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Abstract

The recent growth literature has seen an explosion of work exploring the role of new and fundamental theories of growth such as geography, institutions, ethnic fractionalization, and religion. Nevertheless, claims about the empirical validity of these new growth theories are typically made within very particular specifications of the growth model. In this paper, we investigate the robustness of these theories when the researcher appropriately accounts for model uncertainty. We first consider the robustness of these theories within the canonical growth regression framework. We then deviate from this framework to explore the impact of these new growth theories on the components of growth – TFP growth and physical and human accumulation rates – derived from a growth accounting exercise. We find very little evidence to support the contention that any of the new growth theories play an important and robust role in explaining growth and its components. We find instead that variation in growth may be robustly explained by differences in macroeconomic policies and unknown heterogeneity associated with regional groupings. We also find that, consistent with endogenous growth models, physical and human capital externalities are the main determinants of TFP growth.

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1. Introduction

In this paper, we attempt to accomplish three things. First, we want to uncover robust statistical relationships between a rich set of growth theories and growth of income per worker in the context of the canonical growth regression by taking model uncertainty seriously. Here, we engage in a horserace in the context of the vast number of theories and model specifications that have been proposed (and for which evidence has been adduced) in the empirical growth literature.

Second, we shift the focus of the analysis from canonical linear growth regressions to the analysis of components of growth via a growth accounting identity: total factor productivity (TFP) growth, physical capital accumulation, and human capital accumulation. Specifically, we assess the role of the various growth theories on each of these components of growth. In other words, we hypothesize that differences in the determinants of each theory of growth explain differences in productivity growth and factors of accumulation and then use a model averaging methods to uncover their robust relationships.

Third, we wish to understand the extent to which the robust theories matter for growth in terms of actual cross-section variation. Our idea here is to develop variance decompositions for growth regressions that allow one to assess the contribution of various growth theories in explaining variation in cross-country income growth rates via the components of growth. This approach will move beyond efforts to determine whether one growth determinant affects another, to a systematic examination of the distribution of configurations of fundamental determinants and their collective ability to explain growth differences.

Our investigation of the variance decomposition of growth components is related to several earlier contributions that studied TFP and factors of accumulation. Hall and Jones (1999) show that an index of social infrastructure across countries plays a major in explaining differences in productivity and the factors of accumulation. Aiyar and Feyrer (2002) study the links between human capital accumulation and growth in TFP. They find that while productivity is the most important determinant of per capita income, the accumulation of human capital plays a major role in determining TFP growth. Bernanke and Gürkaynak (2001) find that saving rates of human and physical capital as well as the growth rate of the labor force is correlated with TFP growth. They interpret this finding as evidence against the standard Solow model. In the same spirit, Feyrer (2005) provides evidence that workforce demographics are strongly correlated with productivity and output. All these studies attempt to explain specific features of TFP growth and/or the factors of accumulation.

A more general approach was undertaken by Wong (2003) who regresses the components of growth from a growth accounting decomposition (that is TFP growth, physical and human capital accumulation) on various growth determinants. He finds that TFP growth is what accounts for conditional convergence and not factor accumulation. Our work in this paper is closest in spirit to Wong. However, we differentiate from him at least in three key points. First, we consider externalities in the model space of the TFP growth regression. This allows us to account for possible misspecifications in the production function. Second, we emphasize growth theories as opposed to growth determinants. Third, we account for model uncertainty using model averaging methods.

Model averaging methods have been successfully employed by work such as Brock and Durlauf (2001), Fernandez, Ley and Steel (2001), Doppelhofer, Miller, and Sala-i-Martin (2004) and Masanjala, and Papageorgiou (2005), and Durlauf, Kourtellos, and Tan (2006) to evaluate various empirical claims on growth. This methodology has also proven useful in both macroeconomics (Brock, Durlauf, and West (2006) and Cogley and Sargent (2004)) and in economic forecasting (Garratt et al (2003)). In model averaging analysis, one does not condition on a particular set of theories and their proxies. Rather, one considers a universe of alternative specifications, each of which is a growth model. Information from each model is employed to draw empirical conclusions about the question of interest.

Overall, our results suggest that many of the new growth theories – geography, institutions, and ethnic fractionalization – proposed by the recent literature are not robust determinants of growth. This is certainly true for our canonical growth regression results. Here, variation in growth experiences across countries appears better explained by good macroeconomic policies as well as variables that represent essentially unknown heterogeneity in region-specific characteristics.

It is also true, however, for the components of growth that we obtained via a growth accounting exercise. There is little evidence that any of the new growth theories proposed in the recent growth literature are robust determinants of any of the three growth components. Instead, our findings; in particular, the result that the factor that is primarily responsible for explaining cross-country variations in TFP growth is production externalities, suggest to us that more attention needs to be paid in the literature to exploring possible nonlinearities and heterogeneities that are implied by the "old growth theories" based on production non-convexities and technological spillovers.

Section 2 of this paper formalizes our growth regression and growth accounting exercises. Section 3 details our strategy for addressing model uncertainty using model averaging. Section 4 describes our data. Section 5 presents our findings and Section 6 concludes.

2. Growth Regressions and Growth Accounting

We conduct our analysis in three steps. First, we start by investigating the robust theories that determine the growth rate of income per worker within the canonical framework of linear cross-country growth regressions. Second, we decompose the growth rate of income per worker into productivity growth, physical capital accumulation, and human capital accumulation using a standard growth accounting decomposition. Then we apply model averaging exercises for the models of productivity growth, physical capital accumulation, and human capital accumulation to uncover robust links, if any, between each of the component and the theories of growth. Third, we develop a variance decomposition for growth regressions along the lines of Klenow and Rodriguez-Clare (1997) to further assess the role of each theory of growth in explaining the differences in the components of growth as well as in growth per se.

As emphasized by Hall and Jones (1999), productivity differences play a key role in explaining cross country income differences. Another advantage of this kind of analysis is that it avoids making any assumption about whether countries are on or in transition to a balanced growth path. Therefore we believe that by pursuing this route of analysis we will enhance our understanding of the factors that explain differences in economic performance.

2.1 Canonical Growth Regression Analysis

The form of the canonical linear growth regression is

$$g_{y,i,t} = R_{i,t}\gamma + Y_{i,0}\beta + S_{i,t}\delta + \varepsilon_{i,t} \tag{1}$$

where $g_{y,i,t}$ is the average growth rate of output per worker for country *i* across a time period $[t, t+T]$, $R_{i,t}$ denotes the variables that measure net factor accumulation in the *Neoclassical Growth* theory (Solow (1956), Mankiw, Romer, and Weil (1992)) – the saving rates of physical and human capital accumulation, and population growth rates plus 0.05. $Y_{i,0}$ is the logarithm of initial income per worker. Under the neoclassical growth framework, a negative coefficient to $Y_{i,0}$ (i.e., $\beta < 0$), is interpreted as evidence that poorer countries are catching up with richer countries after controlling for heterogeneity (i.e., "conditional convergence"). $S_{i,t}$ denotes a set of new growth theories $S_1, S_2, ..., S_K$ that go beyond the neoclassical model.

As we show in Section 4 below, the idea is to include a large enough set of growth theories so that the model space is sufficiently comprehensive and appropriately represents the state of the literature. This set therefore includes 7 broad classes of growth theories: *Demography* (Feyrer (2005)), *Macroeconomic Policy*, *Religion* (Barro and McCleary (2003) and Sala-i-Martin (1997)), *Regional Heterogeneity*, *Geography* (Rodrik et al (2002) and Sachs (2003)), *Fractionalization* (Easterly and Levine (1997), Alesina et al (2003)), and *Institutions* (Acemoglu, Johnson, and Robinson (2001) and Acemoglu and Johnson (2005)). In turn, we proxy each theory using various determinants, say for theory j we have $S_j \equiv (X_{j,1}, X_{j,2}, ..., X_{j,p_j})$. These determinants are chosen to reflect those that are typically used by proponents of each growth theory.

It is worth noting, however, that the above set of 8 broad classes of growth theories (including *Neoclassical Growth*) includes both proximate and fundamental theories. The problem is that the effect of a fundamental theory can be eschewed when the fundamental theory (e.g. *Institutions*) is endogenous with respect to a proximate theory that is also present in the model space (e.g. *Macroeconomic Policy*). To allow for this possibility we consider two model spaces. We consider a model space that includes both *Proximate and Fundamental* Theories. This space includes all 8 growth theories as described above. We also consider a shorter model space that includes only the *Fundamental Theories* (*Religion, Geography, Fractionalization, and Institution*). Please refer to the data section for a full description of the determinants of each theory.

2.2 Component Growth Analysis

Following Rodríquez-Clare and Klenow (2005) and Caselli (2005) we assume a Cobb-Douglas production function taking physical capital, human capital from schooling, and productivity as inputs[1]

$$y_{i,t} = A_{i,t} k_{i,t}{}^{\alpha} h_{i,t}{}^{1-\alpha} \tag{2}$$

where $y_{i,t}$ is the output per worker, the $k_{i,t}$ is the physical capital stock per worker, $h_{i,t}$ is human capita stock per worker, and $A_{i,t}$ is the total factor productivity (TFP) that measures how efficiently country i transforms its inputs into output. As in Caselli (2005) we further assume that country i 's capital stock has a Mincerian form

$$h_t = e^{\phi(s_t)} \tag{3}$$

[1] We also tried an alternative growth accounting methodology that assumes a labor augmenting measure of productivity (see Hall and Jones (1999)) $y_{i,t} = k_{i,t}{}^{\alpha} \left(A_{i,t} h_{i,t} \right)^{1-\alpha}$ and decomposes the growth rate of output per worker in terms of capital intensity $g_y = \left(\frac{\alpha}{1-\alpha} \right) g_{K/Y} + g_h + g_A$. Our results on TFP growth appear to be similar.

where $s_{i,t}$ is the average years of schooling in country i at time t and $\phi(s_{i,t})$ is an increasing function that is assumed to be piecewise linear with 0.13 for $s \leq 4$, 0.10 for $4 < s \leq 8$, and 0.07 for $8 \leq s$.[2] The function $\phi(\cdot)$ measures the efficiency of a unit of labor with *E* years of schooling relative to one with no schooling. Finally, we assume that the share of capital (α) is constant across countries and equal to 1/3. Gollin (2002) provided evidence that such an assumption is reasonable.

We can then decompose the growth rate of output per worker as

$$g_y = \alpha g_k + (1-\alpha) g_h + g_A \tag{4}$$

where $g_y = \dot{y}/y$, $g_k = \dot{k}/k$, $g_h = \dot{h}/h$, and $g_A = \dot{A}/A$.

