Respect, Responsibility, and Development

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Abstract

We develop a theory that explains how two core values – *Respect for others* and *Responsibility* – affect productivity, the accumulation of capital, and output per worker. Using data from the *World Values Survey,* we empirically test the model using a panel dataset that includes 82 countries over six distinct years. We find that these two core values are important to production and that their impact is substantial. We also show that *Respect* and *Responsibility* reduce the influence of trust and mitigate the negative macroeconomic effects associated with fractionalized societies. Our results are robust to various treatments for endogeneity and under alternative samples.

JEL Codes: O11, O43, Z13

Keywords: culture, values, respect, responsibility, trustworthiness, trust, scale, development

1 Introduction

In an influential paper, Hall and Jones (1999) argue that the enormous variation in output per worker across countries is driven by differences in social infrastructure. They show that countries with stronger institutions achieve higher levels of investment in human and physical

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capital, greater productivity, and higher levels of output per worker. In this paper, we consider two cultural values - *Respect for others* and *Responsibility* - that we believe may be as fundamental to prosperity as other forms of social capital, or legal and political institutions. We call these *core values* because we believe they reflect deeply-held beliefs that guide one's behavior and are fundamental elements of culture.

The literature linking cultural values to institutions and to economic development is growing. Tabellini (2010) finds that culture and institutions affect economic development. In his presidential address to the European Economic Association, Tabellini (2008a) called for more research on how individual values influence institutional outcomes. Guiso et al. (2006) summarize recent research relating culture to economic behavior and outcomes. They define culture as a set of unchangeable values and beliefs and identify religious faith and ethnicity as the key exogenous determinants of institutions and economic activity. More recently, Siegel et al. (2011) were able to explain international capital flows using a measure of distance in attitudes toward egalitarianism. And Balan and Knack (2012) showed that economic outcomes were systematically related to the within-country correlation between morality and ability. There is, moreover, a large literature on the effect of trust and social capital on living standards.[1]

In this paper, we construct a theoretical model based on the idea that core values are deep determinants of productivity, physical and human capital accumulation, and output per worker. We think of *Respect for others* and *Responsibility,* like *Trust,* as components of social capital. *Respect for others* is a rough measure of how seriously people take the Golden Rule. This code of conduct, prominent in nearly all religions, encourages individuals to be trustworthy when dealing with others, regardless of social distance. *Respect for others* discourages shirking, cheating, and corruption in economic exchange. It raises the level of trust in society as in Breuer and McDermott (2012)[2], which facilitates exchange and increases scale. Productivity, capital accumulation, and output per worker are enhanced.

Responsibility is also important.[3] We model individuals who place value on responsibility as having a low subjective discount rate. A low rate of time preference is the essence of responsibility. When individuals place a greater value on the future at the expense of the

[1]Examples include the pioneering work of Mauro (1995) on corruption, Knack and Keefer (1997) on trust, and Acemoglu et al. (2001) on colonial development.

[2]We claimed that the societal level of both trustworthiness and trust depended on the underlying distribution of caution in a society. We argued that more cautious individuals are more likely to be trustworthy because they desire to avoid punishment associated with acting opportunistically. But, more cautious individuals are also likely to be *less* trusting of others. This creates some tension in the model because trustworthiness is a basis for trust. That is, we demonstrate that more cautious societies may be less or *more* trusting. This is because the direct effect of caution on trust may be overcome by the indirect effect of caution on trustworthy behavior which effects the extent of trust.

[3]President Obama made *Responsibility* a centerpiece of his speech given to school children on September 8, 2009; see http://www.whitehouse.gov/MediaResources/PreparedSchoolRemarks.

present, they are likely to invest in physical and human capital. Thus, we believe accumulation and productivity will be high in societies where responsibility is high. If this is true, output per worker will also be high.

We test our model using survey data on *Respect for others* and *Responsibility* from six waves of the *World Values Survey (2009)* across 82 countries. We follow a methodology similar to Hall and Jones (1999) where we investigate the impact of our two values on output per worker and its three component parts – productivity, capital intensity, and human capital. We find consistent evidence that these two values matter. The pattern of results remains when we consider alternative specifications and samples.

Trust is considered an element of social capital and an important determinant of economic outcomes. So, we include it in our regressions alongside our two core values. Our results show a smaller role for *Trust* once *Respect* and *Responsibility* are included while *Respect* and *Responsibility's* impact remains.

It has also been argued that fractionalization retards economic development because societal divisions may bring civil conflict, corruption, mistrust, and oppression not experienced in more homogeneous societies (Mauro (1995)). To test this idea, we include a measure of *Ethnic Fractionalization* in our regressions. We find that core values substantially reduce the negative impact of fractionalization on human capital accumulation, productivity, and output per worker – enough to offset its effects.

In the third part of the paper, we confront the issue of endogeneity. The core values we propose may be endogenous because we have omitted other relevant observables or unobservables that are correlated with the included variables, because of measurement error, or because of simultaneity with our outcome variables. We address these issues in several ways: by expanding the set of regressors to include other qualities from the *World Values Survey (2009)*, by investigating selection on observables, by using demographically-adjusted response rates to the survey questions on values; and with the standard treatment – instrumental variables estimation. Our instruments are measures of religious observance and institutional development. Regardless of the treatment we employ, we find the pattern established in the OLS results largely remains.

The paper is organized as follows. In Section 2 we construct a model of endogenous growth based on culture-determined scale and time preference. In Section 3 we describe our data and its sources. In Section 4 we estimate the basic model and report baseline results from OLS regressions where *Respect* and *Responsibility* are the main regressors. Here, we also investigate the influence of trust and ethnic fractionalization on output in the presence of core values. In Section 5, we address concerns about potential endogeneity and the robustness of our results using several approaches. Section 6 concludes.

2 A Theoretical Framework

In this section we construct a theoretical model to explain why we think respect and responsibility are important for economic development.

2.1 Respect for Others

In his book *The Moral Foundation of Economic Behavior*, David Rose (2011) argues that prosperity depends on having a trustworthy society. Trustworthiness discourages opportunism and creates the basis for trust, which encourages scale in production and exchange. He explains that trustworthy behavior is necessary to overcome the commons dilemma and what he calls "the empathy problem" – both of which increase as an economy grows and impersonal, faceless exchange becomes more prevalent. At the same time, honest behavior deters "golden opportunities to cheat" that arise more frequently in production as specialization and localized knowledge are required for producing efficiently.

What is the source of trustworthiness? Our view is that it arises, at least in part, from historical and persistent cultural traits. We refer to this dimension of culture as *respect for others*. Where children are taught to be honest, even with those who are different from themselves, trust flourishes. In his work on regional growth in Europe, Tabellini (2010) identifies social capital with both trust and respect. He considers this kind of social capital a key cultural characteristic.

Let scale in country j be represented by the variable M_j. The logic above establishes:

$$M_j = M\left(R_{c,j}\right) \tag{1}$$

where $R_{c,j}$ represents the average level of *respect for others* in country j and $M'(R_c) > 0$. We define scale more precisely below.

2.2 Responsibility

Responsible people are willing to spend time and effort today to earn a future reward or avoid a future cost. Irresponsible people do not sustain effort with the future in mind. They are impatient and often neglect making investments that will make them better off. Children are taught to be responsible by delaying consumption in order to increase it later. They are taught to be punctual, do their work, pay their bills on time, live within their means, and not break the law. It is difficult to conceive of any definition of responsibility that does not involve thinking about the future.

In his book *The Moral Sense*, Wilson (1993) identifies four key cultural traits that shape

society. One of them, *self-control*, is very close to what we have in mind with *responsibility*: the ability to resist immediate gratification for a great future reward. Doepke and Zilibotti (2008) use the concept of *patience* in the same cultural sense.

We assume that those societies endowed with a cultural bias to be responsible also have a low rate of time preference. That is:

$$\rho_j = \rho\left(R_{n,j}\right) \tag{2}$$

where ρ_j is the average rate of time preference in country j, $R_{n,j}$ is the average level of *responsibility*, and $\rho'\left(R_n\right) < 0$.

We now build these ideas into a model of endogenous growth.

2.3 Technology

Scale raises output per worker by increasing the ability of firms to organize into different labor teams that cooperate with a stock of capital. To formalize this idea, assume that the output y_m of firm m is given by:

$$y_m = \left(k_m\right)^{\alpha} \sum_{n=1}^{M_m} \left(h l_{nm}\right)^{1-\alpha} \tag{3}$$

where we suppress the country subscript. In this expression, k_m is the firm's physical capital, h is individual human capital – which does not vary across workers – and l_{nm} is the number of workers in team n of firm m. There are M_m distinct labor teams in firm m.[4] This production function is similar to that introduced by Ethier (1982), who adapted the utility function of Dixit and Stiglitz (1977) to the theory of production. Functions in which variety plays a key role have been applied to the problem of economic growth by several authors, most notably Paul Romer (1987, 1990), but also Grossman and Helpman (1993), Goodfriend and McDermott (1995, 1998), and Acemoglu (1998), among many others. It is a way to build in the effect of scale on specialization in production, the great insight of Adam Smith (1776).

We make two simplifying assumptions. The first is that there is a *minimum team size* l_c. This is a technical constraint: any department within a firm, we assume, requires a certain scale to be viable. For example, $l_c = 5$ means that it takes at least 5 people to constitute a group capable of interacting with other teams and the fixed capital stock to produce output y_m. Because of the nature of the production function, it never pays to form teams in excess

[4] We follow most of the literature in assuming that human capital augments labor directly, converting raw labor l into effective labor hl. One alternative is to assume human capital enters separately, as in Mankiw et al. (1992).

of l_c members. Therefore, we may set $l_{nm} = l_c$ for all n and m.

The second assumption is that there is a *maximum number of workers per firm.* This *firm size*, which we call L_{fj}, is specific to each country j. This is a tractable way to model our main effect: that scale is limited by trust. If, for example, $L_f = 20$ then a firm can only have a total of 20 employees before it becomes impossible to monitor them against theft and shirking. The strict limit of L_f is meant to reflect the idea that in some societies reliable workers can be drawn from a very small pool, a circle of trusted family members, perhaps, or friends who are bound to employers by years of service or past favors. In other societies, where there is a culture of respect for others – so that employers have a reasonable expectation that golden opportunities in Rose's sense will not be taken by their employees – it is possible to have a much larger workforce in any firm.

