshold level also turns out to be neither too high nor too low in the following sense. When the threshold level is low (essentially for all threshold levels below 45%), almost all countries successfully attain the threshold level with very little difference in the time it took to do so, so that there is not enough variation in the data to properly identify the effects of land inequality on schooling delays. However, when the threshold level is high (above 55%), the number of right censored countries becomes large. Table 3 shows the countries that failed to reach various primary schooling enrollment threshold levels; i.e., countries that

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[6] Our approach can be viewed as a "hybrid" approach to model averaging in the sense that we mix frequentist probability statements about observables given unobservables and Bayesian probability statement about unobservables given observables. For a similar approach, see Durlauf, Kourtellos, and Tan (2011)

are right censored. Right censoring reduces the observed variation in schooling delays, and makes it difficult to identify the effects of land inequality on delays.[7]

Table 3: Primary Schooling Threshold Failure

This table lists the countries that fail to attain the primary schooling for various thresholds.

40%	45%	50%	55%	60%	65%	70%
Morocco	India	Egypt	Egypt	Egypt	China	Algeria
Pakistan	Morocco	India	Guatemala	Ghana	Colombia	China
	Pakistan	Morocco	India	Guatemala	Egypt	Colombia
		Mozambique	Iraq	Honduras	Ghana	Costa Rica
		Pakistan	Morocco	India	Guatemala	Egypt
			Mozambique	Iran	Honduras	El Salvador
			Myanmar	Iraq	India	Ghana
			Nicaragua	Morocco	Iran	Greece
			Pakistan	Mozambique	Iraq	Guatemala
			Turkey	Myanmar	Korea Republic	Honduras
				Nicaragua	Morocco	India
				Pakistan	Mozambique	Iran
				Turkey	Myanmar	Iraq
					Nicaragua	Japan
					Pakistan	Korea Republic
					Thailand	Morocco
					Turkey	Mozambique
					Zambia	Myanmar
						Nicaragua
						Pakistan
						Paraguay
						Thailand
						Turkey
						Zambia

The first three columns of Table 4 present the results from our model averaging analysis. The first column shows the posterior probability that each of the covariates is included in the true model for the hazard rate, while the second and third columns present the BMA posterior means and standard errors for each covariate. The remaining six columns show, respectively, the coefficient estimate and standard error for each covariate for (i) the two posterior mode models from the BMA analysis, and (ii) the largest model in the model space considered in the BMA analysis.

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[7] For conciseness, we only report full results for the 50% threshold. The results for land gini as well as the other covariates for threshold levels between about 40% and 50% do not differ substantively. This can be seen from Appendix Figure A1, which shows the Posterior Inclusion Probabilities for the land gini variables across threshold levels. Full results for all other covariates are available upon request.

Table 4: Hazard Model for the Delay in Primary Schooling

The table presents BMA results for the Cox-PH duration model. The posterior inclusion probability (PIP) of a variable is the sum of the posterior probabilities models that include that variable. The posterior mean (PM) is the average of the partial likelihood coefficient estimates (COEF) of individual models weighted by posterior probability. The posterior standard error (PSE) is the BMA estimate for the standard error (SE) taking model uncertainty into account. All reported standard errors refer to heteroskedasticity consistent standard errors.

	Model Averaging			Posterior Mode Models				Largest Model	
	PIP	PM	PSE	COEF	SE	COEF	SE	COEF	SE
Initial Income	100.0	1.423	0.466	1.456	0.390	1.423	0.400	1.258	0.719
Land gini	98.9	-6.643	2.081	-6.844	1.924	-6.857	2.156	-6.509	1.935
Arable Land	97.8	-0.425	0.158	-0.422	0.125	-0.424	0.137	-0.438	0.154
British Colony	95.5	2.199	0.896	2.307	0.613	2.283	0.621	2.438	1.151
Span./Port. Colony	9.6	-0.048	0.247	-	-	-	-	-0.265	0.847
French Colony	17.4	0.256	0.751	-	-	-	-	1.657	1.380
Other Colonies	100.0	2.687	0.785	2.623	0.644	2.662	0.630	3.288	0.899
Independence	100.0	-0.024	0.005	-0.024	0.005	-0.023	0.004	-0.028	0.007
Political Instability	100.0	-2.392	0.886	-2.313	0.741	-2.576	0.823	-2.426	0.947
Initial Executive Constraints	15.2	0.141	0.479	-	-	-	-	0.763	0.779
Tropics	13.6	-0.07	0.262	-	-	-	-	0.148	0.853
Ethnic Fractionalization	37.6	-0.519	0.817	-	-	-1.411	0.698	-1.170	0.879
Auto Registration	6.4	-0.012	0.438	-	-	-	-	0.410	1.550
BFLZ Gini Index	11.9	0.199	0.832	-	-	-	-	2.385	2.346
Wald statistic				42.79		41.02		63.38	
Posterior Model Probabality				0.194		0.175		0.000	

Our reason for reporting the results from the posterior mode and largest models is to provide the reader with the ability to compare findings via model selection - using the best models (in terms of posterior weights) or a low-bias model (at the cost of reduced efficiency) with potentially many irrelevant covariates - with those obtained via model averaging (BMA). Finally, we also note that the posterior means are interpreted as the marginal effect of each covariate on the risk of crossing the 50% primary schooling threshold. Therefore, positive estimates imply that the marginal contribution of the corresponding covariate is to reduce the delay in schooling for countries.

Our BMA results are consistent with the theoretical predictions of GMV. As GMV argued, for given levels of economic progress, land inequality implies a higher reliance of political elites on income derived from landholdings leading them to delay the implementation of human capital enhancing policies, which primarily benefit capitalists and workers. Similarly, the greater the abundance of arable land, all else equal, the greater the importance of agriculture in the elites' portfolio, the higher their subsequent reliance on returns from landholdings, and the greater their reluctance to expand schooling opportunities. However, for given levels of land inequality and arable land, economic progress results in a rebalancing of the portfolio returns of landholding elites away from income derived from land holdings to returns from capital holdings resulting in elites being more willing to extend schooling to the population.

Consistent with the theory, we find that higher levels of land inequality (higher values for Land Gini), greater abundance of Arable Land, and lower Initial Income result in lower risks of exceeding the 50% schooling threshold, thereby implying greater delays in the expansion of schooling opportunities. More precisely, the posterior inclusion probabilities of Land Gini, Arable Land, and Initial Income are all very high at 98.9%, 97.8%, and 100%, respectively - well above the 50% prior inclusion probability. The corresponding posterior means for all three variables are also strongly significant at the 1% level. The BMA results are confirmed by the results from the posterior mode models. Accounting for model uncertainty by averaging across models delivers the same conclusions as doing so by selecting (the best) models.