This decomposition suggests that the determinants based on growth theories $S_{i,t}$ must affect growth via TFP growth, physical capital accumulation, and human capital accumulation. To examine the relative importance of each of these theories on the components of the decomposition we specify the following regression models

$$g_{A,i,t} = S_{i,t}\gamma_A + E_{i,t}\delta + u_{1,i,t} \tag{5}$$

$$g_{k,i,t} = S_{i,t}\gamma_k + u_{2,i,t} \tag{6}$$

$$g_{h,i,t} = S_{i,t}\gamma_h + u_{3,i,t} \tag{7}$$

where $g_{A,i,t}$ is the growth of TFP, $g_{k,i,t}$ is the accumulation of physical capital, and $g_{h,i,t}$ is the accumulation of human capital. $E_{i,t}$ denotes *Externalities* or *other possible misspecifications* in the production function (e.g. CES production function). As

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[2] Specifically we have $\phi(s) = 0.134 \cdot s$ if $s \leq 4$, $\phi(s) = 0.134 \cdot 4 + 0.101 \cdot (s-4)$ if $4 < s \leq 8$, $\phi(s) = 0.134 \cdot 4 + 0.101 \cdot 4 + 0.068 \cdot (s-8)$ if $8 < s$.

Rodríquez-Clare and Klenow (2005) note externalities play a major role in explaining growth and development.

To understand the nature of *Externalities* consider the general production function

$$y_{i,t} = A_{i,t} k_{i,t}^{\beta_k(w_{0,i,t})} h_{i,t}^{\beta_h(w_{0,i,t})} \tag{8}$$

where $\beta_k(w_{0,i,t})$ and $\beta_h(w_{0,i,t})$ are the elasticities of physical capital per worker and human capital per worker, respectively. These elasticities depend on some initial conditions w_0 such as initial income per worker or initial human capital. This specification allows for increasing returns to scale as it does not restrict the elasticities to sum up to one. Furthermore, we allow these elasticities to vary across countries and over time.

To relate this general production function to (1) we can rewrite (1) as

$$y_{i,t} = A_{i,t} k_{i,t}^{\alpha} h_{i,t}^{1-\alpha} z_{i,t} \tag{9}$$

where $z_{i,t} = k_{i,t}^{\gamma_k(w_{0,i,t})} h_{i,t}^{\gamma_h(w_{0,i,t})}$.

Suppose that the true production function is (8) but we calculate the TFP growth based on (1), then it must be the case that terms associated with physical capital externality, $\gamma_k(w_0)g_k$ and human capital externality, $\gamma_h(w_0)g_h$, explain TFP growth, where $\gamma_k(w_0)$ and $\gamma_h(w_0)$ are some unknown functions of initial conditions.

A similar idea is found in Mammuneas, Savvides, and Stengos (2006) who study the impact of human capital growth on the growth of TFP by allowing only for human capital externalities. In contrast, our framework accounts for both physical and human capital externalities. Here, for simplicity we assume that $\gamma_k(w_0) = \gamma_{k,0} + \gamma_{k,1} w_0$ and $\gamma_h(w_0) = \gamma_{h,0} + \gamma_{h,1} w_0$, where $\gamma_{k,0}, \gamma_{k,1}$, $\gamma_{h,0}$, and $\gamma_{h,1}$ are constants. It is worth noting that $\gamma_k(w_0)$ and $\gamma_h(w_0)$ are related to the income per worker elasticity of the physical and capital accumulations. More precisely, the income per worker elasticity of the physical capital accumulation is $d\ln(y_w)/d\ln(k)=\alpha+\gamma_k(w_0)$ and the income per worker elasticity of human capital accumulation is $d\ln(y_w)/d\ln(h)=(1-\alpha)+\gamma_h(w_0)$.

While standard empirical practice consists of investigating more than one model/specification to ensure various claims are not fragile, the growth literature has not systematically investigated the robustness of the various growth theories in explaining the components of TFP growth and factors of accumulation. We propose to do this by explicitly allowing for model uncertainty.

In the next section, we explain our strategy for dealing with model uncertainty.

3. Model uncertainty

3.1 Discussion

As pointed out by Brock and Durlauf (2001) and others, exploring the quantitative consequences of new growth theories presents unique challenges to researchers. These difficulties arise to a large extent because the nature of growth theories is such that they are inherently *open-ended*. By theory open-endedness, Brock and Durlauf refer to the idea that, in general, the statement that a particular growth theory is relevant does not logically preclude other theories of growth from also being relevant. This means that an evaluation of the statistical relationship between the effect of a growth theory on growth needs to account for the presence or absence of other growth theories that exist in the empirical literature. Theory open-endedness, therefore, leads to considerable *theory uncertainty* in explaining growth. In addition, growth researchers also frequently encounter *specification uncertainty*. New growth theories often do not naturally translate into specific regressors. Rather, the theories are qualitative in the sense that multiple empirical proxies exist for each theory.

The problem with theory and specification uncertainty (which we collectively refer to as *model uncertainty*) is that they frequently render inference on objections of interest fragile (see, Leamer (1983)). Dealing with model uncertainty is therefore of first-order importance if we are to identify the growth theories that exhibit robust evidential support for a linkage to growth and its components.

We propose to evaluate the evidentiary robustness of growth theories by employing model averaging methods. Suppose that each growth theory *j* is appropriately proxied by p_j different regressor variables. For instance, researchers have posited that geography may have an important role to play in explaining cross-country growth divergence. They further suspect that the way in which geography affects growth is through climate (which may affect the soil fertility or disease ecology of a location) or perhaps also through physical accessibility (which may affect transportation costs and therefore the returns to engaging in industrialization and trade). Proponents of geography as theory of growth would therefore collect various measures of climatic conditions as well as geographic isolation to investigate their theory.

Consider, for example the growth equation given by (1) above. Suppose that a parameter vector δ_j characterizes the effects of the set of growth variables (e.g., climate and isolation variables) of interest corresponding to theory *j* (e.g., Geography). A standard frequentist exercise constructs estimates of this parameter that are conditional on *D*, the available data, and *m,* the specification of a model, where models are given in the form of (1) but are differentiated by the choice of control variables. For convenience, denote the estimated parameters of interest as $\hat{\delta}_{j|D,m}$. Frequentist estimates of the uncertainty of the parameter estimate, i.e. standard errors, may similarly be conceptualized as both data and model dependent. As such, this sort of calculation means that prior knowledge is assumed about the "true" growth process; i.e., that it is adequately described by model *m*.

Our aim instead is to derive estimates and standard errors for the parameters once uncertainty over models has been properly accounted for. That is, instead of engaging in the analysis of a particular $\hat{\delta}_{j|D,m}$ or a small set of estimates whose differences are based on perturbations of a baseline model, we want to calculate objects that are interpretable as $\hat{\delta}_{j|D,M}$, i.e. parameter estimates that condition on *M*, the collection of candidate models for the true growth process; we subsequently refer to *M* as the *model space*.

How is such a general model space defined? Operationally, one specifies a set of potential growth controls and constructs all possible combinations of the elements of this space. Each combination of elements defines one of the candidate models of the form (1).

The idea is to then "integrate out" uncertainty over models by taking an average of model-specific results $\hat{\delta}_{j|D,m}$ using model weights $\mu(m|D)$, i.e.

$$\hat{\beta}_{R|D,M} = \sum_{m \in M} \hat{\beta}_{R|D,m} \mu(m|D) \tag{10}$$

As shown in Brock and Durlauf (2001), we can then obtain an estimate for uncertainty over the parameter estimates using,

$$\hat{\sigma}^2_{\delta|D,M} = \sum_{m \in M} \hat{\sigma}^2_{\delta|D,m} \mu(m \mid D) + \sum_{m \in M} \left(\hat{\delta}_{j|D,m} - \hat{\delta}_{j|D,M}\right)^2 \mu(m \mid D) \tag{11}$$

Finally, if we can interpret the model weights $\mu(m|D)$ as posterior probabilities; i.e., the probability that model m is the "true" model given the data, then this method also allows for a simple strategy for assessing the likelihood that a given theory is included in the "true" model. To do so, we simply compute the sum, $\sum_{m \in M} \mu(m \mid D, m \in A)$, where A is the event "at least one proxy variable for the theory is included in the model". That is, we calculate the posterior probability that a theory is in the "true" model by summing up the posterior model probabilities conditional on such an event occurring.

3.2 Implementation

3.2.1 Model posteriors and within-model posteriors

How should one understand our model weights as posterior model probabilities? One solution is to pursue a full Bayesian analysis[3], cf. Raftery et al (1997), etc. Using Bayes' rule

[3] However, we prefer the interpretation developed by Doppelhofer, Miller, and Sala-i-Martin (2004) that our robustness exercise is a Bayesian average of classical estimates. In other words, we will use model weights that have an interpretation as model probabilities; Brock, Durlauf and West (2003) call this approach a pseudo-frequentist analysis. We note that this approach is advocated in statistics papers

$$\mu\left(m|D\right) \propto \mu\left(D|m\right)\mu\left(m\right) \tag{12}$$

so that each weight is the product of the likelihood of the data given a model, $\mu\left(D|m\right)$, and the prior probability for a model, $\mu\left(m\right)$. In an important work, Raftery (1995) showed that if one assumes that the regressors are nonrandom and regression errors are i.i.d. normal with known variance, then under a diffuse prior on the regression coefficients, we can approximate the log of the likelihood $\mu(D \mid m)$ with the BIC. Furthermore, the posterior density of the coefficient will have the property that the posterior mean and variance equal the OLS estimate and variance covariance matrix. We follow Raftery's approach in this paper. For robustness, we will also alternatively employ the AIC adjustment in place of the BIC[4].

3.2.2 Model priors

This leaves us with the need to specify the model priors $\mu\left(m\right)$. This turns out to be a nontrivial task. At first glance, it would appear reasonable that if a researcher does not have any a priori information to distinguish between models, she should assign equal prior weights to each model. This is, in fact, the standard practice in the literature; i.e., where there is uncertainty over which of the *p* regressors in M are present, each of the 2^p models in the model space is assigned probability 2^{-p}. This is equivalent to assuming that the prior probability that a given variable is present in the "true" model is 0.5 independent of the presence or absence of any of the other *p* regressors in the model. And in fact this prior is the most commonly used one in the model averaging literature.

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including Candolo, Davison, and Demétrio (2003); see also Hjort and Claeskens (2003) and Hansen (2006) for development of statistical theory.