These two assumptions mean that each firm in country j will have the same number of teams M_j. This allows us to express the number of teams for each firm within Country j as:

$$M_j = \frac{L_{fj}}{l_c} = M\left(R_{c,j}\right) \tag{4}$$

This is the meaning of the $M\left(R_c\right)$ function introduced in (1). This number, while fixed for any culture, will differ across cultures. In societies with more respect and hence more trust, the number of teams per firm M_j is larger because maximum firm size L_{fj} is larger.[5]

The market for the produced good is competitive, so that the rental rate on capital r_K and the wage of a unit of human capital (the "base wage") w_b are equal to the marginal products of the two factors. They are given, respectively, by:

$$r_{Kj} = M\left(R_{c,j}\right)\alpha\left(\frac{h_j l_c}{k_{m,j}}\right)^{1-\alpha} \tag{5}$$

$$w_{bj} = (1-\alpha)\left(\frac{h_j l_c}{k_{m,j}}\right)^{-\alpha} \tag{6}$$

where we assume for convenience that α and l_c – the minimum size of a labor team – are technological constants that do not vary across countries. We note that the number of teams per firm M enters positively in the expression for the return to capital, but not in the base wage. The more teams there are in a firm, the more productive is the capital that cooperates with each team.

[5]We abstract from the integer constraint. That is, if $L_{fj} = 22$ and $l_c = 4$, we assume there are 5 teams – one of which has 7 members.

2.4 Output

Aggregate output is increasing in the number of teams per firm M. To see this, first note that the number of *firms* in economy j is:

$$N_j = \frac{L_j}{L_{fj}} \tag{7}$$

where L_j is the labor force of country j.

National output Y for country j is the product of the number of firms and the output per firm:

$$Y_j = N_j y_{m,j} = N_j M_j \left(k_{m,j}\right)^{\alpha} \left(h_j l_c\right)^{1-\alpha} = M_j \left(N_j k_{m,j}\right)^{\alpha} \left(N_j h_j l_c\right)^{1-\alpha} \tag{8}$$

The second equality is true by the symmetry of the labor teams in (3). We may write this as:

$$Y_j = M_j^{\alpha} K_j^{\alpha} \left(H_j\right)^{1-\alpha} \tag{9}$$

where $K \equiv N k_m$ is total capital in the economy and $H \equiv hL$ is the total human capital in the economy.[6]

Notice that (9) is like the conventional production function used by Hall and Jones (1999) as well as many others:

$$Y_j = K_j^{\alpha} \left(A_j H_j\right)^{1-\alpha} \tag{10}$$

where *productivity* A is defined as follows:

$$A \equiv \left[M\left(R_c\right)\right]^{\frac{\alpha}{1-\alpha}} \tag{11}$$

The economy's level of *Respect* R_c determines scale M, which raises productivity A.

2.5 Growth

In this section we derive the balanced growth equilibrium.[7]

We assume that output can be used for consumption or accumulation of either physical or human capital. Ignoring the country subscript, we have:

$$Y = C + I_K + I_H \tag{12}$$

[6] To derive (9), use (7) for the last N in (8) and express $l_c = L_f/M$ from (4).

[7] Our treatment in this section is a decentralized version of the solution in Barro and Sala-i Martin, Section 5.1. They do not, however, deal with the concept of labor teams, which is important for factor prices and capital intensity in our model.

where C is aggregate consumption and I_K and I_H are gross investment flows, respectively, of physical and human capital.[8] We also assume that all capital depreciates at the same rate δ so that we have the following motion equations:

$$\begin{aligned} \dot{K} &= I_K - \delta K \\ \dot{H} &= I_H - \delta H \end{aligned} \tag{13}$$

We are going to derive the dynamic, decentralized equilibrium by allowing households facing market prices to decide how to invest in both types of assets.

Households maximize discounted total utility

$$U = \int_0^\infty u\left(c\left(t\right)\right) e^{-\rho t} dt \tag{14}$$

where c is the individual's consumption, $u\left(c\right)$ is her instantaneous utility, and ρ is the rate of discount as in (2) and is a function of R_n.

The representative individual can accumulate capital or knowledge by using output that she might instead have consumed. Let $z = \frac{K}{L}$ be capital per person (not per firm) and h, as above, be human capital per person. There is no population growth, so personal assets grow according to:

$$\dot{z} = i_z - \delta z \tag{15}$$

and

$$\dot{h} = i_h - \delta h \tag{16}$$

where i_z and i_h are individual investment (saving) in each stock. Each household is constrained by her income in the following manner:

$$r_K z + w_b h = c + i_k + i_h \tag{17}$$

A balanced-growth equilibrium exists in this model. More details of the derivation of the following results are presented in Appendix A. In this equilibrium, the household chooses paths for c, i_z, and i_h such that output, consumption, capital, and human capital all grow at the same rate γ given by:

$$\gamma = \frac{\dot{y}}{y} = \frac{\dot{c}}{c} = \frac{\dot{z}}{z} = \frac{\dot{h}}{h} = \frac{1}{\theta}\left(r_K - \delta - \rho\right) \tag{18}$$

[8] We follow Mankiw et al. (1992) and Rivera-Batiz and Romer (1991) in assuming that education primarily requires output – lab equipment and computers – to increase human capital.

In the interior – that is, if both forms of investment are positive – then the return to physical capital r_K must equal the return to human capital, or the base wage w_b. From (5) and (6), $r_K = w_b$ means that:

$$\frac{hl_c}{k_m} = \frac{\beta}{M} \tag{19}$$

where $\beta \equiv \frac{1-\alpha}{\alpha}$ is constant across countries. We assume that this ratio condition is met at the outset, so it will be true always.[9] If (19) holds at the firm level, then in the aggregate economy the following must be true:[10]

$$H = \beta K \tag{20}$$

Using (5), (18), and (19), we can express the growth rate in country j as:

$$\gamma_j = \frac{1}{\theta}\left(M\left(R_{c,j}\right)^{\alpha} B - \delta - \rho\left(R_{n,j}\right)\right) \tag{21}$$

where $B \equiv \alpha^{\alpha}\left(1-\alpha\right)^{1-\alpha}$ and, as above, $R_{c,j}$ and $R_{n,j}$ are, respectively, the average level of respect for others and responsibility in country j.

Respect raises the growth rate by raising the return to capital of both types. Responsibility raises the growth rate by reducing the rate of time preference. These core values work by increasing saving and investment, which have permanent effects on the growth rates of y, z, and h.[11]

2.6 Empirical Implications

If we observe output *per worker* $y_j = \frac{Y_j}{L_j}$ across countries at a single date, we expect to find that the wealthiest countries are those with the greatest respect for others and the most responsibility. These two core values will have endowed them with high M and low ρ, both of which put these nations on high growth paths and place them in the upper portion of the income distribution. In a regression, we would expect y_j to be positively and robustly correlated with both $R_{c,j}$ and $R_{n,j}$.

Our model also has implications for the components of y. We decompose per-worker output in the same way as Mankiw et al. (1992),Klenow and Rodríguez-Clare (1997) and Hall

[9] If the ratio is not initially at its equilibrium level, then there will be a period during which there is investment of only one type until the ratio condition is satisfied. We assume that transitional period is over.

[10] To derive (20), first cross multiply, then multiply both sides of (19) by the number of firms N. Then use (4) for M and (7) for N in the term that involves h.

[11] We can recast the model to a form similar to that of Mankiw et al. (1992) with constant saving, exogenous technical change, and a separate human capital factor. In each firm, output would be $y_m = A\left(0\right)e^{gt}{k_m}^{\alpha}{h_m}^{\beta}\sum_{n=1}^{M_m}{l_{nm}}^{1-\alpha-\beta}$. There would still be a role for R_c through trust in the formation of the labor teams, which raises productivity and the steady state *levels* of income and capital.

and Jones (1999). From (10) this yields:

$$y_j = \kappa_j A_j h_j \tag{22}$$

where $\kappa \equiv \left(\frac{K}{Y}\right)^{\frac{\alpha}{1-\alpha}}$ is the economy's "capital intensity".[12]

Human capital per worker h, like per worker output y, grows at the rate γ given in equation (21). It follows that h should be positively related to both respect and responsibility: the greater is M and the smaller is ρ, the higher the level of h observed in a cross-section of countries, since the rate of accumulation has been higher over the years.

Productivity A and capital intensity κ, on the other hand, are *constant* over time. A is determined primarily by respect R_c. This is evident from (11). Responsibility R_n, on the other hand, does not affect A, if our model is literally correct.

Capital intensity is constant because K and Y also grow at the common rate γ. In balanced growth, κ does not depend on responsibility and is an *inverse* function of respect. Countries with high levels of R_c should in fact have low values of κ. To see this, put (20) into the output expression (9) to eliminate H, and then put the resulting expression for Y into the definition of κ to see that capital intensity can be written as

$$\kappa = M\left(R_c\right)^{\frac{-\alpha^2}{1-\alpha}} \beta^{-\alpha}$$

The inverse relationship between respect R_c and capital intensity κ is a testable implication of our theory.[13]

In balanced growth, we can eliminate capital intensity and show that per capita output is:

$$y = \frac{M^{\alpha}}{\beta^{\alpha}} h \tag{23}$$

Respect – through M and h – and responsibility – through h – have a positive effect on per worker output in balanced growth. Table 1 summarizes the testable hypotheses. The sign in each cell indicates the directional effect.

[12] Technically, capital intensity is the simple ratio $\frac{K}{Y}$. We use the term to refer to the ratio to the power of $\frac{\alpha}{1-\alpha}$ since it only appears in this form.