Table 4 also makes clear that it is inequality in land ownership specifically, and not other (non-land) forms of inequality (as proxied for by Auto Registration and BFLZ Gini Index) that is important in determining schooling delays. The posterior inclusion probability for both Auto Registration and BFLZ Gini Index are negligible at 7.2% and 11.9% respectively. The posterior means for both variables are also not significant. Finally, neither Auto

Registration nor BFLZ Gini Index appears as a covariate in either of the two posterior mode models.[8]

Two sets of factors that can be interpreted as country fixed effects are shown to be strongly significant. The first is the delay in a country gaining independence relative to the US. We find, predictably, that countries that took more time to gain independence, so that the relevant elites required more time to attain autonomous control over policies, also faced longer delays in achieving an extension of schooling opportunities to the population, all else equal. The posterior inclusion probability of the Independence variable is 100% and significant at the 1% level. Along with gaining autonomy over a country's policies, the level of Political Instability (elites' hold over power) is also important (with posterior inclusion probability of 100%) and highly significant at the 1% level. Our BMA findings (consistent with those of the other reported models) indicate that a greater degree of Political Instability, all else equal, leads to longer delays in reaching the 50% schooling threshold. Finally, being either a British colony or some other colony that is not French, Spanish, or Portuguese results in a shorter delay in achieving schooling take-off. The posterior inclusion probabilities for the British colony and Other colony dummies are both very high at 95.5% and 100%, respectively, and the corresponding coefficient estimates are strongly significant.

None of the other growth theories appear to be either significant or important (in terms of posterior inclusion probabilities) explanations for delays in achieving the schooling threshold. Importantly, the results in Table 4 make clear that there is no evidence that initial institutions (as measured by Initial Executive Constraints) affects schooling delays. The posterior inclusion probability for Initial Executive Constraints is well below 50% at 15.2%, and the posterior mean is not significant. Initial Executive Constraints also does not appear in either of the posterior mode models.

Finally, the two posterior mode models are very similar (they differ only in the inclusion/exclusion of Ethnic Fractionalization) and have posterior model probabilities that are very close (0.194 and 0.175). Outside of these two models, the other models in the model space have very low posterior probability, and are therefore not reported. For example, the third best model in the model space has negligible posterior model probability (0.076), and the largest model has posterior model probability of 0.000.

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[8] In Table A2 of the Appendix, we consider the robustness of our results to dropping either one or both of the inequality variables, Auto Registration and BFLZ Gini Index. We find that our results are generally robust to these alternative specifications.

In sum, our findings appear to provide strong support for the hypothesis that schooling delays are entirely explained by variables suggested by GMVs theory.

3 Long-run implications of delays in take-offs

3.1 Current institutions and schooling

We next turn to the question of whether land inequality has long-term implications for economic performance via its influence on schooling delays. We do this in two steps. In this section, we take the first step by examining whether (historical) delays in the extension of public schooling generate persistent outcomes in current schooling and current institutional quality of a country. In the next section, we will take the next step and investigate the influence of (historical) schooling delays on long-run per capita income via its effect on the (current) measures of schooling and institutional quality considered in this section.

There is general agreement in the literature that the processes of institutions and schooling are highly persistent (see for example Acemoglu, Johnson, and Robinson (2001) and Glaeser, La Porta, Lopez-De-Silanes, and Shleifer (2004)). However, there is disagreement over the the role of other historical factors in determining current institutions and schooling. In a seminal paper, Acemoglu, Johnson, and Robinson (2001) argued that the mortality rate of European settlers in the colonies was the key factor that determined their decision to settle. Since these early European colonizers were more likely to establish higher quality institutions in lands in which they chose to settle, they thereby influenced the formation of early institutions in the colonies. The effect of these early institutions was thought to be persistent, so that these initial/historical institutions became important determinants of the current institutions of a country.

However, Glaeser, La Porta, Lopez-De-Silanes, and Shleifer (2004), using a limited schooling sample from 1960-2000, produced evidence that suggests an alternative channel through which early European settlers influenced the development of subsequent institutions. Glaeser et al suggest that what European colonizers brought with them to the colonies they settled were not the institutions from their home countries, but rather the high levels of human capital that they possessed. It is this early human capital that was responsible for sustaining the quality of institutions of a country and allowed the latter to persist over time.

More recently, Gallego (2010) has argued for the reverse. Gallego considers human capital accumulation to be a consequence of the development of democratic political structures. He appends the story by Acemoglu, Johnson, and Robinson (2001) by hypothesizing that European colonizers who chose to settle in a location were more likely to invest in human capital for their children and for the native population, while those who set up extractive states would have very little reason to do so. Gallego finds that institutions are responsible for current (as well as historical) schooling levels.

Our analysis of the influence of land inequality on long-run outcomes via its effects on schooling delays allows us to revisit the debate over the historical determinants of current institutions and schooling. With the exception that our primarily interest is in documenting the effects of land inequality on contemporaneous outcomes, the perspective we adopt is not very different from the papers cited above. Different levels of land inequality resulted in variations in the delay in which countries achieved large scale extension of schooling opportunities. If the process for schooling is persistent, then, we should find that current levels of schooling are influenced by historical delays in achieving particular schooling thresholds. If human capital accumulation is required for sustaining high quality of institutions, then, we should also observe that shorter delays in achieving particular thresholds of human capital levels in the past should correlate with better quality institutions now.

To address this question, we consider the regressions of current institutions, $R_{T,i}$, and current schooling, $H_{T,i}$, in equations (3.1) and (3.2), respectively.

$$R_{T,i} = \mu_R + \alpha_R \lambda_i + Z_i' \beta_R + e_{R,i}, \tag{3.1}$$

$$H_{T,i} = \mu_H + \alpha_H \lambda_i + Z_i' \beta_H + e_{H,i}, \tag{3.2}$$

We measure current institutions, $R_{T,i}$, using average executive constraints over the periods 1965- 1995 and 1985-1995. Our preferred measure for averages executive constraints is the period 1985-95, which is the same period average that Acemoglu, Johnson, and Robinson (2001) use for their institutions measure, and therefore allows our work to be more comparable with the findings in the existing literature. For robustness, we also include results where executive constraints are averaged across the period 1965-95; that is, the period of time after decolonization. Similarly, we measure current schooling, $H_{T,i}$, using the logarithm of average years of male secondary and higher school attainment over the periods of 1965-95 and 1985-95.

Our key determinant of both current schooling and executive constraints is the log hazard rate (Log Hazard), λ_i. The Log Hazard captures the effect of schooling delays on outcome variables and is defined as $\lambda_i = log(\lambda(t|X_i;\theta)/\lambda_0(t)) = X_i'\theta$, where θ is estimated by the Cox regression in (2.1). Z_i is a vector of additional exogenous control variables, which includes initial values of Schooling and Executive Constraints, Colonial dummies, Tropics, and Ethnic Fractionalization. We also includes proxies for a country's legal system based on British common law (Britcommon), or French civil law (Frecivil) due to La Porta, Lopez-de Silanes, Shleifer, and Vishny (1999). Legal origin, and in particular French civil law, has been found to be an important determinant of both schooling and institutions; see Glaeser, La Porta, Lopez-De-Silanes, and Shleifer (2004) and Acemoglu and Johnson (2005). The coefficients α_R and α_H capture the effect of delay in schooling on current institutions and current schooling, respectively, while $e_{R,i}$ and $e_{H,i}$ are regression error terms.

Tables 5 and 6 present the results for current Schooling and current Institutions, respectively, over the periods 1965-95 and 1985-95. We focus on the 1985-95 results and contrast them with the 1965-95 results when there is substantive disagreements between the two findings. We present model averaging (2SLS-BMA) results, the posterior mode model, as well as the largest model in the model space. We should note that the BMA methodology here differs from that employed in Section 2.3 in that the model averaging estimates refer to weighted sums of 2SLS estimates rather than PLE estimates.[9]

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[9] 2SLS-BMA has been proposed by Durlauf, Kourtellos, and Tan (2011) in the context of just identification and extended to the case of over identification by Eicher, Lenkoski, and Raftery (2009).