[4] Chipman, George, and McCulloch (2001) show that weighting models according to AIC or BIC is equivalent to a decision problem where Bayesian model averaging is carried out using priors over within-model parameters of the normal-inverse gamma form (calibrated to particular values) and uniform model priors, and where the objective is to minimize a general information criterion with a particular fixed penalty for complexity.

This uniform prior across models, however, ignores interrelations between different variables. As argued in Brock and Durlauf (2001) and Brock, Durlauf and West (2003), the probability that one variable affects growth may be logically dependent on whether others do. They describe this phenomenon as being analogous to the irrelevance of independent alternatives (IIA) in the discrete choice literature.

Why is the IIA problem of particular importance in our context? Recall that one of our key aims is to evaluate the relative importance of various growth *theories*; where a theory is operationally a set of growth variables. Therefore, in principle, what a researcher would want to do is to start by being agnostic about the a priori validity of growth theories, and then examine the posterior evidence in favor of or against each of these theories after viewing the data. However, if the uniform prior is employed, a researcher could arbitrarily increase or reduce the prior weights across *theories* simply by judiciously introducing "redundant" proxy variables (in the sense of George (1999)) for some of these theories.

To handle these interdependencies across theories created by the introduction of redundant variables, we set the prior probability that a particular *theory* – that is, the set of proxy variables classified under that theory – is included in the "true" model to 0.5 to reflect non-information across theories. This prior specification also assumes that theories are independent in the sense that the inclusion of one theory in a model does not affect the probability that some other theory is also included.

This leads us to the question of how to assign priors across the set of variables within each theory. More specifically, given that a theory is in the "true" model, how do we assign priors to each of the models that are generated as a permutation of the set of proxy variables for this theory? As we mentioned above, growth empirics suffer from specification uncertainty. Specification uncertainty results in dependencies between potentially irrelevant proxy variables *within* theories. If we ignore these dependencies by assigning uniform weights across all possible combinations of variables classified under each theory, then analogous to the discussion above, we would end up putting excess prior weights on many similar, but not very informative combinations while taking weight away from more unique and informative alternatives.

To deal with this problem, we introduce a version of George's (1999) *dilution priors*. Given that a theory T is a priori relevant, we assign to each possible combination of variables classified under this theory γ_T the following conditional prior probability,

$$\mu^D(\gamma_T) = \left|R_{\gamma_T}\right| \prod_{j=1}^{p_T} \pi_j^{\gamma_j} \left(1-\pi_j\right)^{1-\gamma_j} \tag{13}$$

where p_T is the number of proxy variables for theory T, $\pi_j = 0.5$ for $j = 1,..., p_T$, and R_{γ_T} is the correlation matrix for the set of variables included in γ_T. Since $|R_{\gamma_T}|$ goes to 1 when the set of variables are orthogonal and 0 when the variables are collinear, these priors are designed to penalize models with many "redundant" variables while preserving weights on unique and informative combinations. Figure 1 shows our model priors as represented by a hierarchical tree structure. [5]

4. Data

We employ an unbalanced panel dataset (see Table 1) over three periods 1965-74 (53 countries), 1975-84 (54 countries), and 1985-94 (57 countries). For the canonical growth regression (1) the dependent variable is the average growth rate of real per worker GDP corresponding to the three periods. For the component growth regressions of TFP growth, physical capital accumulation, and human capital accumulation we use the data constructed in Section 2.2. Data for income are from PWT 6.1 while data for capital per worker are from Caselli (2005). The schooling data used to calculate human capital stocks are from Barro and Lee (2000).

As mentioned in Section 2.1 above, we organize the determinants of growth into 8 theories. The *Neoclassical Growth* variables consist of real per worker GDP in the initial

[5] Other proposals to deviate from "flat" model priors have been advanced in the literature. For instance, Sala-i-Martin, Doppelhofer, and Miller (2004) alter the probability of variable inclusion in order to give greater weight to models with a small number of regressors. Brown, Vannucci, and Fearn (1998, 2002) assume that the probability a given variable is included is itself a random variable drawn from some distribution. This allows different variables to be included with different probabilities. However, the IIA assumption remains common to these approaches.

year of each of the three periods (i.e., 1965, 1975, and 1985), the logarithm of the average percentage of a country's working age population in secondary school (see Bernanke and Gurkaynak (2001)), the logarithm of the average investment to GDP ratio, and the logarithm of population growth plus 0.05 over the corresponding periods.

Demography is proxied using the reciprocal of life expectancy at age 1 in 1960, 1970, and 1980, and the log of the total fertility rate in 1960, 1970, and 1980. Following Barro (1996), we measure *Macroeconomic Policy* using three proxies. We use average ratios for each period of exports plus imports to GDP (filtered for the relation of this ratio to the logs of population and area) average ratios for each period of government consumption (net of outlays on defense and education) to GDP, and the consumer price inflation rate for each period.

With regards to *Religion* we deviate from previous studies (see Barro and McCleary (2003) and Durlauf, Kourtellos, and Tan (2005)) by not using religiosity measures. We do this for two main reasons. First, we have found in Durlauf, Kourtellos, and Tan (2005) that religiosity is not a robust theory of growth and second, it restricts the sample to only about 35 countries. Hence, to minimize the loss of information we opt to proxy Religion using just religion shares. Using data from Barrett (1980) and Barrett et al (2001) we construct data on Religion Shares. They include adherent shares for Catholic, Eastern, Hindu, Jewish, Muslim, Orthodox, Protestant, and Other religions for the years 1970, 1980, and 1990. Each religion share is defined as the fraction adhering to the specified religion among persons who expressed adherence to some religion. The Catholic fraction is omitted from the regressions and thus each coefficient should be interpreted relative to the Catholic share.

Following Rodrik, Subramanian, and Trebbi (2002) and Sachs (2003), we proxy *Geography* using a climate variable – the percentage of a country's land area classified as tropical and subtropical via the Koeppen-Geiger system (KGATSTR) – as well as a measure of geographic accessibility/isolation – the percentage of a country's land area within 100km of an ice-free coast (LCR100KM). With regards to *Regional Heterogeneity*, we employ a dummy variable for East Asian countries, a dummy for Sub-Saharan African countries, and a dummy for Latin American and Caribbean countries. The theory of *Ethnic Fractionalization* is proxied by a measure of linguistic fractionalization (LANG) due to Alesina et al (2003) as well as a measure of "the degree of tension within a country attributable to racial, nationality, or language divisions" (ETHTENS) from the International Country Risk Guide.

To measure the effect of *Institutions*[6] we employ four different measures that attempt to capture different aspects of institutions. Following Acemoglu, Johnson, and Robinson (2001), we use a measure of the risk of expropriation of private investments (EXPRSK) as well as a measure of constraints on executive power (EXCON) to proxy property rights institutions. A third proxy measures the role of institutions supporting private contracts (contracting institutions); see Acemoglu and Johnson (2005). We proxy this with an index of legal formalism (CHECK) that measures the number of procedures for collecting on a bounced check developed by Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2002). A fourth proxy measures the quality governance using a composite governance index (KKZ96) developed by Kaufmann, Kraay and Mastruzzi (2005). This index is the average of following six indicators: voice and accountability, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and control of corruption.

As instruments we use earlier or initial values if available with the exception of inflation, religion shares, and legal formalism (CHECK). For Inflation we use as instruments the colonial dummy for Spain or Portugal and for religion shares we use the corresponding shares in 1900. Following Acemoglu and Johnson (2005) we use dummies for British and French legal origins as an instrument for CHECK. We also tried to use log settler mortality as an instrument for expropriation risk but unfortunately it severely restricts our samples so we opted not to use it.

In the regressions of TFP growth, physical capital accumulation, and human capital accumulation we also include initial income per worker and initial human capital (measured by (3)) to proxy *Initial Heterogeneity*. Furthermore, in the regression of TFP growth we include *Externalities* as proxied by the growth of physical capital, the growth human capital, the interaction term of growth of physical capital and the logarithm of

[6] It is worth noting that here, we do not view the various aspects of institutions (such as property rights and contracting institutions) as separate theories but rather we view them as different measures of one theory. For a different treatment of the model space see Durlauf, Kourtellos, and Tan (2006).

initial income or initial human capital, and the interaction term of growth of human capital and the logarithm of initial income or initial human capital.

We refer the reader to the Data Appendix for a detailed description of the variables and data.

5. Results

Using the model averaging method we described in Section 3 we show our findings for the canonical growth regression as well as for the regressions of TFP growth, physical capital accumulation, and human capital accumulation. For each regression we explore two model spaces. First, we explore a broad model space that includes both *Proximates and Fundamental Theories* and a narrow model space that only includes *Fundamental Theories.*

5.1 Findings for Canonical Growth Regression

We present our findings for the growth per worker equation (1) in Table 3. This table shows results for classical two-stage least squares (Columns 3 and 6) as well as those for BMA two-stage least squares (Columns 2 and 5) for the case where we include both proximate and fundamental determinants in the model space (Columns (1)-(3)) as well as the case where only fundamental growth determinants are in the model space (Columns (4)-(6)). Columns 1 and 4 of Table 3 provides the posterior probability that each theory or variable (as may be the case) is in the "true" model under BMA. We have also run the same exercises using least squares instead of two-stage least squares (no instruments), but we do not report these results because they are very close to the two-stage least squares findings.

5.1.1 Classical 2SLS Results

The classical estimation exercises are essentially "kitchen sink" exercises; i.e., they refer to the largest possible model in our model space (all variables included). The "kitchen sink" approach has been used in growth empirics when a "horserace" between fundamental determinants of growth is desired (see, for instance, Rodrik, Subramanian, and Trebbi (2002) and Sachs (2003)). Our "kitchen sink" results are broadly consistent with those of the existing literature.

In both cases (proximate and fundamental, and fundamental only), we find the coefficient to initial income per worker to be highly significant at the 1% level and negative. A negative coefficient on log initial income per worker is typically taken as evidence in the literature that poorer countries are, conditional on other covariates, catching up with richer countries. For the proximate and fundamental case, we also find that investment, a Solow variable, (but not population growth) is significant at the 5% level and of the correct sign (positive). We have also carried out a run where we dropped the Demography variables. In this case, the other Solow variables, scholing and population growth rates, are also significant (at the 5% and 10% levels, respectively) and of the correct signs (positive and negative, respectively). Our findings are therefore consistent with those in the existing "conditional convergence" literature.