[13] It should be noted, however, that it holds perfectly only in balanced growth. If capital is deficient in the sense that $K < \left(\frac{1}{\beta}\right) H$, then the model behaves like the optimizing neoclassical model with one factor, capital. There is a period during which only K is being accumulated (and H falls through depreciation). In this phase, capital intensity rises over time. It does so faster the greater is A and the lower is ρ. In a cross-section, then, it is possible that respect and responsibility are related positively to capital intensity. On the other hand, H might be deficient, in which case K/Y depends on neither. It is not clear which sort of deficiency is more likely in a developing country.

Table 1: Testable Hypotheses

	Sign			
Effect of $\downarrow$ on $\rightarrow$	A	κ	h	y
Respect R_c	+	-	+	+
Responsibility R_n	0	0	+	+

3 Data

3.1 Core Values

Measuring cultural attributes is never simple, especially when we want to do so along specific dimensions like respect and responsibility. Our approach is to use survey data in which people in different countries were asked similar questions over time. The *World Values Survey* and the *European Values Survey*, extensively used by researchers from many different areas of the social sciences, provide us with data pertaining to individuals' views on many facets of life. The first survey was administered in 1981 and the most recent in 2010. There are a total of six waves, approximately five years apart.[14]

We focus on a set of questions (numbered a027 - a042) that were routinely asked in the survey. We call this set of questions the "*Qualities Group*." In the *Qualities Group*, the following question was asked several times sequentially:

> *"Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you feel to be especially important? Please choose up to five (CODE FIVE ONLY)."*

Each time it was asked, the question was accompanied by a list of qualities in order as[15]:

> *independence, hard work,* ***feeling of responsibility****, imagination,* ***tolerance and respect for others,*** *thrift saving money and things, determination and perseverance, religious faith, unselfishness, and obedience.*

We use responses to *tolerance and respect for others (Respect,* for short) and *feeling of responsibility* (*Responsibility*, for short) and calculate the percentage of respondents selecting the value as important for each country in each wave. The number of respondents per wave

[14]The first five waves of the two surveys were integrated into a single database in 2009. The last wave, Wave 6, was carried out by the *European Values Survey* between 2008 and 2010. We integrated this wave into the other five waves for the analysis.

[15]There were more qualities asked than in our list below – like *good manners*, *politeness*, *honesty*, *leadership*, *self-control*, and *loyalty*. However, *good manners* was not asked in all of the countries comprising a wave and the latter five qualities were only asked in Wave 1.

varies across countries but typically ranges from 1,000-1,300. These percentages (or response rates) are our measures of the two core values, *Respect* and *Responsibility*.

In constructing the response rates, we dropped the data for all interviewees who did not select exactly five qualities as being important. This is the only way to guarantee cross-country and cross-wave comparability in the empirical work. We began with a total of 419,479 individual observations. Of these, 386,731 selected five or fewer qualities. And of these, 310,595 selected exactly five of the possible qualities. This is the sample we use to aggregate into mean response rates per quality for each country-wave.

Country coverage varies widely by wave. Some countries appear in only one wave while others appear six times. The count of countries by wave in our integrated data is as follows: Wave 1 (22); Wave 2 (41), Wave 3 (53), Wave 4 (66), Wave 5 (56), and Wave 6 (39) which gives 277 country-wave observations. The last two waves have very few countries in common. Wave 5 is essentially non-OECD countries, while Wave 6 are OECD countries from the *European Values Survey*. Wave 1 is also mainly European countries. Because of data availability constraints on our measures of production (see below), the panel we are able to utilize has 239 observations.

3.2 Decomposing Output per Worker

We decompose output per worker in each country into each of its components in (22). Our data for y comes from the Penn World Table (Heston et al. (2006)) – we use the $RGDPW2$ series, which is real output per worker based on the Laspeyres method. Data for human and physical capital has not been standardized in the same way, so we construct measures for both following the methodology of Hall and Jones (1999).

To construct individual human capital h, Hall and Jones (1999) assume that the logarithm of h is related to years of schooling in a piece-wise linear manner. For 1 to 4 years, the return to schooling is 13.4 percent; for the next four, 10.1 percent; after that, it is 6.8 percent. These are average rates of return for, respectively, Sub-Saharan Africa, the world, and the OECD, as measured by Psacharopoulos (1994). The data for years of schooling comes from Barro and Lee (2011): we use the measure of the years of schooling of the typical person over the age of 25.

We construct a capital series K using the perpetual inventory method. There are two steps. First, we estimated the initial capital stock: $K_0 = \frac{I_a}{\gamma+\delta}$. In this expression, I_a is the average of the first four observations of investment in each country, γ is the growth rate, and δ is the rate of depreciation. We assume $\gamma = .02$ and $\delta = .06$ in all countries. Second, we applied the recursive formula $K_{t+1} = (1-\delta)\,K_t + I_t$ to fill out later values of K. We use the earliest observation possible, which is 1960 in most cases. To get capital intensity

Table 2: Correlations

	Respect for others R_c	*Responsibility* R_n
R_c	1.00	0.44
A	0.31	0.31
κ	-0.03	0.17
h	0.36	0.37
y	0.35	0.37
Correlations are across six waves and 82 countries.		

κ, we divide our capital series by the series $RGDPL$ from the Penn World Table (this is real GDP per person) multiplied by the population, and then raised to the power of $\frac{\alpha}{1-\alpha}$. We use $\alpha = .333$. Our parameter values for δ and α are those assumed by Hall and Jones (1999). We tried different values for the parameters γ and δ, but it made little difference for our results.[16] We did not, however, attempt to estimate country-specific growth rates or depreciation rates or values for α. Work by Gollin (2002) suggests that the return to labor $1-\alpha$ does not differ dramatically across countries, even between those at different levels of development. Depreciation rates may differ, however, and this could have a important effect on our estimates of κ. The construction of reliable estimates of capital across countries is an area of ongoing research in empirical macroeconomics.[17]

Productivity A is found as the residual once the other series in (22) have been constructed.

The sources and descriptions of the variables are provided in Appendix B. In Table 2, we report correlations between the variables. We see that *Respect for others* and *Responsibility* are positively correlated with our components of production in nearly all cases. The only exception is the correlation between κ and *Respect.*

4 OLS Estimation

4.1 Basic Empirical Model

Our empirical model is motivated by the theory from Section 2 where hypotheses were generated about the effects of *Respect* and *Responsibility* on A, κ, h, and y. Our baseline specification is:

[16](Easterly and Levine, 2002) construct a capital stock series is a similar way but use larger values for both γ and δ.

[17]We thank an anonymous referee for emphasizing the importance of capital construction.

$$Q_{j,k} = \alpha_0 + \alpha_1 R_{c,j,k} + \alpha_2 R_{n,j,k} + \alpha_3 X_j + \epsilon_{j,k} \tag{24}$$

Here, $Q_{j,k}$ represents an element of the set of the outcome variables: (A_j, κ_j, h_j, y_j), each in logs for country j in wave k. X_j represents a control variable. Our parameters of interest are α_1 and α_2, which capture, respectively, the effect of *Respect* and *Responsibility* on Q. Finally, $\epsilon_{j,k}$ is the error term. For now, we assume $R_{c,j}$ and $R_{n,j}$ are exogenous so that $\epsilon_{j,k}$ is uncorrelated with each – a point we will take up in Section 5.

The control variable for all specifications is *Latitude*. (See Appendix B for the definition.) One reason to use a control is that our model may not capture all plausible channels through which $Q_{j,k}$ is affected. *Latitude* is likely to have an important direct effect on outcomes. This is not only because of institutions, but also because geography and climate in the North may be more suited to production. Another good reason for the inclusion of *Latitude* is to lessen any bias from the existence of omitted variables. It is possible that *Latitude* may be correlated with R_c and R_n because of past history: the culture, institutions, and education levels of people living in, and migrating to, Northern latitudes may be conducive to the formation of the values we have identified.

We estimate (24) using pooled OLS. We do this for a few reasons. First, the panel data is highly unbalanced. Some countries have data for several waves, others for only one. Moreover, some waves were heavily weighted toward certain groups of countries. Wave 6, for example, is almost exclusively OECD countries. Second, the use of *Latitude* as a control means that we cannot estimate our model with any country fixed effects. However, to an extent because *Latitude* does not vary over time, it captures country-specific effects. Finally, and maybe more important, to the extent that R_c and R_n do not change over time, there will be very little variation in these explanatory variables. This would make it hard to estimate their effects with precision if we attempted fixed effects estimation.

4.2 Baseline Results

Our first set of results, estimating (24) with pooled OLS, is reported in Table 3. Panels A, B, C, and D, correspond to the outcome variables in Q. In the first two columns of each panel, we include R_c and R_n separately. In the third column, we include both. Column 4 of each panel includes *Latitude* as a control. We also run all specifications including six regional dummies or an *OECD* dummy. The pattern of results is very similar, but for brevity, we do not report them.

Table 3 reveals a pattern that we will see repeated throughout the paper: *Respect* and *Responsibility* are generally both positive and significant for productivity A, human capital

Table 3: OLS Results

	Panel A: Dependent = A				**Panel B: Dependent = κ**			
Respect for others	2.05**		1.45**	0.92*	-0.03		-0.13*	-0.17**
	[0.00]		[0.00]	[0.04]	[0.53]		[0.04]	[0.01]
Responsibility		1.79**	1.22*	0.96*		0.15**	0.21**	0.19**
		[0.00]	[0.04]	[0.04]		[0.01]	[0.01]	[0.01]
Latitude				1.82**				0.13*
				[0.00]				[0.02]
Constant	7.29**	7.42**	6.81**	6.58**	0.48**	0.34**	0.40**	0.38**
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]
Observations	239	239	239	239	239	239	239	239
Adj. R^2	0.10	0.09	0.13	0.26	0.00	0.03	0.04	0.07
	Panel C: Dependent = h				**Panel D: Dependent = y**			
Respect for others	0.58**		0.40**	0.20*	2.61**		1.72**	0.95*
	[0.00]		[0.00]	[0.02]	[0.00]		[0.00]	[0.04]
Responsibility		0.54**	0.38**	0.28**		2.48**	1.81**	1.43**
		[0.00]	[0.00]	[0.00]		[0.00]	[0.01]	[0.04]
Latitude				0.64**				0.13**
				[0.00]				[0.00]
Constant	0.44**	0.56**	0.39**	0.31**	8.31**	8.33**	7.60**	7.27**
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Observations	239	239	239	239	239	239	239	239
Adj/ R^2	0.13	0.13	0.18	0.45	0.12	0.14	0.18	0.39
Notes: Robust p values in brackets. **significant 1%; * at 5%.								

h, and output per worker y. For capital intensity κ, *Respect* is negative and significant while *Responsibility* is positive and significant.