Table 5: Historical Determinants of Current Schooling

The table presents 2SLS-BMA results for average schooling for the periods 1965-95 and 1985-95. The posterior inclusion probability (PIP) of a variable is the sum of the posterior probabilities models that include that variable. The posterior mean (PM) is the average of the coefficient estimates (COEF) of individual models weighted by posterior probability. The posterior standard error (PSE) is the BMA estimate for the standard error (SE) taking model uncertainty into account. All reported standard errors refer to heteroskedasticity consistent standard errors.

Panel A: Schooling in 1965-1995

	Model Averaging			Posterior Mode		Largest	
	PIP	PM	PSE	COEF	SE	COEF	SE
Constant	100.0	0.470	0.361	0.493	0.331	0.606	0.294
British Colony	16.0	-0.004	0.175	-	-	0.272	0.471
Span./Port Colony	21.6	0.042	0.237	-	-	0.216	0.374
French Colony	27.3	-0.135	0.519	-	-	-0.423	0.758
Other Colonies	26.2	0.087	0.256	-	-	0.297	0.373
Initial Exec. Constraints	17.6	0.034	0.212	-	-	0.26	0.504
Initial Schooling	31.6	0.150	0.385	-	-	0.366	0.547
Log Hazard	100.0	0.207	0.101	0.223	0.102	0.161	0.093
Frecivil	81.7	-0.357	0.360	-0.377	0.328	-0.543	0.336
Britcommon	19.5	-0.043	0.218	-	-	-0.538	0.577
Tropics	97.8	-0.614	0.364	-0.591	0.377	-0.694	0.284
Ethnic Fractionalization	22.9	-0.088	0.335	-	-	-0.382	0.569

Panel B: Schooling in 1985-1995

	Model Averaging			Posterior Mode		Largest	
	PIP	PM	PSE	COEF	SE	COEF	SE
Constant	100.0	0.746	0.312	0.810	0.288	0.877	0.273
British Colony	15.44	0.005	0.147	-	-	0.245	0.44
Span./Port Colony	18.36	-0.014	0.169	-	-	0.106	0.347
French Colony	14.43	-0.026	0.317	-	-	-0.127	0.699
Other Colonies	25.41	0.069	0.203	-	-	0.283	0.331
Initial Exec. Constraints	16.6	0.023	0.165	-	-	0.169	0.437
Initial Schooling	28.19	0.114	0.318	-	-	0.284	0.499
Log Hazard	100	0.185	0.09	0.193	0.090	0.149	0.088
Frecivil	62.9	-0.201	0.275	-0.287	0.278	-0.399	0.297
Britcommon	16.73	-0.018	0.16	-	-	-0.412	0.493
Tropics	97.3	-0.549	0.315	-0.558	0.314	-0.579	0.262
Ethnic Fractionalization	21.63	-0.073	0.29	-	-	-0.329	0.523

Table 6: Historical Determinants of Current Institutions

The table presents 2SLS-BMA results for average executive constraints for the periods 1965-95 and 1985-95. The posterior inclusion probability (PIP) of a variable is the sum of the posterior probabilities models that include that variable. The posterior mean (PM) is the average of the coefficient estimates (COEF) of individual models weighted by posterior probability. The posterior standard error (PSE) is the BMA estimate for the standard error (SE) taking model uncertainty into account. All reported standard errors refer to heteroskedasticity consistent standard errors.

Panel A: Executive Constraints in 1965-1995

	Model Averaging			Posterior Mode		Largest	
	PIP	PM	PSE	COEF	SE	COEF	SE
Constant	100.0	0.500	0.153	0.511	0.110	0.598	0.175
British Colony	33.8	-0.075	0.163	-	-	-0.080	0.187
Span./Port Colony	17.4	0.003	0.076	-	-	-0.009	0.181
French Colony	65.7	-0.265	0.315	-0.430	0.295	-0.441	0.272
Other Colonies	30.6	-0.051	0.119	-	-	-0.182	0.199
Initial Exec. Constraints	98.9	0.504	0.249	0.568	0.232	0.599	0.196
Initial Schooling	13.3	0.006	0.096	-	-	0.079	0.226
Log Hazard	99.3	0.071	0.035	0.064	0.031	0.055	0.031
Frecivil	30.5	-0.041	0.111	-	-	-0.110	0.185
Britcommon	56.0	-0.186	0.243	-0.305	0.192	-0.368	0.236
Tropics	68.9	-0.140	0.154	-0.227	0.136	-0.200	0.137
Ethnic Fractionalization	15.5	-0.015	0.114	-	-	-0.014	0.241

Panel B: Executive Constraints in 1985-1995

	Model Averaging			Posterior Mode		Largest	
	PIP	PM	PSE	COEF	SE	COEF	SE
Constant	100.0	0.691	0.115	0.694	0.087	0.753	0.138
British Colony	31.1	-0.086	0.174	-	-	-0.066	0.164
Span./Port Colony	15.5	0.007	0.052	-	-	0.069	0.139
French Colony	90.3	-0.448	0.263	-0.504	0.226	-0.479	0.217
Other Colonies	17.5	-0.016	0.068	-	-	-0.048	0.157
Initial Exec. Constraints	98.7	0.530	0.206	0.557	0.187	0.549	0.160
Initial Schooling	13.9	0.008	0.074	-	-	0.033	0.178
Log Hazard	89.7	0.044	0.027	0.046	0.021	0.039	0.021
Frecivil	17.7	-0.013	0.064	-	-	-0.087	0.155
Britcommon	77.0	-0.342	0.248	-0.450	0.159	-0.412	0.199
Tropics	78.4	-0.164	0.126	-0.210	0.100	-0.210	0.092
Ethnic Fractionalization	19.5	-0.030	0.113	-	-	-0.069	0.201

There are two main findings for current Schooling. First, there is no evidence that initial institutions is an important determinant of current Schooling once we control for Log Hazard. The posterior inclusion probability of Initial Executive Constraints from the BMA analysis is far below the 50% prior at 16.6% for the 1985-95 period, and the posterior mean is not significant. The posterior mode model in this exercise has posterior model probability of 11.8% which is slightly more than twice as large as that for the next best model (at 5.2%). Nevertheless, a posterior model probability of 11.8% is not large, and therefore we prefer the BMA results. In any case, Initial Executive Constraints does not appear in the posterior mode model. Second, the only determinant that is both an important (in terms of posterior inclusion probability) as well as a significant determinant of current Schooling is the Log Hazard. The posterior inclusion probability for Log Hazard is 100% and the posterior mean is significant at the 5% level. Hence, land inequality appears to exert a strong influence on current Schooling via its effect on the (historical) delay in schooling.

The main finding for current Executive Constraints is that both initial institutions and schooling delays appear to be important determinants. The posterior inclusion probabilities for both Initial Executive Constraints and Log Hazard are high at 98.7% and 89.7%, respectively. However, for the 1985-95 period, the posterior mean for Initial Executive Constraints is significant at the 5% level while that for Log Hazard is not significant. This result for the posterior mean for Log Hazard, however, appears to be confined to the 1985-95 BMA exercise. The corresponding posterior mean for the 1965-95 period is significant at the 5% level. Also, Log Hazard is a variable that is included in the posterior mode models in both the 1985-95 and 1965-95 exercises. In both these cases, the posterior mean for Log Hazard is significant at the 5% level. Nevertheless, in both exercises, the evidence for the posterior mode model relative to other models in the model space was not overwhelming, and hence we continue to rely on the evidence from the BMA exercises, which, as we saw, turns out to be ambiguous across the two periods for Log Hazard.