There is also evidence in the classical 2SLS exercise for the proximate and fundamental case, that macroeconomic policies such as trade openness are significant and positive for growth while government consumption and inflation are significant and detrimental to growth. We also find, similar to Easterly and Levine (1997), Alesina et. al. (2003), and Brock and Durlauf (2001), that ethnic fractionalization has a significant negative impact on growth. In terms of religion shares, we find, in the fundamentals only case, that Eastern religion has a significant and positive partial correlation with growth, and, in both cases, that Protestant share has a significant and negative one. We also find evidence (at least in the fundamentals only case) that broad measures of institutions (KKZ96) have a significant impact on growth. These results are broadly consistent with those of Acemoglu and Johnson (2005). Finally, we find that (unexplained) regional heterogeneity plays an important role – countries in East Asia tend to grow conditionally faster.

The "kitchen sink" results are heartening in that they suggest that the model space is comprehensive enough to adequately represent the existing literature. Nevertheless, the "kitchen sink" model is simply one element in the model space. Its claims are therefore based on very specific choices of which growth determinants are included in the analysis (all of them, in this case). Since our primary aim is to investigate theories of growth that are robust to model uncertainty (and therefore not contingent on any one particular model), we turn now to our BMA results.

5.1.2 BMA 2SLS Results

The BMA results are surprisingly consistent with those for the "kitchen sink" regressions with a few important exceptions. We find robust evidence for "conditional convergence" (1% level significance for a negative coefficient to initial per worker income) for both cases. There is also robust evidence that investment is strongly significant and positively related to growth. In unreported exercises where we drop Demography from the model space, we find that population growth is also negatively and strongly related (at the 1% level) to growth. (The effect of schooling, however, remains un-robust, but this finding is largely consistent with that in the literature.) The posterior probabilities of inclusion for all three canonical Solow variables are above the 0.5 prior, and close to 1 for initial income and investment. It is around 0.7 in the reported case where Demography is included in the model space and 0.96 in the alternative specification when Demography variables are dropped.

In terms of macroeconomic policies, the importance of government consumption and inflation appear to be robust. Our BMA results for the proximate and fundamental case suggest that both government consumption and inflation have significant (at the 1% and 5% levels, respectively) negative effects on growth. The posterior probability of inclusion also suggests that both variables almost certainly factor into the "true" model. However, we were not able to confirm the robustness of the trade openness effect that we found in the "kitchen sink" regressions. The results here suggest that trade openness is less likely to be in the "true" model after we viewed the data than before we did so; its posterior probability of inclusion is around 0.41 which is lower than the 0.5 prior. Its effect on growth is also not likely to be significantly different from zero.

The biggest differences between our "kitchen sink" and BMA results, however, were for the fundamental growth determinants in the case where both proximate and fundamental growth variables were included in the model space. The results we obtained for the importance of ethnic fractionalization, religion, and institutions in the classical setting turn out to be non-robust once we account for model uncertainty in this case. In fact, only (unexplained) regional heterogeneity – specifically, the East Asia dummy – remains significant (although only marginally so). It was also found, under BMA, to have a 0.94 posterior probability of being in the "true" model.

Our BMA results, however, become more consistent with the classical estimation results (and therefore with the existing literature) when we drop the set of proximate growth determinants from the model space. In the fundamentals only exercises, we found robust evidence for the importance of Eastern and Protestant religion shares (as we did in the "kitchen sink" regression above). We also found robust evidence of the importance of institutions (KKZ96). We also found far larger effects for all three variables when we accounted for model uncertainty compared to the "kitchen sink" results. Only the ethnic fractionalization variables that were found to be important under the "kitchen sink" model turned out to be un-robust once we accounted for model uncertainty. We should note, however, that in unreported exercises where we included the regional heterogeneity variables in the fundamentals only model space, the religion and institutions variables that were found to be robust determinants of growth in column 5 of Table 3 became non-robust. In this case, only the East Asia and Sub-Saharan Africa dummies were significant (and positive and negative, respectively).

Overall, we are forced to conclude that even within the canonical linear growth regression context, many of the new growth theories – geography, institutions, ethnic fractionalization, and religion – proposed by the recent literature may not be robust determinants of growth. Only religion and institutions remain robust growth determinants, but only if we exclude the proximate growth determinants and regional heterogeneity variables from the model space. It would not be incorrect for a researcher to conclude from the data that heterogeneity in growth experiences appears better explained by variables that represent essentially unknown regional variability in characteristics rather than the new growth theories.

5.2 Growth Components Analysis

We next turn to our findings for the three components of growth as detailed in section 2.2. Table 4 presents the results for TFP growth and Tables 5 and 6 summarize the results for all three findings for the three components of growth – TFP growth, physical capital accumulation, and human capital accumulation. Again, we report results based on two model spaces for each of these components. We show results based on a broad model space that includes both Proximate and Fundamental Theories of growth and results based on a shorter model space that only includes the Fundamental Theories of growth. With regards to Externalities, we allowed the income elasticities of human and physical capital to depend on initial income or initial human capital. Nevertheless, we found similar results so we only show the results based on initial human capital.

5.2.1 Results for TFP Growth

We present our findings for the TFP growth equation (5) in Table 4. Analogous to the income growth regressions above, columns 1-3 of Table 4 show results for BMA and classical two-stage least squares for the case where both proximate and fundamental growth determinants are included in the model space while columns 4-6 show corresponding results for the case where only fundamental determinants are included in the model space.

Again, we see that there are important differences between the classical ("kitchen sink") and BMA results. The classical two-stage least squares results suggest that many theories potentially contribute toward explaining TFP growth. In the case of the broader model space based on both Proximate and Fundamental theories (columns 1-3 of Table 4), for instance, the classical estimation results suggest that TFP growth is significantly and negatively dependent on the logarithm of initial income, the growth of human capital, the interaction between the growth of human capital and initial human capital, inflation, the Muslim religion share, climate (KGATRSTR), and ethnolinguistic fractionalization (Language). TFP growth is found to be significantly and positively correlated with trade openness, being in East Asia, and having a higher Jewish religion share.

However, once we account for model uncertainty, the picture is totally different. In fact, all the variables that were found by to be important in the "kitchen sink" model turn out to have negligible posterior probability of being in the "true" model with the exception of a variable that is related to the physical capital externality. This variable is the interaction of the growth of physical capital and initial human capital and is positive and strongly significant at 1%. A similar outcome holds true when we consider the case where only the fundamental growth determinants are included in the model space (columns 4-6 of Table 4). While the classical results suggest that human capital externalities, the Muslim religion share and climate (KGATRSTR) are important determinants of TFP growth, once we account for model uncertainty, only the physical capital externality variable (i.e., the interaction between physical capital and initial human capital) is significant (at the 1% level). It is also worth noting the posterior inclusion probability of the theory of *Externalities* is close to 1.

As pointed out earlier the importance of *Externalities* may imply possible misspecifications in the production function or externalities such as increasing returns to scale. It turns out that our estimate for the income elasticity of physical capital does not justify the presence of increasing returns. For instance, in the case of the smaller model space that includes only the Fundamental theories our estimate for income elasticity of physical capital is (0.30-0.0005+0.106**Log of Initial Human Capital)* which lies between 0.43 and 0.65. These values suggest parameter heterogeneity and the formation of convergence clubs in the sense of Azariadis and Drazen (1990) rather than externalities in the form of increasing returns.

As a final point, we note that more research is needed to uncover the underlying forces driving our findings on Externalities. One way to do so may be by taking into account model uncertainty and nonlinearity along the lines of Cohen-Cole, Durlauf, and Rondina (2005). Recall that here we made various simplification by assuming that the income elasticities of physical and human capital are linear functions of initial conditions. These functions may not be linear but highly nonlinear. What is more, these functions may depend on other variables such as preferences, institutional quality, etc. This is left for future research.

5.2.2 Results for Other Growth Components

We next turn to our findings for the remaining two components of growth – physical and human capital accumulation (refer to equations (6) and (7) above). We present our BMA findings for these two components, and juxtapose them with those found above for TFP growth, in Table 5. Specifically, columns 1 and 2 of Table 5 reproduce the results from columns 2 and 5 of Table 4. Columns 3 and 4 provide BMA 2SLS results for physical capital accumulation for, respectively, the regression based on broader model space that includes both Proximate and Fundamental theories and the smaller model space that only includes Fundamental theories. Columns 5 and 6 give the corresponding results for human capital accumulation.

In both cases, we do not find many robust fundamental growth theories. Initial per worker income appears to be significant (at the 5% level) and negatively correlated with physical capital accumulation (at least for the long specification). This suggests some evidence for conditional convergence in physical capital across the set of countries. However, the reverse appears to be true for human capital accumulation. Initially richer countries appear to have (conditionally) higher human capital accumulation rates than initially poorer countries.

In the specification with both Proximate and Fundamental theories, we also find evidence that Regional Heterogeneity is important in accounting for differences in physical and human capital accumulation rates. Countries in East Asia appear to have (conditionally) higher accumulation rates for both physical and human capital while countries in Sub-Saharan Africa appear to have lower accumulation rates for physical capital. These findings are in line with Young (1994) who showed that the East Asian countries grew mainly because of factor accumulation rather than TFP growth.

In terms of the fundamental theories, we find that Institutions (constraints on the executive) has a significant impact on physical capital accumulation when proximate variables are also included in the model space (i.e., the long specification), but the Eastern religion share is significant when we do not (i.e., in the FT specification).

Recall that in our growth regression findings above (Section 5.1.2), we found that religion (Eastern and Protestant religion shares in that instance) and a broad measure of institutions (KKZ96) were robust growth determinants only if the proximate growth determinants and regional heterogeneity variables were excluded from the model space. Taken together with the results here, therefore, the evidence points not to religion and institutions as explanations for TFP growth, as it is usually conceived to be within the neoclassical framework, but as a determinant of physical capital accumulation (which in turn is an important and significant proximate determinant of growth).

For convenience, we present the posterior probabilities of theory inclusion for the theories under consideration for each of the four BMA exercises (i.e., per worker income growth, TFP growth, physical capital accumulation, and human capital accumulation) in one table (see Table 6).

Collectively, the findings for the three components of growth appear to deliver the same message as those for the linear growth regression case in Section 5.1. The evidence that any of the new fundamental growth theories proposed in the recent growth literature are robust determinants of any of these outcome variables is mixed at best. Our analysis suggests that the main factor that accounts for cross-country variations in TFP growth is Externalities rather than fundamental theories such as institutions or geography. Similarly, variations in physical and human capital accumulation rates appear primarily reliant on initial conditions and unexplained variations in regional characteristics. There is some evidence that institutions and/or religion might be important determinants of per worker income growth rates, but, again, the findings suggest that these factors are likely to affect growth rates not directly but rather through physical capital accumulation.