Panel A reports the results for productivity. When *Respect* or *Responsibility* is included alone, each is statistically significant, positive across all specifications, and accounts for about 10 percent of the country-wave variation in productivity. This rises to 26 percent when both are included with *Latitude*. We find that a 1 percentage point increase in R_c or R_n corresponds to a rise in productivity between 0.9-1.5 percentage points.

Panel B reports the results for these same specifications for capital intensity. With or without the control, we see that *Respect* is negative and significant and that *Responsibility* is positive and significant. The coefficients and adjusted R^2 values are very small, however.

Our theoretical model predicts the negative effect of R_c on κ, but it does not predict that R_n will be significant for either A or κ. As we shall see, however, both of these results are quite robust, leading us to conclude that there must be another channel through which R_n works.

Panel C reports the results for human capital. Here again, both *Respect* and *Responsibility* are significant whether *Latitude* is included as a control or not. The explanatory power of the two core values alone is 18 percent; with *Latitude* it jumps to 45 percent. A 1.0 percentage point increase in either R_c or R_n will expand human capital by 0.2 to 0.4 percentage points, depending upon whether or not *Latitude* is included as a control.

Finally, Panel D reports the results for y. Looking across the specifications, we see that these values have a positive, statistically significant effect on output per worker, with or without the control variable. When both values and *Latitude* are included, 40 percent of the variation in output across countries and waves is explained. The overall effect of these values is large. Without controls, our results suggest that a 1 percentage point increase in each of these values will collectively increase output per worker by 3.5 percent. The inclusion of *Latitude* dampens the effect, but it still remains large at 2.4 percent.

Overall, we find support that our two core values are statistically significant determinants of productivity, physical and human capital accumulation, and output per worker in a way consistent with our theory. In nearly all cases, we see levels of statistical significance of 4% or higher.

4.3 Core Values and Trust

There has been much empirical work that examines the influence of trust on economic outcomes and finds a statistically significant, positive relationship (Knack and Keefer, 1997; Zak and Knack, 2001; and Guiso et al., 2009). In this section, we include the well-known trust question from the World Values Survey (2006) in (24), to see if it adds anything to the de-

termination of y or its components. In Breuer and McDermott (2012), we constructed a theoretical model to explain how trust arises endogenously. One of the key building blocks of that model was the causal relationship running from trustworthiness to trust. We think of *Respect for others* as conceptually similar to trustworthiness. Therefore, we expect that the inclusion of *Respect* will reduce or eliminate the effect of trust on the outcome variables in Q. Another reason to include *Trus*t is that there is good reason to think that it is an omitted variable that is correlated with our core values. If so, its inclusion is warranted to lessen any endogeneity that might arise from this source.

The trust question reads:

> *"Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people? 1. Most people can be trusted. and 2. Can't be too careful."*

The percentage of respondents in each country selecting *"Most people can be trusted"* corresponds to our measure of *Trust*. (See Appendix B for details).

Table 4 reports the results where we now include *Trust* and our two core values, with and without *Latitude*. As a starting point, we present results where only *Trust* is a regressor. The first column of each panel of Table 4 documents that trust is significant to A, h, and y, but not for κ.

However, our results show that the impact of trust declines in magnitude (whether statistically significant or not) with the inclusion of our two core values and even further with *Latitude*. We also see that the effect of *Trust* seems to work only through productivity A (and therefore to y also), as suggested by our theoretical model. The coefficients of *Trust* on κ are not significant in any specification and for h are near zero and insignificant in Column (4). Those for A and y, on the other hand, remain significant regardless of the specification.

4.4 Core Values and Societal Divisions

It is unsurprising that in countries with recurring ethnic and religious tensions, we see lower standards of living and lower levels of education, investment, and productivity. Empirical work by Mauro (1995), Easterly and Levine (1997), Alesina and Ferrara (2005), and Montalvo and Reynal-Querol (2005) report that societies that are highly fractious or polarized along ethnic or religious lines are likely to be under-performers.[18] We question whether *Respect for others* and *Responsibility* may ameliorate the negative influences of societal divisions on physical and

[18]There is an alternative view. Fractionalized societies are more diverse and therefore more likely to bring variety, imagination, and better problem solving to the production process. It is possible, therefore, that fractionalized societies could achieve better economic growth rates. See Alesina et al. (2000) and Lazear (1999).

Table 4: Trust and Core Values

	Panel A: Dependent =A			**Panel B: Dependent = κ**		
Trust	2.05**	1.64**	0.94*	0.07	0.06	0.00
	[0.00]	[0.00]	[0.02]	[0.15]	[0.15]	[0.99]
Respect for others		0.95†	0.75†		-0.15*	-0.17**
		[0.06]	[0.10]		[0.02]	[0.01]
Responsibility		1.04*	0.91*		0.20**	0.19**
		[0.04]	[0.05]		[0.01]	[0.01]
Latitude			1.43**			0.13*
			[0.00]			[0.05]
Constant	8.13**	6.80**	6.62**		0.40**	0.38**
	[0.00]	[0.00]	[0.00]		[0.001]	[0.00]
Observations	239	239	239	239	239	239
Adj. R^2	0.15	0.22	0.29	0.01	0.05	0.07
	Panel C: Dependent = h			**Panel D: Dependent = y**		
Trust	0.38**	0.24**	-0.10	2.50**	1.94**	0.83*
	[0.00]	[0.00]	[0.14]	[0.00]	[0.00]	[0.04]
Respect for others		0.32**	0.22**		1.13*	0.82†
		[0.00]	[0.01]		[0.05]	[0.09]
Responsibility		0.35**	0.29**		1.59**	1.39**
		[0.00]	[0.00]		[0.00]	[0.00]
Latitude			0.71**			2.27**
			[0.00]			[0.00]
Constant		0.39**	0.31**		7.59**	7.31**
		[0.00]	[0.00]		[0.00]	[0.00]
Observations	239	239	239	239	239	239
Adj R^2	0.09	0.21	0.46	0.18	0.28	0.40
Notes: Robust p-values in brackets. **significant 1%; * at 5%; † at 10%.						

human capital accumulation, productivity, and output per worker. If these core values are overarching guides to behavior between people, then ethnic or religious differences may not matter.

To test our idea, we investigate the effect of *Ethnic Fractionalization* on Q using data from Alesina et al. (2003). (See Appendix B). We first regress our outcome variables on *Ethnic Fractionalization* alone. These results are reported in the first column of each of the panels in Table 5. *Ethnic fractionalization* has a statistically significant negative effect on A, h, and y and explains up to 14 percent of the variation in each. *Ethnic fractionalization,* however, does not appear to affect κ in any case.

Next, we add our two core values alongside *Ethnic Fractionalization*. The results are reported in the second column of each panel. Accounting for core values reduces the size of the effect of *Ethnic Fractionalization* wherever it was significant. Our results suggest that core values may reduce the negative effects of ethnic or religious divisions on development. At the same time, *Respect* and *Responsibility* remain significant for A, κ, h, and y. In fact, their separate or combined effect is enough to offset any negative effects associated with ethnic divisions. In the third column of each panel, we include *Latitude* as a control and obtain similar results.

We also investigate several other measures of societal division: *Religious Fractionalization, Ethnic Polarization,* and *Religious Polarization.*[19] (See Appendix B for descriptions). The pattern of results for *Respect* and *Responsibility* that we see in Table 5 is largely repeated, but there is one important difference. Either type of polarization exerts a strong negative influence: it eliminates the significance of *Respect* for A and y when *Latitude* is also included. One explanation is that in highly polarized societies, *Respect* may be strong within factions, but not across them.

5 Endogeneity and Robustness

5.1 OLS and Endogeneity Problems

We have assumed to this point that our core values R_c and R_n are exogenous. In this section, we consider the alternative. If $Cov\left(R_i, \epsilon\right) \neq 0$ for $i = (c, n)$ in (24) then core values are endogenous and our OLS estimates of α_1 and α_2 reported in Table 3 are biased. There are three common sources of endogeneity: omitted variables, measurement error, and simultaneity. We address these potential problems in turn.

[19] Polarization is a measure of societal division that reaches a maximum when there are two groups. Fractionalization rises with the number of groups. See Montalvo and Reynal-Querol (2005).

Table 5: Societal Fractionalization and Core Values

	Panel A: Dependent = A			**Panel B: Dependent = κ**		
Ethnic Fractionalization	-1.34**	-1.15**	-0.69**	-0.05	-0.04	-0.00
	[0.00]	[0.00]	[0.01]	[0.18]	[0.36]	[0.92]
Respect for others		1.42**	1.00*		-0.13*	-0.17**
		[0.00]	[0.02]		[0.04]	[0.01]
Responsibility		0.91†	0.82†		0.20**	0.19**
		[0.10]	[0.09]		[0.01]	[0.01]
Latitude			1.47**			0.13*
			[0.00]			[0.03]
Constant	9.16**	7.41**	6.98**	0.47**	0.41	0.38**
	[0.00]	[0.00]	[0.00]	[0.00]	[0.06]	[0.00]
Observations	239	239	239	239	239	239
Adj. R^2	0.12	0.22	0.29	0.01	0.05	0.07
	Panel C: Dependent = h			**Panel D: Dependent = y**		
Ethnic Fractionalization	-0.28**	-0.21**	-0.01	-1.66**	-1.40**	-0.69*
	[0.00]	[0.00]	[0.84]	[0.01]	[0.00]	[0.02]
Respect for others		0.39**	0.20*		1.69**	1.04*
		[0.00]	[0.02]		[0.00]	[0.02]
Responsibility		0.32**	0.28**		1.42*	1.29**
		[0.00]	[0.00]		[0.02]	[0.01]
Latitude			0.66**			2.26**
			[0.00]			[0.00]
Constant	1.04**	0.51**	0.32	10.67**	8.38**	7.68**
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Observations	239	239	239	239	239	239
Adj R^2	0.08	0.23	0.46	0.14	0.28	0.41

Notes: Robust p-values in brackets. **significant 1%; * at 5%; † at 10%.