Our analysis highlights the importance of land inequality in influencing both current institutions and schooling through the former's impact on delaying the extension of schooling opportunities. In particular, our findings agree with both Acemoglu et al and Glaeser et al. Early institutions do play a critical role in determining current institutions, but so do the initial conditions surrounding early human capital accumulation. However, at least for the sample of countries we have, we do not find evidence for an important role of early institutions in determining current human capital levels. The main explanation for the variation of current human capital levels appears to be variations in the ability of countries to substantially extend schooling opportunities early on in the development process. In turn, a key determinant of delays in reaching early schooling milestones is the inequality of land ownership.

3.2 Long-run economic performance

We now extend the analysis in the previous section to investigate the implications of schooling delays on long-run economic performance. The results from the previous section suggest that this would be accomplished through both the current schooling and current institutions channels. To facilitate our analysis, we employ the canonical cross-country income regression framework along the lines of Hall and Jones (1999), Acemoglu, Johnson, and Robinson (2001), and Glaeser, La Porta, Lopez-De-Silanes, and Shleifer (2004), which is standard in the growth literature. This regression is given by equation (3.3) that takes the form of a linear regression of log GDP per capita in 1995 on current institutions, $R_{T,i}$, schooling, $H_{T,i}$, and other factors, Z_i that include Tropics, Ethnic Fractionalization, and colonial dummies,

$$y_{T,i} = \mu_y + \alpha_y R_{T,i} + \beta_y H_{T,i} + Z_i' \gamma_y + e_{y,i}, \tag{3.3}$$

Our identification strategy exploits the variation in the cross-country distribution of land inequality and its effect on the delay of the extension of public schooling. As put forth by Engerman and Sokoloff (2002) and GMV, variations in initial climatic conditions are responsible for the distribution of land inequality. In areas where conditions are conducive for the cultivation of large scale crops, land ownership tends to be concentrated in the hands of a small group of elites. However, in areas where only small holdings are possible, land ownership tends to be more dispersed. We posit that the historical inequality of land ownership would not constitute a direct determinant of long-run income.

To the extent that we can conceive of climatic conditions as being randomly assigned to countries, we are then able, in the spirit of Acemoglu, Johnson, and Robinson (2001), to assume our key exclusion restriction. As argued in the previous section, land inequality can assert an influence over long-run income via its effect on schooling delays, which in turn affects contemporaneous determinants of current income, such as current institutions and schooling. We therefore instrument current Schooling with the Log Hazard.

However, we urge the reader to view the results in this section as being purely suggestive. As pointed out by Brock and Durlauf (2001), it is very difficult to obtain strong causal statements using cross-country growth regressions because very many factors (some of which would be invariably omitted even with a large model space) potentially determine long-run growth, and it is very difficult to argue that proposed instrumental variables are orthogonal to these factors. We therefore urge the reader to consider our findings within the environment of the existing literature, and to think of our findings as being only comparable to the existing findings in the literature that would also invariably suffer from the same criticism.

Our main strategy employs the Log Hazard and Initial Executive Constraints as instruments for current Schooling and current Executive Constraints, respectively. Table 7 presents our main findings for the two alternative periods: 1965-95 and 1985-95. Panel A shows BMA-2SLS results, which include the posterior inclusion probability of each variable, as well as the corresponding posterior mean and posterior standard error. We also present results for the posterior mode model as well as the largest model. Panel B presents the first-stage results.

The first stage results confirm that the Log Hazard and Initial Executive Constraints are good instruments for current Schooling and current Executive Constraints. In the first stage regression of current Executive Constraints, Initial Executive Constraints is strongly significant at the 1% level. This is true for both time periods. Similarly, the Log Hazard is also strongly significant at the 1% level for both time periods in the first stage regression for current Schooling. Finally, note that in all cases the F-statistics are well above 10 that suggest that our instruments are not weak.

In the second stage current income regression, for both time periods, we find that both current Executive Constraints and current Schooling are important determinants of long-run income. The posterior inclusion probability for both these variables are very high at close to 100%. However, while both the current Executive Constraints and current Schooling are very likely to be variables in the true model, once we account for model uncertainty, only current Schooling turns out to have a (highly) significant impact (at the 1% level) on long-run income. Our findings suggest, therefore, that land inequality has an ultimate and important influence on long-run income via the human capital channel.

Next, we provide two robustness exercises to our main strategy reported in Tables 8-9.

Table 7: Long-run Income Regression: including schooling (just identification)

The table presents 2SLS-BMA results for log per capita income in 1995 using fitted Log Hazard and Initial Executive Constraints as instruments for current schooling and executive constraints, respectively. The posterior inclusion probability (PIP) of a variable is the sum of the posterior probabilities models that include that variable. The posterior mean (PM) is the average of the coefficient estimates (COEF) of individual models weighted by posterior probability. The posterior standard error (PSE) is the BMA estimate for the standard error (SE) taking model uncertainty into account. All reported standard errors refer to heteroskedasticity consistent standard errors. Panel B presents the first stage results for both Executive Constraints and Schooling for 1965-95 and 1985-1995.

Panel A: Second stage results

	Model Averaging			Posterior Mode		Largest		Model Averaging			Posterior Mode		Largest	
	PIP	PM	PSE	COEF	SE	COEF	SE	PIP	PM	PSE	COEF	SE	COEF	SE
Constant	100.0	8.031	0.269	8.078	0.249	7.815	0.304	100.0	7.292	0.290	7.271	0.294	7.029	0.342
British Colony	100.0	-0.681	0.132	-0.679	0.118	-0.770	0.215	100.0	-0.539	0.155	-0.531	0.149	-0.678	0.212
Span./Port Colony	14.2	-0.004	0.076	-	-	0.033	0.226	13.1	-0.001	0.085	-	-	-0.014	0.212
French Colony	8.9	0.041	0.146	-	-	0.547	0.280	8.4	0.024	0.109	-	-	0.355	0.260
Other Colonies	14.8	-0.016	0.113	-	-	-0.112	0.300	17.7	-0.042	0.159	-	-	-0.272	0.269
Exec. Con., 1965-95	99.8	0.809	0.559	0.829	0.552	0.801	0.540	-	-	-	-	-		
Schooling, 1965-95	100.0	0.983	0.287	0.945	0.298	1.117	0.341	-	-	-	-	-		
Exec. Con., 1985-95	-	-	-	-	-	-	-	99.7	1.032	0.607	1.010	0.606	1.103	0.596
Schooling, 1985-95	-	-	-	-	-	-	-	99.7	1.128	0.346	1.146	0.318	1.246	0.400
Tropics	48.9	-0.102	0.198	-0.212	0.232	-0.163	0.288	35.3	-0.061	0.179	-	-	-0.128	0.284
Ethnic Fractionalization	4.7	0.018	0.116	-	-	0.583	0.359	3.5	0.015	0.110	-	-	0.609	0.384