5.3 Variance decomposition

Given the results from the BMA exercises, we can estimate the posterior mean of each theory as $\hat{S}_j = X_{j,1}\hat{\delta}_{j,1} + X_{j,2}\hat{\delta}_{j,2} + \ldots + X_{j,p}\hat{\delta}_{j,p}$. Then, following Klenow and Rodriguez-Clare (1997) we decompose the variance of each component as follows[7]

[7] Notice that there is a conceptual limitation in using covariances for variance decomposition. Ideally, we would like to express the decomposition in terms of variances of orthogonal components.

$$1 = \sum_{j=1}^{k} \frac{Cov(g_A, \hat{S}_j)}{Var(g_A)} + \frac{Cov(g_A, \hat{e})}{Var(g_A)} \quad (14)$$

$$1 = \sum_{j=1}^{k} \frac{Cov(g_k, \hat{S}_j)}{Var(g_k)} + \frac{Cov(g_k, \hat{e})}{Var(g_k)} \quad (15)$$

$$1 = \sum_{j=1}^{k} \frac{Cov(g_h, \hat{S}_j)}{Var(g_h)} + \frac{Cov(g_h, \hat{e})}{Var(g_h)} \quad (16)$$

This decomposition can be thought of as equivalent to looking at the partial contribution of each theory rather than the contribution of each determinant alone. Again we provide the variance decomposition for both model spaces – one where both proximate and fundamental determinants are included (broad) and one where only fundamental factors are included (narrow). Table 7a presents the results for the components of growth. Columns 1 and 2 show the change in TFP growth that is associated with an increase of 1 standard deviation for each theory for the two model spaces. Columns 3 and 4, and 5 and 6 provide similar information for physical and human capital accumulation, respectively.

The results show that a key theory for explaining the variation in TFP growth is Externalities. An increase of 1 standard deviation in Externalities is associated with a 26% and 24% increase in TFP growth in, respectively, the broad and narrow model spaces. As we noted above, the new growth theories – geography, institutions, and ethnic fractionalization – that have been advanced (at least within the canonical neoclassical growth framework) as explanations for TFP growth perform poorly. Their disappointing performance extends to the case when these theories are used as explanations for variations in factors of accumulation.

The results for physical capital accumulation in the case of the model space that depends on both proximate and fundamental theories show that that only Regional Heterogeneity plays a major role in explaining the variation of physical capital accumulation (27%). Macroeconomic Policy and Initial Heterogeneity are limited to about 8% and 4%, respectively. Institutions play only a minor role: an increase of 1 standard deviation in Institutions is associated with only a 2.7% increase in TFP growth.

Even when we drop the proximate variables from the model space, we do not observe a substantial change in the contribution of the fundamental theories. The only difference is that the contribution of Regional Heterogeneity is now captured by Religion. In the case of human capital accumulation Initial Heterogeneity plays a major role (around 15%) while Demography and Regional Heterogeneity account for about 6% each, respectively. The only theory that survives when we drop the proximate theories is still Initial Heterogeneity.

Table 7b presents the results from a variance decomposition of the variance of growth of income per worker. The results show that the variation in TFP growth accounts for 60% of the total variation in growth of income per worker. This finding is consistent with Hall and Jones (1999) who show that productivity differences play a key role in explaining cross-country income differences. The remainder of the total income growth variation is attributed to physical capital accumulation. Interestingly, we find that variation in human capital accumulation accounts for a small negative (-1%) association with variation in growth of income per worker.

Finally, Table 8 summarizes the role of each theory in explaining the variation of the growth of income per worker via its components; i.e., TFP growth and physical and human capital accumulations. As our previous results above anticipate, the major theories are only Externalities and Regional Heterogeneity. Externalities account for about 16% while Regional Heterogeneity accounts for about 11% of the total variation in growth of income per worker. Macroeconomic Policy accounts for only about 3.6% of total variation. Interestingly, the new fundamental growth theories each only account for less than 1% of the total variation of growth of income per worker. This finding does not change even if we drop the proximate variables from the model space and focus only on the fundamental theories.

6. Conclusion

The recent growth literature has seen an explosion of work exploring the role of new and fundamental theories of growth such as geography, institutions, ethnic fractionalization, and religion. Within the canonical neoclassical growth framework, these new growth theories may be interpreted as theories of total factor productivity (TFP) growth. Nevertheless, claims about the empirical validity of these new growth theories are typically made within very particular specifications of such regressions. In this paper, we investigate the robustness of these new growth theories when we allow the researcher to appropriately account for her uncertainty over the underlying model relating these theories to growth. We find, when we do so, that there is very little evidence that any of these new growth theories are robust determinants of growth.

We also deviate from canonical growth regressions, and explore the impact of these new growth theories on the components of growth – TFP growth and physical and human accumulation rates – derived from a growth accounting exercise. Yet again, we find very little evidence to support the contention that these new growth theories play an important role in explaining variations in these growth components. In as much as institutions and religion may have a role in affecting per worker income growth, our results suggest that their effect is likely to flow through their influence on physical capital accumulation rates. This finding is not inconsistent with the literature since studies have suggested that good institutions may be important in reducing macroeconomic volatility (e.g., Acemoglu, Johnson, Robinson, and Thaicharoen (2003)) that conceivably affects incentives to invest. Studies motivating a role for religion in economic performance also emphasize religion's role in shaping attitudes such as saving behavior (e.g., Guiso, Sapienza and Zingales (2003)). There is simply little evidence that these factors affect growth directly (as determinants of technological progress).

What we find instead is that variation in growth across countries may be robustly explained by differences in macroeconomic policies and unknown heterogeneity associated with regional groupings. Our results also suggest that the linear growth model (with constant parameters) may be misspecified. In particular, our findings that physical and human capital externalities are the main determinants of TFP growth suggest that more work needs to be done in systematically uncovering potential nonlinearities and heterogeneity in growth processes across countries (see, for instance, Durlauf, Kourtellos, and Minkin (2001) and Tan (2005)).

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Data Appendix

Variable	Description	Source
Average Growth Rates of Real Per Capita GDP	Average growth rates for the periods 1965-74, 1975-84, and 1985-94.	Penn World Tables 6.1
Time Dummy Variables	Three dummy variables for 1965-74, 1975-84, and 1985-94.	
Regional Dummy Variables	A dummy variable for East Asia and a dummy variable for sub-Saharan.	
Initial Income	Logarithm of per worker GDP at 1965, 1975, and 1985. The instruments for initial income include the values at 1960, 1970, and 1980.	Penn World Tables 6.1
Population Growth Rates	Logarithm of average population growth rates plus 0.05 for the periods 1965-74, 1975-84, and 1985-94. The instruments for population growth rates include the average values of 1960-65, 1970-75, and 1980-85.	ibid
Investment	Logarithm of average ratios over each period of investment to GDP for the periods 1965-74, 1975-84, 1985-94. The instruments for investments include the average values of 1960-65, 1970-75, and 1980-85.	ibid
Schooling	Logarithm of years of male secondary and higher school attainment in 1965, 1975, and 1985.	Barro and Lee (2000)
Population Growth Rates	Logarithm of average population growth rates plus 0.05 for the periods 1965-74, 1975-84, and 1985-94. The instruments for population growth rates include the average values of 1960-65, 1970-75, and 1980-85.	Penn World Tables 6.1
1/ Life Expectancy at age 1	Reciprocals of life expectancy at age 1 in 1960, 1970, and 1980	Barro and Lee (1994), World Bank
Log of Fertility Rate	The log of the total fertility rate in 1960, 1970, and 1980	Barro and Lee (1994), World Bank, UNCDB
Openness (filtered)	Average ratios for each period of exports plus imports to GDP, filtered for the usual relation of this ratio to the logs of population and area for the periods 1965-74, 1975-84, and 1985-94. The instruments for this variable include the average values of 1960-65, 1970-75, and 1980-85.	Barro and McCleary (2003)
Government Consumption (net)	Average ratios for each period of government consumption (net of outlays on defense and education) to GDP.	Barro and Lee (1994), PWT61, GFS, SIPRI, UNESCO.
Inflation	The consumer price inflation rate for the periods 1965-74, 1975-84, 1985-94.	Barro and Lee (1994), IFS, Global Development Network Growth Database.
Buddhism	Buddhism share in 1970 and 1980 expressed as a fraction of the population who expressed adherence to some religion.	Ibid
Catholic	Catholic share in 1970 and 1980 expressed as a fraction of the population who expressed adherence to some religion.	World Christian Encyclopedia (1982)

Variable	Description	Source
Eastern Religion	Eastern Religion share in 1970 and 1980 expressed as a fraction of the population who expressed adherence to some religion. It includes Chinese Universists, Confucians, Neoreligionists, Shintos, and Zoroastrians (Parsis).	Ibid
Hindu	Hindu share in 1970 and 1980 expressed as a fraction of the population who expressed adherence to some religion. It includes Hindus, Jains and Sikhs.	Ibid
Jew	Jewish share in 1970 and 1980 expressed as a fraction of the population who expressed adherence to some religion.	Ibid
Muslim	Muslim share in 1970 and 1980 expressed as a fraction of the population who expressed adherence to some religion.	Ibid
Orthodox	Orthodox share in 1970 and 1980 expressed as a fraction of the population who expressed adherence to some religion.	Ibid
Other Religion	Other Religion share 1970 and 1980	Ibid
Protestant	Protestant share in 1970, 1980, and 1990 expressed as a fraction of the population who expressed adherence to some religion. It includes Protestants and Anglicans.	Ibid
KGATRSTR	Percentage of land area classified as tropical and subtropical via the in Koeppen-Geiger system.	The Center for International Development at Harvard University
LCR100km	Percentage of a country's land area within 100km of an ice- free coast.	ibid
LANG	Measure of linguistic fractionalization based on data describing shares of languages spoken as "mother tongues".	Alesina, et al (2003)
ETHTENS	Measures the degree of tension within a country attributable to racial, nationality, or language divisions	International Country Risk Guide
Expropriation Risk	Risk of "outright confiscation and forced nationalization" of property. Rescaled, from 0 to 1, with a higher score indicating higher less risk of expropriation. For the first two periods of our sample, we use the average value of expropriation risk for 1982-84. For the third and fourth periods of our sample we use the average value 1985-1994 and 1985-97, correspondingly. Source: International Country Risk Guide	International Country Risk Guide
Legal Formalism: Check	Index of formality in legal procedures for collecting on a bounced check, rescaled from 0 to 1.	World Bank at http://www.doingbusiness.org
English Legal Origin	Coded zero or one. One indicates that country was colonized by Britain and English legal code was transferred.	La Porta et al(1999), and Djankov et al (2003).