5.2 Omitted Variables Bias and Other Variables from the WVS

There may be other variables that are important in the determination of Q that we have omitted from (24). These omitted variables will be present in ϵ. Candidate omitted variables may include any of the other allied qualities asked in the *Qualities Group.* If any of these allied qualities are correlated with R_c or R_n we introduce potential bias into our estimates α_1 and α_2. This bias can be reduced by including the omitted additional qualities in (24).[20]

There is little guidance as to what specifications would be appropriate to consider. Have we omitted one, two, or more additional qualities? We choose to estimate (24) by adding, one by one, each of the other eight values from the *Qualities Group* described in Section 3.1. [21]

Our results are shown in Table 6. The first column shows the coefficient and p-value for the newly added value (e.g. *Independence* in Row 1); the second column shows the same information for *Respect*; and the third column for *Responsibility.* We do not report the coefficients or p-values for our control variable, *Latitude,* or the constant, but both were always included and were positive and significant.

Our two core values retain the pattern observed earlier. *Responsibility* is positive and significant in every variant of the specification in the panels for A, κ, h, and y, even in instances where the added quality is itself significant. *Respect* is positive and significant in every specification for h and negative and significant in all but one case for κ, repeating the pattern of results established earlier. Its effect on A and y, however, are not as uniform.

Note that of the eight included additional qualities in the regression for A, five of the coefficients are significant, but four of them are *negative.* In the regression for y, five of the six significant coefficients are negative. In both cases, the lone exception is *unselfishness.* It is significant, positive, and drives out the explanatory power of our core value R_c. In itself, this should not be surprising: *Respect for others* and *Unselfishness* are very similar values. They both establish the virtue of self sacrifice to help others. It could be that *Unselfishness* is a better measure of what we mean by the virtue that leads to greater trustworthiness and trust.

The negative coefficients on the *Added* values suggest that there may be something fundamentally different – and important – about our two core values. We would like to believe it is because our core values are permanent and exogenous, whereas the other values – *Hard Work*, for example – are endogenous. That is, societies that have high productivity and high incomes per capita may generate a shift in attitude away from hard work, persistence, and obedience,

[20] The results reported in Table 4 and Table 5, where we included *trust* and *ethnic fractionalization,* can be viewed as ways to lessen omitted variable bias.

[21] With eight additional values to consider, the number of possible regressions that could be run using pairwise combinations of the additional qualities rises to 28 for each of the outcome variables [A, $k\,h\,y$]. We run these regressions, but for brevity do not report the results. The results for R_c and R_n were little changed.

Table 6: Added Qualities

	Panel A: Dependent = A			**Panel B: Dependent = κ**		
Added Value ↓	*Added*	R_c	R_n	*Added*	R_c	R_n
independence	-0.07	0.92*	0.99*	-0.02	-0.17**	0.20**
	[0.80]	[0.04]	[0.05]	[0.64]	[0.01]	[0.01]
hard work	-1.51**	0.07	0.90*	0.01	-0.16**	0.19**
	[0.00]	[0.86]	[0.02]	[0.74]	[0.01]	[0.01]
perseverance	-1.41**	1.22**	1.42**	0.02	-0.17**	0.18*
	[0.00]	[0.01]	[0.01]	[0.83]	[0.01]	[0.03]
thrift	-1.58**	0.56	1.46**	0.12†	-0.14*	0.15†
	[0.00]	[0.18]	[0.00]	[0.08]	[0.04]	[0.06]
imagination	0.14	0.87	0.95*	-0.11	-0.12	0.20**
	[0.81]	[0.12]	[0.05]	[0.26]	[0.15]	[0.01]
religious faith	-0.53†	1.03*	0.79†	0.06	-0.17**	0.21**
	[0.08]	[0.02]	[0.09]	[0.30]	[0.01]	[0.01]
unselfishness	1.09**	0.48	1.11*	-0.12*	-0.12†	0.17*
	[0.00]	[0.31]	[0.01]	[0.04]	[0.10]	[0.02]
obedience	-0.51	1.12*	0.80†	-0.10	-0.13*	0.16*
	[0.25]	[0.02]	[0.10]	[0.14]	[0.05]	[0.04]
	Panel C: Dependent = h			**Panel D: Dependent = y**		
Added Value ↓	*Added*	R_c	R_n	*Added*	R_c	R_n
independence	0.13*	0.19*	0.22**	0.04	0.95*	1.41**
	[0.03]	[0.03]	[0.01]	[0.88]	[0.04]	[0.01]
hard work	0.05	0.24**	0.29**	-1.45**	0.15	1.38**
	[0.12]	[0.01]	[0.00]	[0.00]	[0.73]	[0.00]
perseverance	0.18*	0.19*	0.24**	-1.21**	1.23**	1.83**
	[0.03]	[0.03]	[0.01]	[0.00]	[0.01]	[0.00]
thrift	-0.00	0.20*	0.28**	-1.47**	0.63	1.89**
	[0.97]	[0.03]	[0.00]	[0.00]	[0.15]	[0.00]
imagination	-0.20*	0.30**	0.32**	-0.17	1.05†	1.46**
	[0.05]	[0.00]	[0.00]	[0.77]	[0.07]	[0.00]
religious faith	-0.13†	0.22**	0.24**	-0.60†	1.08*	1.23**
	[0.07]	[0.01]	[0.00]	[0.07]	[0.02]	[0.01]
unselfishness	0.09	0.18†	0.30**	1.05**	0.53	1.58**
	[0.17]	[0.06]	[0.00]	[0.00]	[0.28]	[0.00]
obedience	-0.28**	0.31**	0.19*	-0.89†	1.29**	1.15*
	[0.00]	[0.00]	[0.04]	[0.07]	[0.01]	[0.02]
Notes: *Latitude* and a constant included. Robust p-values in brackets.** significant at 1%; * at 5%; † at 10%.						

and more to leisure, entertainment, and independence. If true, this could explain the negative coefficients in some of the cells. In fact, this is one message of Doepke and Zilibotti (2008), who construct a theoretical model in which a preference for *hard work*, in particular, declines as society develops. Inglehart and Baker (2000) hypothesize that some values are influenced by social and economic development, whereas others have a more permanent component – and do not easily change. Therefore, it does not seem unreasonable to interpret negative coefficients as evidence that reverse causation is at work. A positive coefficient, however, is not proof that the trait in question is exogenous.

5.3 Selection on Observables

It is possible that even after controlling for observable omitted variables, bias in our estimates of α_1 and α_2 from (24) may persist because of important omitted *un*observables. This is because the additional observable variables – call the set $\mathbf{V}$ – may not completely capture an additional important but intangible cultural quality C that influences Q and that may be correlated with core values. If true, our estimating equation (24) should be replaced with:

$$Q_{j,k} = b + \alpha_{\mathbf{1}} R_{c,j,k} + \alpha_2 R_{n,j,k} + \beta_1 X_j + \beta_2 C_{j,k} + \epsilon_{j,k} \tag{25}$$

Assume that *Culture* C is determined by observable variables $\mathbf{V}$ and an unobservable variable c. Thus,

$$C_{j,k} = \mathbf{V_{j,k}}\gamma + c_{j,k} \tag{26}$$

If $Cov(R_c, c) \neq 0$ or $Cov\left(R_n, c\right) \neq 0$ then our estimates of *Respect* and *Responsibility* in Table 6 will be biased, even though we have controlled for $\mathbf{V}$. It is possible that the bias from *un*observables is so large that the effect of R_c and R_n on Q is really zero, and our positive and significant estimates of α_1 and α_2 are just an illusion. We would like to know how large the selection on *observables* would have to be, relative to selection on *unobservables,* for this to be the case.

To find the relevant ratio, we follow Bellows and Miguel (2009) and Nunn and Wantchekon (2011). This method stems from original work by Altonji et al. (2005) in a set-up where the variable of interest is binary. The first step in the method is to estimate α_i using different models, one using a *restricted* set of controls (possibly no controls) and one – the *full* model – that introduces additional controls (or observables) the inclusion of which may attenuate potential bias stemming from unobservables. The more observables we include, the less likely bias from unobservables is at fault. In our case, the restricted model corresponds to our original estimating equation (24). These $\hat{\alpha}_i$ estimates are reported in Table 3 using (24). We

Table 7: $T_{i,j}$ Selection on Observables

	T-Ratios for Respect			
Variant ↓ / Outcome →	A	k^{ρ}	h	y
V_1	13.30	168.90	9.62	21.61
V_2	15.37	187.56	27.83	17.88
	T-Ratios for Responsibility			
	A	k^{ρ}	h	y
V_1	5.05	234.88	473.7	8.11
V_2	6.98	32.18	2.58	6.32

Source: Author's calculations. Absolute values reported.

then estimate two variants of a full model, V_1 and V_2. V_1 adds *Trust* and *Ethnic Fractionalization* to (24). V_2 augments the first variant with the first principal component of the eight additional qualities from the *Qualities Group.* The estimates from these variants are labelled $\hat{\alpha}_{i,Vj}$.

From these regressions, we calculate the ratio for each outcome in Q:

$$T_{i,j} = \hat{\alpha}_{i,Vj}/(\hat{\alpha}_i - \hat{\alpha}_{i,Vj}) \quad (i = R_c, R_n) \quad (j = 1, 2) \tag{27}$$

Under the assumption that the true effect $\alpha_i = 0$, we know that $T_{i,j} = Cov(R_i, c_j)/Cov(R_i, V_j)$ so we can use it to consider the plausibility that our results are driven by unobservables in (24).[22] If we form $T_{1,1}$ using the coefficient estimate on *Respect* $\hat{\alpha}_1$ from (24) for *productivity* A and the coefficient estimate $\hat{\alpha}_{1,V1}$ from the same regression supplemented with *Trust and Ethnic Fractionalization*, we get a value of 13.30 (see the first cell of Table 7). We interpret this to mean that the influence of unobservables on *Respect* must be 13.3 times greater than the influence of observables if α_1 were really zero. Altonji et al. (2005), Bellows and Miguel (2009), and Nunn and Wantchekon (2011) state that the larger the ratio in absolute value, the less plausible it is that results can be explained by omitted *unobservables.* In these papers, ratios in excess of 1 were interpreted to mean that bias from unobservables was unlikely.