Panel B: First stage results

	1965-95				1985-95			
	Exec. Con.		Schooling		Exec. Con.		Schooling	
	COEF	SE	COEF	SE	COEF	SE	COEF	SE
Constant	0.552	0.082	0.443	0.158	0.704	0.087	0.761	0.139
British Colony	-0.312	0.139	0.043	0.262	-0.343	0.145	0.068	0.211
Span./Port Colony	-0.047	0.094	-0.089	0.176	0.048	0.080	-0.115	0.148
French Colony	-0.462	0.089	-0.633	0.190	-0.490	0.108	-0.277	0.160
Other Colonies	-0.181	0.089	0.149	0.230	-0.039	0.099	0.180	0.205
Initial Exec. Con.	0.526	0.127	0.250	0.252	0.459	0.135	0.157	0.200
Log Hazard	0.063	0.016	0.193	0.043	0.045	0.017	0.174	0.042
Tropics	-0.180	0.087	-0.594	0.170	-0.192	0.078	-0.506	0.146
Ethnic Fractionalization	-0.038	0.162	-0.498	0.279	-0.088	0.150	-0.414	0.269
F-stat	35.41		25.15		17.01		28.67	

Table 8: Long-run Income Regression (over identification)

The table presents 2SLS-BMA results for log per capita income in 1995 using an over-identification strategy based on the results in Tables 6 and 5 as the first stage. Panel A presents the results when we account for the effect of both current schooling and executive constraints while Panel B presents the results for the case when we exclude the effect of current schooling. The posterior inclusion probability (PIP) of a variable is the sum of the posterior probabilities models that include that variable. The posterior mean (PM) is the average of the coefficient estimates (COEF) of individual models weighted by posterior probability. The posterior standard error (PSE) is the BMA estimate for the standard error (SE) taking model uncertainty into account. All reported standard errors refer to heteroskedasticity consistent standard errors.

Panel A: Including Schooling

	Model Averaging			Posterior Mode		Largest		Model Averaging			Posterior Mode		Largest	
	PIP	PM	PSE	COEF	SE	COEF	SE	PIP	PM	PSE	COEF	SE	COEF	SE
Constant	100.0	8.107	0.321	8.362	0.117	7.829	0.243	100.0	7.331	0.374	7.160	0.218	7.061	0.280
British Colony	99.5	-0.693	0.161	-0.660	0.148	-0.742	0.199	96.0	-0.530	0.193	-0.527	0.140	-0.549	0.203
Span./Port Colony	14.0	0.011	0.091	-	-	0.064	0.226	14.6	0.014	0.100	-	-	0.010	0.218
French Colony	13.0	0.003	0.124	-	-	0.091	0.312	15.5	0.014	0.159	-	-	0.219	0.243
Other Colonies	12.5	-0.003	0.103	-	-	0.027	0.252	13.5	-0.013	0.123	-	-	-0.106	0.293
Exec. Con., 1965-95	49.8	0.612	0.742	-	-	1.315	0.418	-	-	-	-	-	-	-
Schooling, 1965-95	97.1	1.087	0.338	1.321	0.129	0.791	0.256	-	-	-	-	-	-	-
Exec. Con., 1985-95	-	-	-	-	-	-	-	67.5	0.815	0.675	1.134	0.402	1.408	0.478
Schooling, 1985-95	-	-	-	-	-	-	-	99.9	1.269	0.304	1.181	0.236	1.060	0.314
Tropics	24.8	-0.083	0.203	-	-	-0.364	0.263	16.6	-0.032	0.132	-	-	-0.198	0.284
Ethnic Fractionalization	13.2	0.018	0.137	-	-	0.174	0.335	13.3	0.015	0.148	-	-	0.185	0.371

Panel B: Excluding Schooling

	Model Averaging			Posterior Mode		Largest		Model Averaging			Posterior Mode		Largest	
	PIP	PM	PSE	COEF	SE	COEF	SE	PIP	PM	PSE	COEF	SE	COEF	SE
Constant	100.0	7.505	0.254	7.239	0.338	7.566	0.362	100.0	6.862	0.498	6.799	0.430	6.925	0.514
British Colony	99.9	-0.822	0.201	-0.694	0.232	-0.860	0.268	60.1	-0.254	0.275	-0.199	0.238	-0.484	0.266
Span./Port Colony	16.1	-0.026	0.118	-	-	-0.139	0.269	19.0	-0.041	0.156	-	-	-0.279	0.254
French Colony	12.8	0.014	0.121	-	-	0.029	0.327	28.6	0.228	0.437	-	-	0.448	0.387
Other Colonies	12.6	0.005	0.116	-	-	-0.020	0.350	13.4	-0.009	0.161	-	-	-0.212	0.407
Exec. Con., 1965-95	100.0	2.723	0.331	2.980	0.378	2.704	0.420	-	-	-	-	-	-	-
Exec. Con., 1985-95	-	-	-	-	-	-	-	100.0	2.981	0.508	3.053	0.456	3.080	0.550
Tropics	97.2	-0.703	0.264	-	-	-0.646	0.286	91.2	-0.681	0.334	-	-	-0.542	0.318
Ethnic Fractionalization	13.0	-0.016	0.169	-0.568	0.433	-0.078	0.464	24.4	-0.128	0.327	-0.869	0.437	-0.204	0.475

Table 9: Long-run Income Regression: excluding schooling (just identification)

The table presents 2SLS-BMA results for log per capita income in 1995 using initial institutions as instrument for current institutions. The posterior inclusion probability (PIP) of a variable is the sum of the posterior probabilities models that include that variable. The posterior mean (PM) is the average of the coefficient estimates (COEF) of individual models weighted by posterior probability. The posterior standard error (PSE) is the BMA estimate for the standard error (SE) taking model uncertainty into account. All reported standard errors refer to heteroskedasticity consistent standard errors. Panel B presents the first stage results for Executive constraints for 1965-95 and 1985-1995.

Panel A: Second stage results

	Model Averaging			Posterior Mode		Largest		Model Averaging			Posterior Mode		Largest	
	PIP	PM	PSE	COEF	SE	COEF	SE	PIP	PM	PSE	COEF	SE	COEF	SE
Constant	100.0	8.038	0.260	8.002	0.241	8.194	0.331	100.0	7.600	0.370	7.552	0.351	7.750	0.450
British Colony	100.0	-0.704	0.189	-0.717	0.176	-0.636	0.244	99.9	-0.460	0.230	-0.448	0.211	-0.500	0.240
Span./Port Colony	16.8	-0.031	0.112	-	-	-0.087	0.245	25.7	-0.080	0.180	-	-	-0.280	0.230
French Colony	12.8	-0.016	0.107	-	-	-0.191	0.291	12.3	0.010	0.120	-	-	-0.040	0.340
Other Colonies	20.0	0.058	0.157	-	-	0.243	0.269	14.6	0.020	0.130	-	-	0.010	0.320
Exec. Con., 1965-95	100.0	1.865	0.339	1.892	0.333	1.752	0.353	-	-	-	-	-	-	-
Exec. Con., 1985-95	-	-	-	-	-	-	-	100.0	2.110	0.430	2.132	0.416	2.070	0.450
Tropics	98.9	-0.820	0.237	-0.852	0.204	-0.763	0.272	98.2	-0.840	0.260	-0.907	0.202	-0.690	0.290
Ethnic Fractionalization	20.3	-0.085	0.237	-	-	-0.427	0.363	21.8	-0.090	0.260	-	-	-0.370	0.400

Panel B: First stage results

	1965-95		1985-95	
	Exec.Con.		Exec.Con.	
	COEF	SE	COEF	SE
Constant	0.718	0.082	0.820	0.070
British Colony	-0.397	0.163	-0.400	0.160
Span./Port Colony	-0.073	0.105	0.030	0.090
French Colony	-0.652	0.081	-0.620	0.090
Other Colonies	-0.174	0.112	-0.030	0.110
Initial Exec. Con.	0.616	0.144	0.520	0.140
Tropics	-0.223	0.100	-0.220	0.080
Ethnic Fractionalization	-0.237	0.166	-0.230	0.150
F-stat	19.45		13.86	