Figure 1: Hierarchical Model Priors

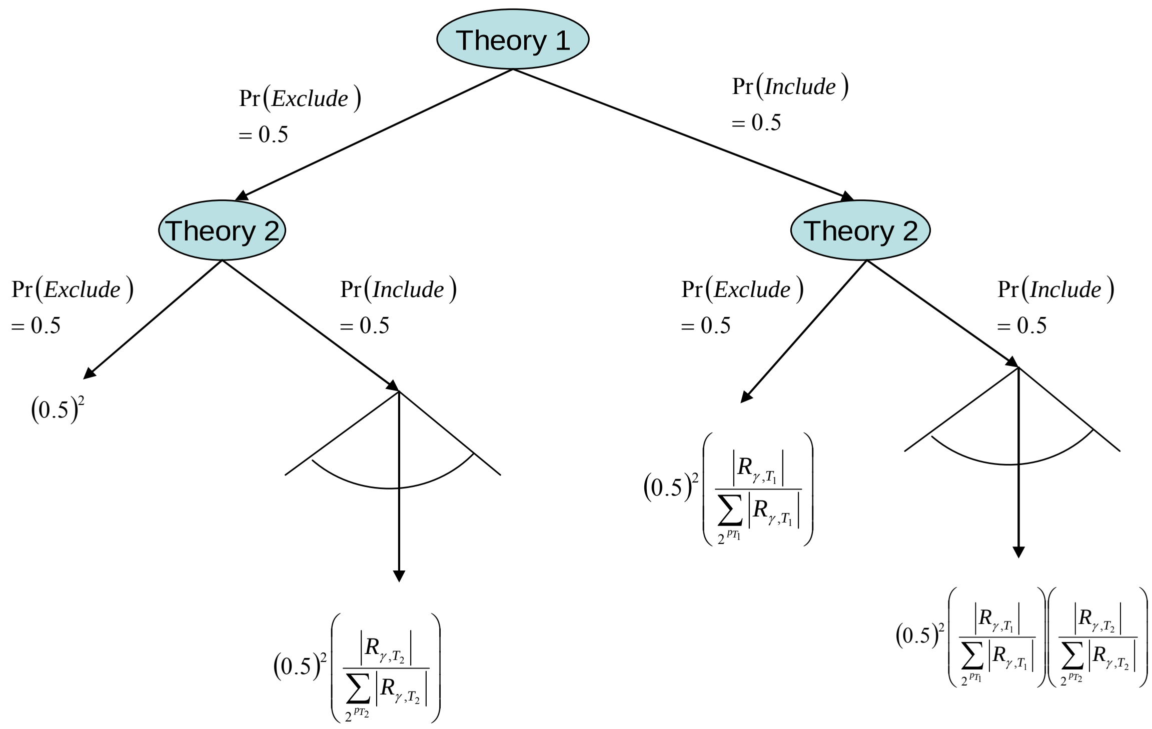

Table 1: List of Countries

Code	Country	Code	Country
	North America		*Asia and Oceania*
CAN	Canada	AUS	Australia
USA	United States	IDN	Indonesia
		IND	India
	Europe	JPN	Japan
AUT	Austria	KOR	Korea, Rep.
BEL	Belgium	LKA	Sri Lanka
CHE	Switzerland	MYS	Malaysia
DNK	Denmark	NZL	New Zealand
ESP	Spain	PAK	Pakistan
FIN	Finland	PHL	Philippines
FRA	France	THA	Thailand
GBR	United Kingdom	TWN	Taiwan, China
GRC	Greece	TUR	Turkey
HUN	Hungary		
IRL	Ireland		*Sub-Saharan Africa*
ISR	Israel	GHA	Ghana
ITA	Italy	KEN	Kenya
NLD	Netherlands	MWI	Malawi
NOR	Norway	SEN	Senegal
POL	Poland	UGA	Uganda
PRT	Portugal	ZAF	South Africa
SWE	Sweden	ZMB	Zambia
		ZWE	Zimbabwe
	Middle East & North Africa		
EGY	Egypt, Arab Rep.		*Latin America & Caribbean*
JOR	Jordan	ARG	Argentina
TUN	Tunisia	BOL	Bolivia
		BRA	Brazil
		CHL	Chile
		COL	Columbia
		DOM	Dominican Republic
		ECU	Ecuador
		JAM	Jamaica
		MEX	Mexico
		PAN	Panama
		PER	Peru
		URY	Uruguay
		VEN	Venezuela

Table 2: Descriptive Statistics

Variable	Mean	Median	St. Dev.	Min.	Max.
Growth per worker	0.0186	0.0170	0.0220	-0.0323	0.0705
TFP growth	0.0035	0.0034	0.0155	-0.0407	0.0469
Physical Capital Accumulation	0.0264	0.0236	0.0343	-0.0565	0.1218
Human Capital Accumulation	0.0095	0.0091	0.0059	-0.0008	0.0285
Initial Income	9.4328	9.6212	0.9536	6.8942	10.7824
Initial Human Capital	1.9241	1.8473	0.5365	1.1233	3.2948
Log of Investments	2.8358	2.9393	0.9348	0.3311	3.6838
Log of Schooling	0.2123	0.3043	0.5179	-3.3814	1.7881
Log of Pop. Growth Rates plus 0.05	-2.7114	-2.6769	0.1588	-3.0150	-2.3301
1/ Life Expectancy at age 1	1.5351	1.4550	0.2102	1.3066	2.0950
Log of Fertility Rate	1.3745	1.4097	0.4905	0.4383	2.0794
Openness (filtered)	-0.0287	-0.0448	0.1909	-0.4703	0.7926
Government Consumption (net)	0.0912	0.0790	0.0540	0.0100	0.2954
Inflation	0.1817	0.0880	0.2701	0.0077	2.0923
East Asia	0.1296	0.0000	0.3369	0.0000	1.0000
Sub-Saharan Africa	0.1481	0.0000	0.3563	0.0000	1.0000
Latin America & Caribbean	0.2407	0.0000	0.4289	0.0000	1.0000
Eastern Religion	0.0852	0.0008	0.2356	0.0000	0.9666
Hindu	0.0213	0.0000	0.1100	0.0000	0.8196
Jew	0.0186	0.0004	0.1156	0.0000	0.8956
Muslim	0.1266	0.0088	0.2797	0.0000	0.9950
Orthodox	0.0234	0.0010	0.1295	0.0000	0.9719
Protestant	0.1789	0.0330	0.2898	-0.0066	1.4601
Other Religion	0.1332	0.0485	0.2054	-0.5596	0.9037
LCR100km	0.5319	0.4850	0.3543	0.0000	1.0000
KGATRSTR	0.3531	0.1052	0.4047	0.0000	1.0000
Language	0.3383	0.2216	0.2922	0.0028	0.9227
Ethnic Tensions	0.6995	0.8333	0.2910	0.1200	1.0000
Expropriation Risk	0.7060	0.7000	0.1989	0.3000	1.0000
Executive Constraints	0.6517	0.7806	0.3635	0.0000	1.0000
KKZ96	0.5567	0.3207	0.8632	-0.7633	1.9268
Legal Formalism: Check	0.4175	0.3724	0.1823	0.0965	0.8348

Table 3: 2SLS BMA Estimation Results for Growth rate of Capita per Worker

Explanatory Variable	Proximate and Fundamental Growth Theories			Fundamental Growth Theories		
	Posterior Inclusion Probability (1)	Posterior Mean (Std. Error) (2)	Classical 2SLS (3)	Posterior Inclusion Probability (4)	Posterior Mean (Std. Error) (5)	Classical 2SLS (6)
Neoclassical	0.9999#					
Initial Income	0.9998	-0.0171*** (0.0034)	-0.0205*** (0.0046)	1.0000	-0.0080** (0.0034)	-0.0126*** (0.0034)
Log of Pop. Growth Rates plus 0.05	0.6964	-0.0270 (0.0218)	-0.0167 (0.0211)	-	-	-
Log of Schooling	0.0193	0.0000 (0.0006)	-0.0090* (0.0048)	-	-	-
Log of Investments	0.9999	0.0132*** (0.0032)	0.0085*** (0.0030)	-	-	-
Demography	0.0328#					
1/ Life Expectancy at age 1	0.0142	-0.0002 (0.0026)	-0.0261 (0.0175)	-	-	-
Log of Fertility Rate	0.0187	-0.0002 (0.0018)	-0.0077 (0.0076)	-	-	-
Macroeconomic Policy	0.9997#					
Openness (filtered)	0.4167	0.0057 (0.0087)	0.0217** (0.0085)	-	-	-
Government Consumption (net)	0.9997	-0.1365*** (0.0337)	-0.1121*** (0.0350)	-	-	-
Inflation	0.9882	-0.0139** (0.0068)	-0.0236** (0.0102)	-	-	-
Regional Heterogeneity	0.9796#					
East Asia	0.9439	0.0109* (0.0056)	0.0238*** (0.0071)	-	-	-
Sub-Saharan Africa	0.5874	-0.0087 (0.0090)	-0.0070 (0.0084)	-	-	-
Latin America & Caribbean	0.0301	-0.0001 (0.0011)	0.0004 (0.0063)	-	-	-

Table 3-*Cont'd*: 2SLS BMA Estimation Results for Growth rate of Capita per Worker