In Table 7 we present the $T_{i,j}$ ratio in sixteen cases. There are two panels in Table 7: the top panel refers to R_c and the bottom panel to R_n. In each panel, the row labeled V_1 reports the T ratios in (27) using $\hat{\alpha}_{i,V_1}$ from our first model variant; the row labeled V_2 reports the T ratios from our second model variant. In all cases the T ratios for *Respect* and *Responsibility* are above 2 – and in most cases they are well above 3. Bias owing to unobservables does not

[22] See the Appendix of Bellows and Miguel (2009) for more details on this method.

appear to be a problem.

5.4 Demographic Adjustment

Another source of bias may arise because of measurement error. Our problem of measurement error is compounded by the fact that more than one of our explanatory variables is likely to contain, at least, a similar source of mismeasurement. That is, $R_{c,j} = R^*_{c,j} + \omega$, and $R_{n,j} = R^*_{n,j} + \omega$, where $R^*_{c,j}$ and $R^*_{n,j}$ are the "deep" measures of core values in country j uninfluenced by, e.g. demographic characteristics. We assume the error term, ω, may contain both random (ε) and non-random (χ) sources of mismeasurement. In the classic errors in variables case, the mismeasurement is unobservable and random. Here, however we expect that observable demographic traits may systematically influence survey responses at the individual level and thus our measured response rates, aggregated at the country-wave level.

Ideally, we would like to get a measure of $R^*_{c,j}$ and $R^*_{n,j,}$. To do this, we can control for demographic influences on the survey responses S. We begin by using the survey data gathered at the individual level in each country for each wave. This micro-level data includes each individual's response to the survey questions in the *Qualities Group* discussed in Section 3.1. We use only those survey respondents who selected exactly five qualities, as before. We also have data on various demographic characteristics of each individual. To capture χ, we choose to use the following demographic characteristics since these seem most relevant: *Age*, *Gender*, and *Education*. (See Appendix B). There are approximately 250,000 individuals responses across Waves 2 - 6. Wave 1 was dropped from the analysis since no data on education was collected in that survey.

We estimate the following regression, using the individual-level data:

$$\begin{aligned} S_{i,j,k} &= \beta_0 + \beta_1 Age_{i,j,k} + \beta_2 Gender_{i,j,k} + \beta_3 Educ_{i,j,k} + \\ &\quad + \Sigma_{k=3}^{6} \theta_k Wave_k + \Sigma_{j=2}^{82} \varphi_{,j} Country_j + \varepsilon_{i,j,k} \end{aligned} \tag{28}$$

where $S_{i,j,k}$ is individual $i's$ binary response in country j in wave k. The variable *Wave* is a dummy variable for each wave, where Wave 2 is the omitted category. We include wave dummies in the estimation to preserve the panel nature of our response rate data. *Country* is a dummy variable for each country with the United States as the omitted group. We estimate (28) for our two main qualities of interest - *Respect* and *Responsibility*.

Using the individual responses to the *Respect* question for $S_{i,j,k}$, our new, *conditional aggregate* measure of R^*_c in Wave k for Country j equals $(\beta_0 + \theta_k + \varphi_j)$. For the US in Wave 2,

however, it is just β_0, since Wave 2 and the US were the omitted cases for the two dummies. Our conditional measure of R_n^* is constructed in the same way.

These estimates provide a demographically-adjusted measure of *Respect* and *Responsibility* aggregated at the country and wave-level. Tabellini (2010) uses a similar treatment in demographically adjusting values from the *European Values Survey* across region and country. In total, we have 188 observations – fewer than the 239 from our earlier work. This is because there were some countries in Wave 2 where data on *Education* was not collected. The correlation between the demographically-adjusted series and the unadjusted response rates is 0.92 for *Respect* and 0.93 for *Responsibility*.

Earlier, we had stated that we believe that the core values we identify are deeply-held beliefs. Though they are a facet of culture, we view them as an enduring component. If true, *Respect* and *Responsibility* will not change over time. An examination of the estimates of the θ_j's – the coefficients on the wave dummies – provides some favorable evidence. First, the coefficients are small. The average across $\theta_3 - \theta_6$ for *Respect* is -0.03 and for *Responsibility* is 0.012. The respective means are 0.62 and 0.74. Second, there is no discernible trend in the coefficients – they are neither trending up nor down over time. This result supports recent evidence documented by Guiso et al. (2008) and Tabellini (2008a, 2010) that cultural values are persistent, at least globally.

With these alternative measures of *Respect* and *Responsibility,* we re-estimate specifications used in Tables 3 - 7. To conserve on space, we report results from estimating (24) and supplementing it with *Trust, Ethnic Fractionalization*, or one additional quality as in Table 6.[23] The three columns in each panel of Tables 8 and 9 show the coefficient estimates for the *added variable* and for *Respect* (R_c) and *Responsibility* (R_n) from (24). In all cases, our control *Latitude* and a constant were included, but are not reported.

We find even *stronger* support for the importance of our two core values. *Respect* and *Responsibility* are now highly significant in nearly all cases for A and y – the one exception is when we add the *hard work* quality, but that has a negative influence. With the unadjusted data, there were a total of seven exceptions out of 16 – four for A and three for y. For κ, *Responsibility* retains its significance always and *Respect* is always negative – as the theory predicts – and significant in seven of the eight cases. For human capital h, *Responsibility* is highly significant across specifications, and *Respect* retains significance in many cases. We also see that *Trust* generally loses its significance when our two core values are included, except for h, where *Trust* becomes negative and significant.

[23]We followed the same two procedures for creating alternative measures of *Trust* and for each of the additional qualities listed in Table 6. We lose two countries with the *Trust* data.

Table 8: OLS Results using Demographically-Adjusted Response Rates

	Panel A: Dependent = A			**Panel B: Dependent = κ**		
Added Variable ↓	*Added*	R_c	R_n	*Added*	R_c	R_n
–	–	2.31**	2.49**	–	-0.16†	0.22**
		[0.00]	[0.00]		[0.07]	[0.01]
Trust	0.49	2.40**	2.11**	0.00	-0.18*	0.22**
	[0.26]	[0.00]	[0.00]	[0.97]	[0.04]	[0.01]
Ethnic Fractionalization	-0.68*	2.33*	2.28**	0.04	-0.17†	0.23**
	[0.02]	[0.02]	[0.00]	[0.50]	[0.07]	[0.01]
independence	0.31	2.25**	2.38**	-0.04	-0.16†	0.23**
	[0.31]	[0.00]	[0.00]	[0.55]	[0.08]	[0.00]
hard work	-1.49**	0.63	1.80**	-0.02	-0.19*	0.21*
	[0.00]	[0.99]	[0.00]	[0.73]	[0.03]	[0.02]
perseverance	-1.15**	2.53**	2.68**	-0.03	-0.17†	0.22**
	[0.01]	[0.00]	[0.00]	[0.82]	[0.06]	[0.01]
thrift	-1.09**	1.76**	2.77**	0.15†	-0.09	0.18*
	[0.01]	[0.00]	[0.00]	[0.06]	[0.38]	[0.03]
imagination	-0.76	2.82**	2.56**	-0.18	-0.05	0.23**
	[0.28]	[0.002]	[0.00]	[0.19]	[0.68]	[0.01]
religious faith	-0.26	2.27**	2.32**	0.09	-0.15†	0.26**
	[0.38]	[0.00]	[0.00]	[0.16]	[0.10]	[0.00]
unselfishness	1.61**	1.65**	2.71**	-0.15*	-0.10	0.20*
	[0.00]	[0.00]	[0.00]	[0.05]	[0.26]	[0.02]
obedience	-0.75	2.57**	2.25**	-0.09	-0.14	0.19*
	[0.15]	[0.00]	[0.00]	[0.34]	[0.17]	[0.02]

Notes: *Latitude* and a constant included.
Robust p-values in brackets.** significant at 1%; * at 5%; † at 10%.

Table 9: OLS Results using Demographically Adjusted Response Rates, continued.

	Panel C: Dependent = h			**Panel D: Dependent = y**		
Added Variable ↓	*Added*	R_c	R_n	*Added*	R_c	R_n
–	–	0.18	0.42**	–	2.33**	2.49**
		[0.14]	[0.00]		[0.00]	[0.00]
Trust	-0.25**	0.27*	0.46**	0.25	2.49**	2.78**
	[0.00]	[0.03]	[0.00]	[0.60]	[0.00]	[0.00]
Ethnic Fractionalization	-0.00	0.18	0.42**	-0.64*	2.34**	2.93**
	[0.95]	[0.14]	[0.00]	[0.04]	[0.00]	[0.00]
independence	0.18*	0.14	0.36**	0.45	2.23**	2.97**
	[0.01]	[0.22]	[0.00]	[0.15]	[0.00]	[0.00]
hard work	0.07	0.29*	0.47**	-1.43**	0.73	2.47**
	[0.15]	[0.05]	[0.00]	[0.00]	[0.30]	[0.00]
perseverance	0.13	0.18	0.42**	-1.05*	2.54**	3.30**
	[0.23]	[0.12]	[0.00]	[0.03]	[0.00]	[0.00]
thrift	0.06	0.21†	0.41**	-0.87*	1.88**	3.35**
	[0.52]	[0.10]	[0.00]	[0.04]	[0.00]	[0.00]
imagination	-0.31**	0.40**	0.46**	-1.24†	3.15**	3.24**
	[0.01]	[0.01]	[0.00]	[0.10]	[0.00]	[0.00]
religious faith	-0.17*	0.15	0.34**	-0.33	2.27**	2.92**
	[0.04]	[0.19]	[0.00]	[0.31]	[0.00]	[0.00]
unselfishness	0.07	0.17	0.44**	1.53**	1.72**	3.35**
	[0.40]	[0.18]	[0.00]	[0.00]	[0.01]	[0.00]
obedience	-0.27*	0.27**	0.34*	-1.11†	2.70**	2.77**
	[0.04]	[0.04]	[0.02]	[0.07]	[0.00]	[0.00]
Notes: *Latitude* and a constant included. Robust p-values in brackets.** significant at 1%; * at 5%; † at 10%.						