First, we employ the same income regression as in Table 7, but account for both second stage and first stage model uncertainty along the lines of Eicher, Lenkoski, and Raftery (2009). In particular, we instrument current Executive Constraints and current Schooling using the full set of historical determinants from Tables 5 and 6 to compute the 2SLS-BMA estimates. We report the results from this over-identified exercise in Table 8. Panel A of Table 8 confirms that the results we obtained for the just-identified case in Table 7 for Schooling are robust to the inclusion of additional instruments. As in the latter case, the posterior inclusion probabilities for Schooling are close to 100% for both time periods. The posterior means are also always strongly significant at the 1% level. However, the findings for current Executive Constraints are significantly weakened from before. Now, current Executive Constraints is found to be a far less important determinant of current income. Its posterior inclusion probability has dropped from close to 100% in Table Table 7 to 49.8% and 67.5% for the periods 1965-95 and 1985-95, respectively. Its posterior mean remains insignificant for both periods.

As a further robustness check, we also report results that drop current Schooling from the model space. These results are reported in Table 9 and Table 8 (Panel B), and correspond to those in Tables 7 and 8 (Panel A), respectively. This exercise provides a check that we are able to verify the existing results in the literature (e.g., Acemoglu, Johnson, and Robinson (2001) and Glaeser, La Porta, Lopez-De-Silanes, and Shleifer (2004)) that find a major role for institutional quality in determining cross-country differences in economic development. For example, Acemoglu, Johnson, and Robinson (2001) was able to do so using log settler mortality to instrument for current institutions. Unfortunately, we could not use the preferred instrument of Acemoglu, Johnson, and Robinson (2001) because it severely restricts our sample. However, when we drop current Schooling from the income regression (3.3), we find that current Executive Constraints is an important and highly significant determinant of long-run income. This result is consistent with the findings in the existing literature and is, therefore, precisely what we expected to find.

In terms of the other growth determinants, we find that British Colony negatively affects income at the 1% significant level and with a posterior inclusion probability of 1. This finding is consistent with the findings of Acemoglu, Johnson, and Robinson (2001). As pointed out by Acemoglu et al, a possible explanation for the negative effect of British Colony on income is that researchers are overestimating the negative quality of institutions for French colonies, and the second-stage effect of British colony is correcting for this. We also find that Ethnic

Fractionalization and Tropics are not robust determinants of long-run economic performance. Interestingly, when we consider the effect of Schooling the posterior inclusion probability of Tropics is always below 50% with a negative but insignificant effect (see Tables 7 and 8 (Panel A)). However, when we do not consider the effect of Schooling (see Table 8 (Panel B)), Tropics appears to play an important role with posterior inclusion probability of 97.2% and 91.2% and a negative and strongly significant effect at the 1% and 5% levels, for the periods of 1965-95 and 1985-95, respectively. Our reading of this result is that Tropics is masking the correlation of geography with land inequality, which in turn is the key determinant of schooling in the first stage.

Overall, our findings highlight the important role that human capital accumulation plays in determining long-run economic performance. Since land inequality has been shown to be a key factor in determining human capital accumulation, it is therefore a crucial fundamental determinant of economic outcomes.

4 Conclusion

This paper accomplishes three things. First, we confirm the direct predictions of the theory of Galor, Moav, and Vollrath (2009) that higher levels of land inequality result in delays in the implementation of human capital enhancing policies. Using new historical data by Frankema (2009), we test the importance of land inequality as a determinant of delays in the extension of schooling opportunities against alternatives theories. Next, we examine the effect of schooling delays on contemporaneous determinants of long-run income; specifically, current institutions and human capital formation. Our findings suggest new channels through which land inequality potentially affects long-run economic performance. Finally, we contribute to the ongoing debate in the growth literature over whether it is the historical level of human capital or the historical quality of institutions that is ultimately responsible for long-run economic performance. While our findings do not allow us to assert the primacy of either of these deep determinants, they do suggest a stronger role for human capital. We certainly do not find evidence to support the hypothesis that initial institutions determine current schooling levels. Rather, our work concludes that it is land inequality and the incentives it provides to elites to delay the extension of schooling opportunities that ultimately results in the failure of countries to launch economically through the effects of schooling delays on both current schooling levels and quality of institutions.

Table A1: Data Appendix

Variable	Description
Delay in Schooling	Following the methodology of Comin and Hobijn (2004), we construct historical data for primary schooling enrollments, measured as the number of students in primary school as a fraction of population between 5-14. First, we verify the dataset of Comin and Hobijn (2004), which is limited to 23 industrialized countries and then expand it to 53 countries. Using this new dataset we create the delay in schooling variable, which is the time the time it takes for each country to first reach a threshold level in primary schooling enrollment, minus the time it took the first country to pass that threshold. Source: Mitchell (1998) for the population data; Banks (1999) for the number of students.
Initial Income	Log of GDP per capita, where for the colonies we use the independence date or earliest available, and for the non-colonies the average of earliest possible until 1831 (threshold for 50%). Source: Maddison (2009).
Income in 1995	Log of GDP per capita 1995. Source: Maddison (2009).
Initial Schooling	Primary schooling enrollments is based on authors' calculations using historical schooling data. For colonies we use the independence date (or earliest available if the independence not available). For non-colonies, we use the earliest available. Source: Mitchell (1998), Banks (1999).
Schooling	Logarithm of average years of male secondary and higher school attainment (25+), average for the periods 1965- 1995 and 1985-1995. Source: Barro and Lee (2010).
Initial Executive Constraints	Institutional variable with the lowest value 0 indicating unlimited executive authority and 1 executive parity or subordination. For the colonies we use the independence date or earliest available, and for the non-colonies the average of earliest possible until 1831 (threshold for 50%). Source: Polity IV.
Executive constraints	Institutional variable with the lowest value 0 indicating unlimited executive authority and 1 executive parity or subordination, average for the periods 1965- 1995 and 1985-1995. Source: Polity IV.
Auto Registration	Number of passenger cars (excluding tractors and similar vehicles) in use. Numbers typically derived from registration and licensing records, meaning that vehicles out of use may occasionally be included. We divide the variable to population and then multiply by 10. We use data over the period 1895-1978. Source: Comin and Hobijn (2004).
BFLZ Gini Index	BFLZ Gini Index is based on a large number of observations of within country inequality spanning from 1820-1995. For non-colonies we use earliest available and for colonies we use the Independence date and if not available we use the earliest available after Independence. In particular, the Gini Index is based on direct income Gini estimates; estimates of the net household or expenditure Ginis; Ginis based on income shares; Williamson index, which is the ratio between GDP per capita and real wages of unskilled laborers; and height inequality data. Source: Van Zanden, Baten, Földvari, and Van Leeuwen (2011).