Explanatory Variable	Proximate and Fundamental Growth Theories			Fundamental Growth Theories		
	Posterior Inclusion Probability (1)	Posterior Mean (Std. Error) (2)	Classical 2LS (3)	Posterior Inclusion Probability (4)	Posterior Mean (Std. Error) (5)	Classical 2SLS (6)
Religion	0.6684#			0.9999	0.9999	
Eastern Religion	0.0201	0.0001 (0.0012)	-0.0140 (0.0090)	0.9999	0.0299 *** (0.0079)	0.0241*** (0.0087)
Hindu	0.0518	0.0009 (0.0049)	0.0211 (0.0137)	0.0489	0.0004 (0.0029)	0.0116 (0.0125)
Jew	0.0372	0.0005 (0.0030)	0.0139 (0.0099)	0.0404	0.0001 (0.0018)	0.0042 (0.0134)
Muslim	0.0580	-0.0005 (0.0030)	-0.0108 (0.0090)	0.1224	0.0010 (0.0035)	0.0103 (0.0105)
Orthodox	0.0186	-0.0001 (0.0011)	-0.0101 (0.0089)	0.0474	0.0003 (0.0027)	0.0071 (0.0126)
Protestant	0.0874	-0.0007 (0.0025)	-0.0118** (0.0049)	0.8889	-0.0169** (0.0073)	-0.0179** (0.0075)
Other	0.6470	-0.0099 (0.0113)	-0.0186 (0.0142)	0.6553	-0.0144 (0.0136)	-0.0038 (0.0232)
Geography	0.4198#			0.0673	0.0673	
LCR100km	0.0097	0.0000 (0.0004)	-0.0044 (0.0046)	0.0413	0.0003 (0.0016)	0.0044 (0.0050)
KGATRSTR	0.4160	-0.0055 (0.0076)	-0.0099 (0.0073)	0.0268	-0.0002 (0.0015)	0.0023 (0.0069)
Fractionalization	0.4201#			0.3807	0.3807	
Language	0.4057	-0.0051 (0.0079)	-0.0284*** (0.0076)	0.3636	-0.0070 (0.0107)	-0.0250*** (0.0083)
Ethnic Tensions	0.1329	-0.0021 (0.0060)	-0.0135** (0.0067)	0.2665	-0.0050 (0.0095)	-0.0201** (0.0090)
Institutions	0.1292#			0.9641	0.9641	
Expropriation Risk	0.0024	0.0000 (0.0006)	-0.0195 (0.0157)	0.0157	-0.0001 (0.0022)	0.0078 (0.0220)
Executive Constraints	0.0933	-0.0007 (0.0026)	-0.0055 (0.0054)	0.0441	-0.0002 (0.0016)	-0.0017 (0.0072)
KKZ96	0.0093	0.0001 (0.0007)	0.0056 (0.0058)	0.9632	0.0135*** (0.0045)	0.0199*** (0.0060)
Legal Formalism: Check	0.0427	-0.0009 (0.0046)	-0.0135 (0.0235)	0.2765	-0.0064 (0.0122)	0.0047 (0.0339)

Note: This table provides results for the growth regression exercise in equation (1) of the text. Standard errors are in parentheses. "***" denotes significance at 1%, "**" at 5%, and "*" at 10%. "#" denotes the posterior inclusion probability of each theory (as opposed to each individual variable). The dependent variable is the average growth rate of real per worker GDP corresponding to the three periods, 1965-74 (53 countries), 1975-84 (54 countries), and 1985-94 (57 countries). Please refer to the Data Appendix for details on the variables used. We instrument for endogenous variables using earlier or initial values if available with the exception of inflation, religion shares, and legal formalism (CHECK). For Inflation we use as instruments the colonial dummy for Spain or Portugal and for religion shares we use the corresponding shares in 1900. Following Acemoglu and Johnson (2005) we used dummies for British and French legal origins as an instrument for CHECK. We should note that the (unreported) least squares (non-instrumented) results are very similar to the ones here.

Table 4: Classical and BMA Estimation Results for TFP Growth

Explanatory Variable	Proximate and Fundamental Growth Theories			Fundamental Growth Theories		
	Posterior Inclusion Probability (1)	Posterior Mean (Std. Error) (2)	Classical 2SLS (3)	Posterior Inclusion Probability (4)	Posterior Mean (Std. Error) (5)	Classical 2SLS (6)
Initial Heterogeneity	0.2945#			0.0487		
Logarithm of Initial Income	0.2555	-0.0012 (0.0027)	-0.0141*** (0.0040)	0.0322	-0.0001 (0.0005)	-0.0055* (0.0031)
Initial Human Capital	0.0436	-0.0002 (0.0008)	-0.0046 (0.0056)	0.0170	0.0000 (0.0003)	-0.0046 (0.0051)
Externalities	0.9999#			0.9999		
Growth of Physical capital	0.0047	-0.0005 (0.0128)	-0.0807 (0.1496)	0.0058	-0.0001 (0.0127)	0.0724 (0.1936)
Growth of Human capital	0.7204	-0.5529 (0.3840)	-0.1968* (0.1096)	0.3868	-0.2463 (0.3401)	-0.2698** (0.1092)
Growth of Physical capital times Log of Initial Human Capital	1.0000	0.1060*** (0.0220)	0.0756 (0.0771)	0.9985	0.1180*** (0.0215)	0.0868 (0.0968)
Growth of Human capital times Log of Initial Human Capital	0.2864	-0.1145 (0.1901)	-0.2704** (0.0904)	0.5967	-0.2071 (0.1885)	-0.1780* (0.1039)
Demography	0.1111#					
1/ Life Expectancy at age 1	0.0891	-0.0019 (0.0076)	-0.0130 (0.0153)	-	-	-
Log of Fertility Rate	0.0229	0.0000 (0.0008)	-0.0070 (0.0054)	-	-	-
Macroeconomic Policy	0.0487#					
Openness (filtered)	0.0165	0.0002 (0.0014)	0.0212*** (0.0078)	-	-	-
Government Consumption (net)	0.0292	-0.0015 (0.0102)	-0.0601 (0.0373)	-	-	-
Inflation	0.0098	-0.0000 (0.0006)	-0.0164** (0.0074)	-	-	-

Table 4-*Cont'd*: Classical and BMA Estimation Results for TFP Growth

Explanatory Variable	Proximate and Fundamental Growth Theories			Fundamental Growth Theories		
	Posterior Inclusion Probability (1)	Posterior Mean (Std. Error) (2)	Classical 2SLS (3)	Posterior Inclusion Probability (4)	Posterior Mean (Std. Error) (5)	Classical 2SLS (6)
Regional Heterogeneity	0.0251#					
East Asia	0.0115	0.0001 (0.0007)	0.0137** (0.0057)	-	-	-
Sub-Saharan Africa	0.0073	-0.0000 (0.0005)	0.0003 (0.0083)	-	-	-
Latin America & Caribbean	0.0063	-0.0000 (0.0003)	0.0054 (0.0046)	-	-	-
Religion	0.0031#			0.0031		
Eastern Religion Share	0.0007	0.0000 (0.0002)	-0.0101 (0.0069)	0.0007	0.0000 (0.0002)	-0.0024 (0.0075)
Hindu Share	0.0004	0.0000 (0.0002)	0.0065 (0.0106)	0.0004	0.0000 (0.0001)	-0.0032 (0.0092)
Jewish Share	0.0004	0.0000 (0.0002)	0.0192** (0.0074)	0.0005	0.0000 (0.0002)	0.0045 (0.0082)
Muslim Share	0.0006	0.0000 (0.0002)	-0.0218** (0.0087)	0.0006	0.0000 (0.0002)	-0.0196* (0.0103)
Orthodox Share	0.0003	0.0000 (0.0000)	-0.0055 (0.0057)	0.0003	0.0000 (0.0000)	-0.0106 (0.0070)
Protestant Share	0.0006	0.0000 (0.0001)	-0.0029 (0.0049)	0.0004	0.0000 (0.0001)	-0.0075 (0.0055)
Other Religion Share	0.0003	0.0000 (0.0001)	-0.0162 (0.0126)	0.0004	0.0000 (0.0002)	-0.0183 (0.0171)

Table 4-*Cont'd*: Classical and BMA Estimation Results for TFP Growth

Explanatory Variable	Proximate and Fundamental Growth Theories			Fundamental Growth Theories		
	Posterior Inclusion Probability (1)	Posterior Mean (Std. Error) (2)	Classical 2SLS (3)	Posterior Inclusion Probability (4)	Posterior Mean (Std. Error) (5)	Classical 2SLS (6)
Geography	0.1144#			0.0729		
LCR100km	0.0162	0.0000 (0.0005)	-0.0049 (0.0043)	0.0153	0.0000 (0.0004)	0.0011 (0.0041)
KGATRSTR	0.1042	-0.0008 (0.0028)	-0.0175*** (0.0064)	0.0614	-0.0003 (0.0016)	-0.0120** (0.0048)
Fractionalization	0.0544#			0.0458		
Language	0.0160	-0.0000 (0.0006)	-0.0140* (0.0077)	0.0188	-0.0001 (0.0007)	-0.0098 (0.0068)
Ethnic Tensions	0.0385	-0.0002 (0.0013)	-0.0076 (0.0064)	0.0273	-0.0001 (0.0010)	-0.0100 (0.0076)
Institutions	0.0194#			0.0207		
Expropriation Risk	0.0044	0.0000 (0.0006)	-0.0132 (0.0167)	0.0042	0.0000 (0.0005)	-0.0193 (0.0212)
Executive Constraints	0.0046	-0.0000 (0.0003)	-0.0035 (0.0050)	0.0041	0.0000 (0.0002)	-0.0012 (0.0065)
KKZ96	0.0063	0.0000 (0.0003)	0.0017 (0.0051)	0.0060	0.0000 (0.0002)	0.0044 (0.0056)
Legal Formalism: Check	0.0041	-0.0000 (0.0005)	-0.0148 (0.0184)	0.0065	-0.0000 (0.0007)	-0.0273 (0.0216)

Note: This table provides results for the TFP growth regression exercise in equation (5) of the text. Standard errors are in parentheses. "***" denotes significance at 1%, "**" at 5%, and "*" at 10%. "#" denotes the posterior inclusion probability of each theory (as opposed to each individual variable). The dependent variable is the TFP growth rate, as constructed in Section 2.2 of the text, corresponding to the three periods, 1965-74 (53 countries), 1975-84 (54 countries), and 1985-94 (57 countries). Please refer to the Data Appendix for details on the variables used. We instrument for endogenous variables using earlier or initial values if available with the exception of inflation, religion shares, and legal formalism (CHECK). For Inflation we use as instruments the colonial dummy for Spain or Portugal and for religion shares we use the corresponding shares in 1900. Following Acemoglu and Johnson (2005) we used dummies for British and French legal origins as an instrument for CHECK. We should note that the (unreported) least squares (non-instrumented) results are very similar to the ones here.