5.5 Simultaneous Equations Bias and Instrumental Variables Estimation

Cultural traits appear to be persistent,[24] but this does not mean that they are not influenced by living standards. As incomes rise, it is likely that values change, if only slowly. Simultaneity of this kind means that our previous estimates of the effect of *Respect* and *Responsibility* are biased. Here, we focus exclusively on the single outcome, per worker income y, since it makes most sense to link the determination of values to income and not, say, to capital intensity or productivity.

We can address simultaneous equations bias in (24) – as well as other sources of bias – by using instrumental variables estimation (or two-stage least squares $2SLS$). Ideally, we would like to have deep historical measures of *Respect* and *Responsibility* to be instruments for current values, but cultural data from the distant past is sparse. To overcome the lack of historical data on values, we need observable variables that are correlated with R_c and R_n but have little independent effect on our outcome variable y.

There is a rich tradition of using instruments in the literature on economic growth,[25] but there have been fewer papers that address the specific problem of evolving culture over time. In his important work, Tabellini (2010) uses historical European data on literacy and political restraint as instruments for his cultural measures. Much of the research in this area, however, has used some measure of religion as an instrument for values. Barro and McCleary (2003) and McCleary and Barro (2006) use three measures of the state's involvement in society's religious life and the extent of religious pluralism as instruments for beliefs and church attendance. Guiso et al. (2006) use the individual's religion and country of ancestor's origin as instruments for responses to the trust question. To explain government performance in US states, Knack (2002) uses religious composition variables as instruments for social capital. Zak and Knack (2001) employ a similar strategy in their work on cross-country growth. In their analysis of international investment, Siegel et al. (2011) show that differences in the moral quality *egalitarianism,* instrumented by past religion, war history, and social fractionalization, account for a significant amount of financial flows across borders. The interaction of morality and human capital may be more important than either separately in determining economic outcomes. To make this case, Balan and Knack (2012) instrument for the morality-ability correlation with religious affiliation measures and the state antiquity index (see Bockstette

[24] Fernandez (2010)), Fernandez and Fogli (2009)), and Tabellini (2010) show that the country of origin of one's grandparents is very influential in determining a person's values today. Spolaore and Wacziarg (2009)) use genetic distance as a metric for the extent to which cultural or biological beliefs, customs, etc. are transmitted intergenerationally. Theoretical work by Bisin and Verdier (2001) and Tabellini (2008b) shows that culture is shaped over time by persistent forces originating in the family structure.

[25] To mention a few: Hall and Jones (1999), Acemoglu et al. (2001); Acemoglu and Johnson (2005), Glaeser et al. (2004), and Sachs (2000).

et al. (2002)).

Our identification strategy is similar to that of Siegel et al. (2011) and Balan and Knack (2012). Our instruments are the *religious composition* of the population in 1980; the *state antiquity index;* and the *civil liberties index* in 1972. This instrument set is also selected for statistical and sample size considerations.

A major purpose of religion is to shape its adherent's beliefs, behaviors, and values in line with a deeper truth. It is plausible that such values – like *Respect* and *Responsibility* – are not only significantly influenced by religion, but that religion affects economic outcomes only through such values. We therefore, like others, use religious measures for instruments. Our instruments are the proportions of the populations in 1980 that are identified as Catholic *or* Protestant (called *CP80*) and the proportion of the population that identify with the Muslim faith (called *Muslim80*).

Values are also likely to be shaped by secular institutions over time. The longer states have been in existence, the more likely they are to have developed a national identity, a common language, and a stable bureaucracy. The longer a nation has been in existence, we hypothesize, the stronger any cultural attribute. Accordingly, we think the *State Antiquity Index* (or *SAI*) from Bockstette et al. (2002) is another potential instrument. This variable is a weighted measure of years of organized statehood going back to 1A.D. It seems plausible that the main channel through which *SAI* would affect economic outcomes is value formation.

Our last instrument is a measure of institutional quality in each country. We use the *index of civil liberties* in 1972 – the first year it was available – which we call *CL72*. The idea here is that institutions that protect civil liberties embody a society's values. If values are persistent, current institutions will be reliable measures of historical institutions and values. Moreover, these institutions from the past will influence economic outcomes mainly through cultural values.

Since our main OLS estimating equation (24) contains two potentially endogenous regressors, R_c and R_n for which we must instrument, we will examine the pairwise desirability of our four instruments – *CP80*, *Muslim80*, *SAI,* and $CL72$ (as well as on *Latitude,* the included exogenous regressor).

It should be recognized that IV estimation has its own problems. The choice between OLS – in the presence of endogeneity – and IV is one that involves trading one set of biases for another. The difficulties in isolating these biases in the case of IV rise, moreover, as the number of endogenous regressors increases. This is because the ability to identify valid, exogenous instruments that contribute independently to the identification of each endogenous regressors becomes more difficult. If good instruments are not found, problems associated with $2SLS$ are exacerbated.

For that reason, in this section we first estimate (24) by $2SLS$ with only one endogenous regressor, R_c or R_n. (We always include *Latitude* as an exogenous regressor). The results are reported in the first two columns of 10. Our choice of desirable instrument sets was selected where the F-test for the joint significance of the instruments is greater than 10 - the rule-of-thumb critical value. The first-stage F tests reported in Table 10 show that the instruments are strong. In addition, the test for overidentification shows that using more than onse instrument helps to identify the effect of R_c (R_n) on y. That is, we "accept" the null hypothesis that the instruments are valid. Turning to the coefficient estimates on R_c and R_n reported in Columns 1 and 2, we see that the earlier OLS results are confirmed. The coefficient estimates are positive, large, and highly significant.

Next, we use the principal component of the two values (pcR) in place of either value alone. This allows us to keep the information in both values, but also to keep the number of endogenous regressors to one. Tabellini (2010) follows a similar strategy. These results are reported in Column 3 of Table 10. In Column 4, we include both values together acknowledging that the complexity of statistical and interperetive issues rises in this case. In these latter two regressions, we use all four instruments.

When we use pcR, the F-test on the first-stage regression exceeds 10 and so we conclude that the instrument set is relevant. Also, the test for overidentification suggests our instrument set is valid. When we include both endogenous regressors, we report Shea (1997)'s partial R^2 and the Stock-Yogo test for weak identification in Column 4. (We also report the first-stage F-tests even though the critical value of 10 does not necessarily mean that the instruments are jointly relevant). These latter two diagnostics help determine whether the instrumental variables capture enough independent variation in the two endogenous regressors to allow for identification. Shea's partial R^2 is reasonable and the Stock-Yogo test confirms that we can reject the null hypothesis that the instrument set is weak. That is, that the bias from weak instruments that may be introduced when we use $2SLS$ is no more than 10% of the inconsistency from the endogenous regressors in OLS. (See Stock et al. (2002)). The overidentification test is also passed. The results are again very supportive of the theoretical model and accord with the OLS results: the coefficients on R_c and R_n are positive and significant.

We also estimated all of the specifications using $LIML$, which is considered to be superior in the presence of possibly weak instruments. We found virtually no difference in the results. As a final test, we replaced the instrument $CL72$ with the *settler mortality* variable in Acemoglu et al. (2001). The results are also very good, but the sample size is much smaller.

Table 10: 2SLS Results

	Dependent variable is y			
Respect for others R_c	9.75** [0.00]	–	–	5.50** [0.00]
Responsibility R_n	–	6.37** [0.00]	–	4.86** [0.00]
Principal Component	–	–	1.00** [0.00]	–
Latitude	1.33* [0.03]	2.04** [0.00]	1.42** [0.00]	1.42** [0.00]
Constant	2.70* [0.05]	4.49** [0.00]	9.50** [0.00]	2.02† [0.06]
Observations	217	227	208	208
Instrument Set	*CP80* and *CL72*	*Muslim80* and *SAI*	*CP80*, *Muslim80* *CL72*, and *SAI*	
First stage F-test	15.31	10.53	11.79	R_c 13.00 R_n 9.57
Shea's Partial R^2	–	–	–	R_c 0.20 R_n 0.11
Stock-Yogo Weak Identification Test	–	–	–	9.51[a]
Overidentification Test	0.00 [0.99]	0.65 [0.42]	2.50 [0.47]	2.50 [0.29]

Notes: Robust p values in brackets. **significant 1%; * at 5%; and † at 10%.
[a]The reported F-statistic rejects 10% maximal relative bias; instruments are strong.

6 Conclusion

This paper continues recent work on the search for deep determinants of economic development. We take seriously the idea that culture contains an exogenous component, and that this component is a significant determinant of economic outcomes. Our first step was to construct a model of growth in which two core values - *Respect for others* and *Responsibility* - are key determinants of output. *Respect for others* raises trust, scale, and productivity; and *Responsibility* encourages patience and investment. The structure also allows us to decompose output per worker into the product of human capital, physical capital intensity, and productivity, and to see how they are related to our two core values.

The empirical analysis was carried out in two parts. In the first part, we ran pooled OLS on various specifications using data from 82 countries and six waves of data from the *World Values Survey.* Our explanatory variables were response rates on two questions that we believe measure the intensity with which the two core values are held. We showed that these response rates are almost always significant and of sizable magnitude in explaining output per worker and its components, even with the inclusion of *Latitude* as a control.

We introduced two other cultural variables – *Trust* and *Ethnic Fractionalization* – (one at a time) into the analysis. Both of these have been shown to be highly correlated with economic performance. We find the same here, but they have a considerably smaller impact when we include *Respect* and *Responsibility* with them in the regressions. The results support the idea that trust is, at least partly, determined by *Respect* – a building block of the theoretical model — and that values can mitigate, or even offset, the detrimental effects of ethnic or other divisions.