Table A1 continued

Variable	**Description**
Land Gini	The gini coefficient of the size distribution of land. For all countries we use the earliest observation available. We use data over the period 1880-1999. Source: Frankema (2009).
Arable Land	Log of arable land (absolute) in hectares, in 1700. Source: Ramankutty and Foley (1999)
Independence	Independence The time it takes for each country to declare independence relative to the United States who declared independence in 1776. Source: CIA Factbook.
Tropics	Percentage of land area classified as tropical and subtropical via the Koeppen-Geiger system. Source: CID at Harvard.
Ethnic Fractionalization	Variable which combines racial and linguistic characteristics. Source: Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003).
Colonial Dummies	Coded zero or one. One indicates that country was colonized by Britain, France, Spain or Portugal. Source: CIA Factbook
Political Instability	Political Instability is measured as the average of the first differences (in absolute values) of the Polity2 variable from Polity IV. The Polity2 variable is a measure of the degree of democracy in a country with a score of +10 representing most democratic and -10 signifying most autocratic. The averages of the first differences are calculated as follows: for colonies we average values of the (absolute) year-to-year changes in the Polity2 variable from the year of independence to the year the colony achieves the schooling threshold, while for non-colonies, we take the corresponding average values from the earliest available observation until the year the country achieves the schooling threshold. Source: Polity IV.
Frecivil	Coded zero or one. It indicates that a country was colonized by France, Spain, Belgium, Portugal or Germany and French legal code was transferred. Source: La Porta, Lopez-de Silanes, Shleifer, and Vishny (1999).
Britcommon	Coded zero or one. It indicates that a country was colonized by Britain and English legal code was transferred. Source: La Porta, Lopez-de Silanes, Shleifer, and Vishny (1999).

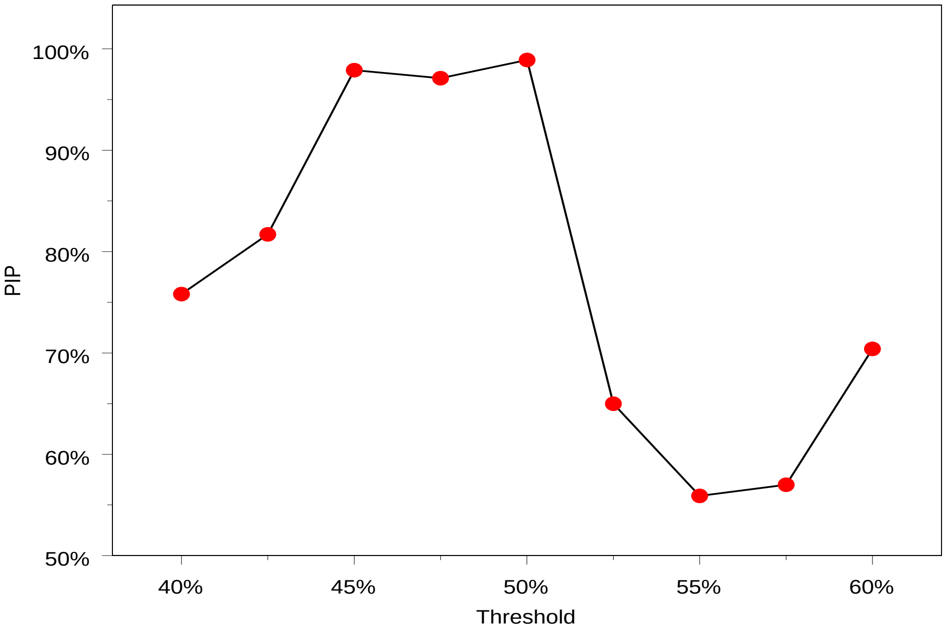
Table A2: Hazard Model for the Delay in Primary Schooling

The table presents BMA results for the Cox-PH duration model for four different model spaces. The posterior inclusion probability (PIP) of a variable is the sum of the posterior probabilities models that include that variable. The posterior mean (PM) is the average of the partial likelihood coefficient estimates (COEF) of individual models weighted by posterior probability. The posterior standard error (PSE) is the BMA estimate for the standard error (SE) taking model uncertainty into account. All reported standard errors refer to heteroskedasticity consistent standard errors.

	Model Averaging I							Model Averaging II						
	BMA			Posterior Mode Models				BMA			Posterior Mode Models			
	PIP	PM	PSE	COEF	SE	COEF	SE	PIP	PM	PSE	COEF	SE	COEF	SE
Initial Income	100	1.424	0.461	1.456	0.390	1.423	0.400	100	1.423	0.466	1.456	0.390	1.423	0.400
Land gini	98.6	-6.58	2.112	-6.844	1.924	-6.857	2.156	98.9	-6.643	2.081	-6.844	1.924	-6.857	2.156
Arable Land	97.3	-0.423	0.161	-0.422	0.125	-0.424	0.137	97.8	-0.425	0.158	-0.422	0.125	-0.424	0.137
British Colony	94.5	2.156	0.918	2.307	0.613	2.283	0.621	95.5	2.199	0.896	2.307	0.613	2.283	0.621
Span./Port. Colony	11.8	-0.059	0.273	-	-	-	-	9.6	-0.048	0.247	-	-	-	-
French Colony	17.6	0.248	0.737	-	-	-	-	17.4	0.256	0.751	-	-	-	-
Other Colonies	100	2.67	0.784	2.623	0.644	2.662	0.630	100	2.687	0.785	2.623	0.644	2.662	0.630
Independence	100	-0.023	0.005	-0.024	0.005	-0.023	0.004	100	-0.024	0.005	-0.024	0.005	-0.023	0.004
Political Instability	100	-2.393	0.884	-2.313	0.741	-2.576	0.823	100	-2.392	0.886	-2.313	0.741	-2.576	0.823
Initial Executive Constraints	17.3	0.163	0.515	-	-	-	-	15.2	0.141	0.479	-	-	-	-
Tropics	14.8	-0.073	0.269	-	-	-	-	13.6	-0.07	0.262	-	-	-	-
Ethnic Fractionalization	39	-0.538	0.826			-1.411	0.698	37.6	-0.519	0.817			-1.411	0.698
Auto Registration	-	-	-	-	-	-	-	6.4	-0.012	0.438	-	-	-	-
BFLZ Gini Index	-	-	-	-	-	-	-	11.9	0.199	0.832	-	-	-	-
Wald Statistic				42.79		41.02					42.79		41.02	
Posterior Model Probability				0.237		0.214					0.194		0.175	

	Model Averaging III							Model Averaging IV						
	BMA			Posterior Mode Models				BMA			Posterior Mode Models			
	PIP	PM	PSE	COEF	SE	COEF	SE	PIP	PM	PSE	COEF	SE	COEF	SE
Initial Income	100	1.42	0.461	1.456	0.390	1.423	0.400	100.0	1.430	0.470	1.456	0.390	1.423	0.400
Land gini	98.8	-6.633	2.091	-6.844	1.924	-6.857	2.156	98.7	-6.600	2.100	-6.844	1.924	-6.857	2.156
Arable Land	97.6	-0.425	0.159	-0.422	0.125	-0.424	0.137	97.5	-0.420	0.160	-0.422	0.125	-0.424	0.137
British Colony	95.2	2.185	0.905	2.307	0.613	2.283	0.621	94.9	2.170	0.910	2.307	0.613	2.283	0.621
Span./Port. Colony	10.3	-0.051	0.255	-	-	-	-	10.9	-0.050	0.260	-	-	-	-
French Colony	17.5	0.256	0.753	-	-	-	-	17.5	0.250	0.740	-	-	-	-
Other Colonies	100	2.684	0.786	2.623	0.644	2.662	0.630	100.0	2.670	0.780	2.623	0.644	2.662	0.630
Independence	100	-0.024	0.005	-0.024	0.005	-0.023	0.004	100.0	-0.020	0.010	-0.024	0.005	-0.023	0.004
Political Instability	100	-2.391	0.886	-2.313	0.741	-2.576	0.823	100.0	-2.390	0.880	-2.313	0.741	-2.576	0.823
Initial Executive Constraints	16.2	0.151	0.494	-	-	-	-	16.1	0.150	0.500	-	-	-	-
Tropics	14.5	-0.074	0.27	-	-	-	-	13.7	-0.070	0.260	-	-	-	-
Ethnic Fractionalization	37.4	-0.516	0.815	-	-	-1.411	0.698	39.0	-0.540	0.830	-	-	-1.411	0.698
Auto Registration	-	-	-	-	-	-	-	7.2	-0.010	0.470	-	-	-	-
BFLZ Gini Index	12.7	0.212	0.858	-	-	-	-	-	-	-	-	-	-	-
Wald Statistic				42.79		41.02					42.79		41.02	
Posterior Model Probability				0.207		0.187					0.220		0.199	