Table 5: BMA 2SLS estimates for TFP growth and factors of accumulation

Explanatory Variable	$g(A)$		$g(k)$		$g(h)$	
	Proximate and Fundamental Theories	Fundamental Theories	Proximate and Fundamental Theories	Fundamental Theories	Proximate and Fundamental Theories	Fundamental Theories
	(1)	(2)	(3)	(4)	(5)	(6)
Initial Heterogeneity						
Log of Initial Income	-0.0012 (0.0027)	-0.0001 (0.0005)	-0.0154** (0.0062)	-0.0000 (0.0009)	0.0039*** (0.0009)	0.0025** (0.0010)
Initial Human Capital	-0.0002 (0.0008)	0.0000 (0.0003)	0.0000 (0.0000)	-0.0000 (0.0004)	-0.0075*** (0.0016)	-0.0070*** (-4.3216)
Externalities						
Growth of Physical capital	-0.0005 (0.0128)	-0.0001 (0.0127)	-	-	-	-
Growth of Human capital	-0.5529 (0.3840)	-0.2463 (0.3401)	-	-	-	-
Growth of Physical capital times Log of Initial Human Capital	0.1060*** (0.0220)	0.1180*** (0.0215)	-	-	-	-
Growth of Human capital times Log Initial Human Capital	-0.1145 (0.1901)	-0.2071 (0.1885)	-	-	-	-
Demography						
1/ Life Expectancy at age 1	-0.0019 (0.0076)	-	0.0000 (0.0004)	-	-0.0002 (0.0015)	-
Log of Fertility Rate	0.0000 (0.0008)	-	-0.0201** (0.0087)	-	0.0027 (0.0025)	-
Macroeconomic Policy						
Openness (filtered)	0.0002 (0.0014)	-	0.0167 (0.0147)	-	0.0000 (0.0004)	-
Government Consumption (net)	-0.0015 (0.0102)	-	-0.1139* (0.0674)	-	0.0001 (0.0017)	-
Inflation	-0.0000 (0.0006)	-	-0.0067 (0.0101)	-	0.0000 (0.0000)	-
Regional Heterogeneity						
East Asia	0.0001 (0.0007)	-	0.0254*** (0.0095)	-	0.0053*** (0.0015)	-
Sub-Saharan Africa	-0.0000 (0.0005)	-	-0.0322*** (0.0123)	-	0.0000 (0.0005)	-
Latin America & Caribbean	-0.0000 (0.0003)	-	-0.0132 (0.0090)	-	-0.0000 (0.0003)	-

Table 5-*Cont'd*: BMA 2SLS estimates for TFP growth and factors of accumulation

Explanatory Variable	$g(A)$		$g(k)$		$g(h)$	
	Proximate and Fundamental Theories	Fundamental Theories	Proximate and Fundamental Theories	Fundamental Theories	Proximate and Fundamental Theories	Fundamental Theories
	(1)	(2)	(3)	(4)	(5)	(6)
Religion						
Eastern Religion Share	0.0000 (0.0002)	0.0000 (0.0002)	0.0001 (0.0023)	0.0649*** (0.0103)	0.0000 (0.0002)	0.0007 (0.0021)
Hindu Share	0.0000 (0.0002)	0.0000 (0.0001)	0.0000 (0.0016)	0.0019 (0.0077)	0.0008 (0.0024)	0.0001 (0.0009)
Jewish Share	0.0000 (0.0002)	0.0000 (0.0002)	0.0000 (0.0001)	-0.0000 (0.0008)	0.0000 (0.0003)	0.0000 (0.0003)
Muslim Share	0.0000 (0.0002)	0.0000 (0.0002)	0.0000 (0.0001)	0.0140 (0.0133)	-0.0000 (0.0002)	0.0000 (0.0001)
Orthodox Share	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0003)	0.0008 (0.0051)	0.0001 (0.0009)	0.0000 (0.0001)
Protestant Share	0.0000 (0.0001)	0.0000 (0.0001)	-0.0001 (0.0016)	-0.0009 (0.0035)	0.0016 (0.0026)	0.0003 (0.0012)
Other Religion Share	0.0000 (0.0001)	0.0000 (0.0002)	-0.0013 (0.0078)	-0.0199 (0.0182)	0.0003 (0.0013)	0.0002 (0.0010)
Geography						
LCR100km	0.0000 (0.0005)	0.0000 (0.0004)	0.0000 (0.0002)	0.0046 (0.0078)	-0.0000 (0.0003)	0.0000 (0.0001)
KGATRSTR	-0.0008 (0.0028)	-0.0003 (0.0016)	0.0000 (0.0001)	-0.0000 (0.0008)	0.0000 (0.0001)	0.0000 (0.0003)
Fractionalization						
Language	-0.0000 (0.0006)	-0.0001 (0.0007)	-0.0046 (0.0090)	-0.0003 (0.0023)	0.0000 (0.0003)	0.0000 (0.0005)
Ethnic Tensions	-0.0002 (0.0013)	-0.0001 (0.0010)	-0.0000 (0.0010)	-0.0000 (0.0009)	-0.0000 (0.0002)	-0.0000 (0.0003)
Institutions						
Expropriation Risk	0.0000 (0.0006)	0.0000 (0.0005)	0.0035 (0.0116)	0.0252 (0.0248)	0.0000 (0.0001)	0.0000 (0.0002)
Executive Constraints	-0.0000 (0.0003)	0.0000 (0.0002)	-0.0163** (0.0083)	-0.0076 (0.0100)	-0.0000 (0.0001)	-0.0000 (0.0002)
KKZ96	0.0000 (0.0003)	0.0000 (0.0002)	-0.0005 (0.0031)	0.0000 (0.0004)	0.0000 (0.0001)	0.0000 (0.0001)
Legal Formalism: Check	-0.0000 (0.0005)	-0.0000 (0.0007)	-0.0063 (0.0128)	-0.0071 (0.0163)	-0.0000 (0.0004)	-0.0001 (0.0008)

Note: This table provides BMA 2SLS estimates for the TFP growth regression exercise in equation (5) of the text (imported from Table 4), and for the other two components of growth – growth in physical and human capital – given by equations (6) and (7) of the text respectively. Standard errors in parentheses. "***" denotes significance at 1%, "**" at 5%, and "*" at 10%. All three dependent variables were constructed as in Section 2.2 of the text and are for the three periods, 1965-74 (53 countries), 1975-84 (54 countries), and 1985-94 (57 countries). Please refer to the Data Appendix for details on the variables used. We instrument for endogenous variables using earlier or initial values if available with the exception of inflation, religion shares, and legal formalism (CHECK). For Inflation we use as instruments the colonial dummy for Spain or Portugal and for religion shares we use the corresponding shares in 1900. Following Acemoglu and Johnson (2005) we used dummies for British and French legal origins as an instrument for CHECK. The corresponding BMA LS results (unreported because of space limitations) are very similar to the ones in this table.

Table 6: Posterior Probabilities of Theory (2SLS-BMA)

	$g(yw)$		$g(A)$		$g(k)$		$g(h)$	
Theories	Proximate and Fundamental Theories	Fundamental Theories	Proximate and Fundamental Theories	Fundamental Theories	Proximate and Fundamental Theories	Fundamental Theories	Proximate and Fundamental Theories	Fundamental Theories
Solow/Initial Heter.	0.9999	1.0000	0.2945	0.0487	0.9469	0.0383	0.9998	0.9991
Externalities	-	-	0.9999	0.9999	-	-	-	-
Demography	0.0328	-	0.1111	-	0.9775	-	0.6135	-
Macroeconomic Policy	0.9997	-	0.0487	-	0.8878	-	0.0267	-
Religion	0.6684	1.0000	0.0031	0.0031	0.0374	0.9999	0.3105	0.1290
Regional Heterogeneity	0.9796	-	0.0251	-	0.9999	-	0.9817	-
Geography	0.4198	0.0673	0.1144	0.0729	0.0004	0.2969	0.0318	0.0560
Fractionalization	0.4201	0.3808	0.0544	0.0458	0.2636	0.0397	0.0285	0.0637
Institutions	0.1293	0.9641	0.0194	0.0207	0.9460	0.7201	0.0222	0.0589

This table should be read alongside Table 5. It provides the posterior inclusion probabilities for each of the theories for the exercises in Table 5.

Table 7a: The Role of Growth Theories in the Components of Growth

Equation	$\frac{Cov(g_A, \hat{S}_j)}{Var(g_A)}$		$\frac{Cov(g_k, \hat{S}_j)}{Var(g_k)}$		$\frac{Cov(g_h, \hat{S}_j)}{Var(g_h)}$	
	Proximate and Fundamental Theories (1)	Fundamental Theories. (2)	Proximate and Fundamental Theories (3)	Fundamental Theories. (4)	Proximate and Fundamental Theories (5)	Fundamental Theories. (6)
Theories						
Initial Heterogeneity	0.0062	0.0002	0.0420	0.0002	0.1513	0.14815
Externalities	0.2674	0.2414	-		-	-
Demography	0.0017	-	0.0174	-	0.0616	-
Macroeconomic Policy	0.0014	-	0.0871	-	0.0003	-
Religion	0.0000	0.0000	0.0027	0.2712	-0.0043	0.00259
Regional Heterogeneity	0.0004	-	0.2683	-	0.0622	-
Geography	0.0023	0.0016	0.0000	0.0138	0.0002	0.00048
Fractionalization	0.0001	0.0001	0.0019	0.0001	0.0001	0.00015
Institutions	0.0001	0.0002	0.0272	0.0356	-0.0002	-0.00038

This table provides variance decomposition results given by equations (14), (15), and (16) in the text for the three growth components – respectively, TFP growth, growth in physical capital, and growth in human capital. It shows the partial contribution of each theory in explaining variation in each of the growth components.

Table 7b: The Role of the Components in Growth of Income per Worker

$\frac{Cov(g_{y_w}, g_A)}{Var(g_{y_w})}$	$\frac{Cov(g_{y_w}, \alpha g_k)}{Var(g_{y_w})}$	$\frac{Cov(g_{y_w}, (1-\alpha) g_k)}{Var(g_{y_w})}$
0.6006	0.4099	-0.0106

This table provides a variance decomposition of the variance of growth of income per worker. It shows the partial contribution of each growth component; respectively, TFP growth, growth in physical capital, and growth in human capital, in explaining variation in per worker income growth.

Table 8: The Role of Growth Theories in Growth of Income per Worker

Theories	$\frac{Cov(g_{y_w}, \hat{S}_j)}{Var(g_{y_w})}$ Proximate and Fundamental Theories (1)	$\frac{Cov(g_{y_w}, \hat{S}_j)}{Var(g_{y_w})}$ Fundamental Theories. (2)
Initial Heterogeneity	0.0193	-0.0014
Externalities	0.1606	0.1450
Demography	0.0075	-
Macroeconomic Policy	0.0365	-
Religion	0.0012	0.1111
Regional Heterogeneity	0.1096	-
Geography	0.0014	0.0066
Fractionalization	0.0008	0.0001
Institutions	0.0112	0.0147

This table summarizes the role of each theory in explaining the variation of growth of income per worker via its components; i.e., TFP growth and physical and human capital accumulation. It traces the contribution of each theory through each component (as shown in 7a) and ultimately from there to per worker growth rates (as shown in 7b).