Figure A1: Posterior inclusion probabilities for various schooling thresholds



References

Acemoglu, A., S. Johnson, and J. Robinson, 2001, The Colonial Origins of Comparative Development : An Empirical Investigation, *American Economic Review* 91, 1369–1401.

——— , 2006, Economic Backwardness in Political Perspective, *American Political Science Review* 100, 115–131.

Acemoglu, D., and A. Johnson, 2005, Unbundling Institutions, *Journal of Political Economy* 113, 949–995.

Alesina, A., R. Baqir, and W. Easterly, 1999, Public goods and ethnic divisions, *Quarterly Journal of Economics* 114, 1243–1284.

Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat, and R. Wacziarg, 2003, Fractionalization, *Journal of Economic Growth* 8, 155–194.

Banerjee, A., and L. Iyer, 2005, History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure Systems in India, *American Economic Review* 95, 1190–1213.

Banks, A, 1999, *Cross-National Time-Series Data Archive* (Binghamton, New York: Databanks International).

Barro, B. J., and J.-W. Lee, 2010, A New Data Set of Educational Attainment in the World, 1950 to 2010, NBER Working Papers, 15902.

Bourguignon, F., and C. Morrisson, 2002, Inequality among world citizens: 1890-1992, *American Economic Review* 92, 1190–1213.

Brock, W., and S. D. Durlauf, 2001, Growth Empirics and Reality, *World Bank Economic Review* 15, 229–272.

Ciccone, A., and M. Jarocinski, 2010, Determinants of Economic Growth: Will Data Tell?, *American Economic Journal: Macroeconomics* 2, 222–246.

Comin, D., and B. Hobijn, 2004, Cross-Country Technological Adoption: Making the Theories Face the Facts, *Journal of Monetary Economics* 51, 39–83.

Cox, D. R., 1972, Regression Models and Life Tables, *Journal of the Royal Statistical Society Series B* 34, 187–220.

Desmet, K., and P. Parente, 2009, The Evolution of Markets and the Revolution of Industry: A Unified Theory of Growth, CEPR Discussion Paper 7290.

Durlauf, S.N., A. Kourtellos, and C.M. Tan, 2011, Is God in the Details? A Reexamination of the Role of Religion in Economic Growth, *Journal of Applied Econometrics*, forthcoming.

Durlauf, S. N., A. Kourtellos, and C. M. Tan, 2008, Are Any Growth Theories Robust?, *Economic Journal* 118, 329–346.

Eicher, T. S., A. Lenkoski, and A. E. Raftery, 2009, Bayesian Model Averaging and Endogeneity Under Model Uncertainty: An Application to Development Determinants, Working Paper, University of Washington.

Engerman, S., and K. Sokoloff, 2002, Factor Endowments, Inequality and Paths of Development Among New World Economies, NBER Working Papers, 9259.

Fernandez, C., E. Ley, and M. Steel, 2001, Model Uncertainty in Cross-Country Growth Regressions, *Journal of Applied Econometrics* 16, 563–576.

Frankema, Ewout, 2009, The Colonial Roots of Land Inequality: Geography, Factor Endowments, or Institutions?, *Economic History Review* 63, 418–451.

Gallego, F. A., 2010, Historical Origins of Schooling: The Role of Democracy and Political Decentralization, *The Review of Economics and Statistics* 92, 228–243.

Galor, O., and O. Moav, 2006, Das Human Kapital: A Theory of the Demise of the Class Structure, *Review of Economic Studies* 73, 85–117.

——— , and D. Vollrath, 2009, Inequality in Land Ownership, the Emergence of Human Capital Promoting Institutions, and the Great Divergence, *Review of Economic Studies* 76, 143–179.

Galor, O., and D. Weil, 2000, Population, Technology, and Growth: From Malthusian Stagnation to the Demographic Transition and Beyond, *American Economic Review* 90, 806–828.

Glaeser, E. L., R. La Porta, F. Lopez-De-Silanes, and A. Shleifer, 2004, Do Institutions Cause Growth, *Journal of Economic Growth* 9, 271–303.

Goldin, C., and L.F. Katz, 1997, Why the United States Led in Education: Lessons from Secondary School Expansion, 1910 to 1940, NBER Working Papers, 6144.

Hall, R. E., and C. I. Jones, 1999, Why Do Some Countries Produce So Much More Output Per Worker Than Others?, *Quarterly Journal of Economics* 114, 83–116.

Hansen, G., and E. C. Prescott, 2001, Malthus to Solow, *American Economic Review* 92, 1205–17.

La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. W. Vishny, 1999, The Quality of Government, *Journal of Law, Economics and Organization* 15, 222–279.

Maddison, A., 2009, *Statistics on World Population, GDP, and Per Capita GDP, 1-2006 AD*.

Masanjala, W., and C. Papageorgiou, 2008, Rough and Lonely Road to Prosperity: A Reexamination of the Sources of Growth in Africa Using Bayesian Model Averaging, *Journal of Applied Econometrics* 23, 671–682.

Miller, M. K., 2011, Democracy by Example? Economic Growth, Policy Diffusion, and Regime Change., Princeton, mimeo.

Mitchell, B.R, 1998, *International Historical Statistics: The Americas, Africa, Asia,Oceania, and Europe 1750-1993* (MacMillan Press).

Parente, S., and E. Prescott, 2000, *Barriers to Riches* (MIT Press).

Rajan, R. G., and R. Ramcharan, 2010, Land and Credit: A Study of the Political Economy of Banking in the United States in the Early 20th Century, *Journal of Finance* (forthcoming).

Ramankutty, N., and J. A. Foley, 1999, Estimating historical changes in global land cover: Croplands from 1700 to 1992, *Global Biogeochemical Cycles* 13, 997–1027.

Sachs, J., J. L. Gallup, and A. Mellinger, 1999, Geography and Economic Development, *International Regional Science Review* 22, 172–232.

Sala-i Martin, X., G. Doppelhofer, and R. Miller, 2004, Determinants of Long-term Growth: a Bayesian Averaging of Classical Estimates (BACE) Approach, *American Economic Review* 94, 813–835.

Van Zanden, J.L, J. Baten, P. Földvari, and B. Van Leeuwen, 2011, The Changing Shape of Global Inequality: Exploring a new dataset, Center for Global Economic History (CGEH), No. 1, CGEH working paper series.

Volinsky, C., D. Madigan, A. Raftery, and R. Kronmal, 1997, Bayesian Model Averaging in Proportional Hazards Model: Predicting the Risk of a Stroke, *Applied Statistics* 46, 443–448.