In the second part of the empirical analysis, we addressed concerns about endogeneity. First, into the basic regression with core values and *Latitude*, we introduced the other qualities – one at a time – from the list that survey respondents were given. We did this primarily to see if there was anything different about our core values *Respect* and *Responsibility.* In fact, we found, with one exception (*Unselfishness*) that *none* of the other values was positive and significant for output per worker or its components. This does not prove exogeneity, but it suggests that the values identified by our theoretical model are important in ways that other virtues are not.

Second, because we cannot observe all potentially omitted variables, we investigated the potential for bias arising from *un*observables using the method of Altonji et al. (2005). We concluded that it was implausible that there was significant bias arising from unobservable variables that were correlated with our values variables.

Response rates averaged over all respondents may reflect the demographic composition of

different societies. To address this, we used the micro-level source data to construct aggregated conditional response rates that controlled for age, sex, and education. These demographically-adjusted measures of *Respect* and *Responsibility* are more likely to capture deeply-held values. Using these response rates, we obtain even stronger results.

Finally, we allowed for simultaneity between core values and output per worker. We then estimated our main equation using instrumental variables estimation. Our instruments were measures of religion and institutions which reflect deep-seated values that may not be otherwise correlated with economic outcomes. Our main conclusions were not altered. *Respect* and *Responsibility* are important to production.

Our findings have several important implications. First, they suggest an alternative interpretation to studies that find political and legal institutions are critical to output per worker and economic development. It is conceivable that these institutions may matter because fundamentally, they capture the core values a society holds dear. Our work also offers an explanation for the inertia of institutions and underdevelopment. Because core values are likely to be highly persistent, they may be able to explain the persistence of institutions and underdevelopment.

The persistence of underdevelopment has long been recognized yet is not well-understood. If core values are the key to economic success, then persistence may reflect the difficulty in changing the fundamental principles by which citizens behave and interact.

A Conditions for Optimal Growth

Households maximize discounted total utility $J = \int_t^\infty u\left(c\left(t\right)\right) e^{-\rho t} dt$ subject to the constraint (17) and the motion equations (15) and (16). Utility is assumed to be of the standard type: $u\left(c\right) = \frac{c^{\theta-1}-1}{\theta-1}$. The Hamiltonian (Lagrangian) for this problem is:

$$\mathcal{H} = uc + q\left(i_z - \delta\right) + \mu\left(i_h - \delta h\right) + \lambda\left(R_K z + w_b h - i_z - i_h - c\right) \tag{29}$$

where q and μ are co-states and λ is a Lagrangian multiplier.

The first-order conditions for i_z and i_h require that $q = \mu = \frac{1}{\theta}$ in the interior, which means that $\frac{\dot{q}}{q} = \frac{\dot{\mu}}{\mu}$.

The arbitrage conditions are:

$$\frac{\dot{q}}{q} = \rho + \delta - \frac{\lambda}{q} R_K \tag{30}$$

$$\frac{\dot{\mu}}{\mu} = \rho + \delta - \frac{\lambda}{\mu} w_b \tag{31}$$

Equating these two means that $R_K = w_b$, which implies equation (19) in the text.

The first order condition for consumption requires that $\frac{\dot{c}}{c} = -\frac{1}{\theta}\left(\frac{\dot{q}}{q}\right) = \frac{1}{\theta}\left(R_K - \delta - \rho\right)$. This is expressed as (21) in the text.

B Data Appendix

We used the following data in the paper.

1. *Respect*. Proportion of individuals selecting *Respect* - Question a035. Source: *World Values Survey.*

2. *Responsibility*. Proportion of individuals selecting *Responsibility* - Question a032. Source: *World Values Survey.*

3. A. Total factor productivity. Source: Constructed as the residual $A = \frac{y}{k^{\rho}h}$ where $\rho \equiv \frac{\alpha}{1-\alpha}$.

4. k. Physical capital intensity $\frac{K}{Y}$. Source: K is constructed using the perpetual inventory method using data from investment from the *Penn World Table v. 7.0.*

5. h. Human capital per capita. Source: Constructed using the method of Hall and Jones, 1999 using the data from Barro and Lee, 2001.

6. y. Output per worker; series $RGDPWK$. Source: *Penn World Table* v. *7.0*

7. *Latitude*. Absolute value of latitude. Source: La Porta et al. (1998).

8. $Trust$. Proportion of individuals selecting *"most people can be trusted"* - Question a165. Latest of 1995 or 2000. Source: the *World Values Survey.*

9. $Ethnic\,Fractionalization$. Measure of number of different ethnic groupings within a country. Various years. Source: Alesina et al. (2003).

10. *Qualities*, other. Proportion of individuals selecting questions a029 (*independence),* a030 *(hard work)*, a039 (*perseverance*), a038 (*thrift*), a034 (*imagination*), a040 (*religious faith*), a041 (*unselfishness*), a042 (*obedience).* Latest of 1995 or 2000. Source: *World Values Survey.*

11. *Age*. Categorical age variable of survey respondents. Six categories of ages. Source: *World Values Survey.*

12. *Gender*. Binary indicator of the gender of survey respondents. Male = 1; Female = 2. Recoded as male = 0; female = 1. Source: *World Values Survey.*

13. *Education*. Categorical education variable of highest level of educational attainment of survey respondents. Eight categories. Source: *World Values Survey.*

14. $CP80$. Proportion of the population with religious faith identified as Catholic or Protestant. Source: La Porta et al. (1999).

15. $Muslim80$. Proportion of the population with religious faith identified as Muslim. Source: La Porta et al. (1999)

16. SAI. State Antiquity Index. Weighted index based on the fraction of years from 1C.E. to 1950 that a nation-state was in existence. Source: Bockstette et al. (2002).

17. $CL72$. Index of Civil Liberties in 1972. (Re-coded) scale of 1 – 7, with 7 indicating the most free. Source: *Freedom House.*

18. *pcR*. Principal component of *Respect* and *Responsibility.*

References

Acemoglu, D. (1998). Why do new technologies complement skills? directed technical change and wage inequality. *The Quarterly Journal of Economics*, 113(4):1055–1089.

Acemoglu, D. and Johnson, S. (2005). Unbundling institutions. *Journal of Political Economy*, 113(5):949–995. available at http://ideas.repec.org/a/ucp/jpolec/v113y2005i5p949-995.html.

Acemoglu, D., Johnson, S., and Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, 91(5):1369–1401.

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., and Wacziarg, R. (2003). Fractionalization. *Journal of Economic Growth*, 8(2):155–94.

Alesina, A. and Ferrara, E. L. (2005). Ethnic diversity and economic performance. *Journal of Economic Literature*, 43(3):762–800.

Alesina, A., Spolaore, E., and Wacziarg, R. (2000). Economic integration and political disintegration. *The American Economic Review*, 90(5):1276–1296.

Altonji, J. G., Elder, T. E., and Taber, C. R. (2005). Selection on observed and unobserved variables: Assessing the effectiveness of catholic schools. *Journal of Political Economy*, 113(1):151–184.

Balan, D. J. and Knack, S. (2012). The correlation between human capital and morality and its effect on economic performance: Theory and evidence. *Journal of Comparative Economics*, 40(3):457 – 475.

Barro, R. J. and Lee, J.-W. (2001). International data on educational attainment: Updates and implications. *Oxford Economic Papers*, 53(3):541–63. available at http://ideas.repec.org/a/oup/oxecpp/v53y2001i3p541-63.html.

Barro, R. J. and Lee, J.-W. (2011). International data on educational attainment: Updates.

Barro, R. J. and McCleary, R. M. (2003). Religion and economic growth across countries. *American Sociological Review*, 68(5):pp. 760–781.

Barro, R. J. and Sala-i Martin, X. (2004). *Economic Growth, 2nd Edition*, volume 1 of *MIT Press Books*. The MIT Press.

Bellows, J. and Miguel, E. (2009). War and local collective action in sierra leone. *Journal of Public Economics*, 93(11-12):1144–1157.

Bisin, A. and Verdier, T. (2001). The economics of cultural transmission and the dynamics of preferences. *Journal of Economic Theory*, 97(2):298–319.

Bockstette, V., Chanda, A., and Putterman, L. (2002). States and markets: The advantage of an early start. *Journal of Economic Growth*, 7(4):347–69.

Breuer, J. B. and McDermott, J. (2012). Culture, caution, and trust. *Journal of Development Economics*, 97(1):15 – 23.

Dixit, A. K. and Stiglitz, J. E. (1977). Monopolistic competition and optimum product diversity. *American Economic Review*, 67(3):297–308.

Doepke, M. and Zilibotti, F. (2008). Occupational choice and the spirit of capitalism. *The Quarterly Journal of Economics*, 123(2):747–793.

Easterly, W. and Levine, R. (1997). Africa's growth tragedy: Policies and ethnic divisions. *The Quarterly Journal of Economics*, 112(4):1203–50. available at http://ideas.repec.org/a/tpr/qjecon/v112y1997i4p1203-50.html.

Easterly, W. and Levine, R. (2002). ItÂŽs not factor accumulation: Stylized facts and growth models. In Loayza, N., Soto, R., Editor), N. L. S., and Editor), K. S.-H. S., editors, *Economic Growth: Sources, Trends, and Cycles*, volume 6 of *Central Banking, Analysis, and Economic Policies Book Series*, chapter 3, pages 061–114. Central Bank of Chile.

Ethier, W. J. (1982). National and international returns to scale in the modern theory of international trade. *American Economic Review*, 72(3):389–405.

Fernandez, R. (2010). Does culture matter? In Benhabib, J., Bisin, A., and Jackson, M., editors, *Handbook of Social Economics*, volume 1A and 1B, chapter 7.

Fernandez, R. and Fogli, A. (2009). Culture: An empirical investigation of beliefs, work, and fertility. *American Economic Journal: Macroeconomics*, 1(1):146–77.

Glaeser, E. L., Porta, R. L., de Silanes, F. L., and Shleifer, A. (2004). Do institutions cause growth? *Journal of Economic Growth*, 9(3):271–303.

Gollin, D. (2002). Getting income shares right. *Journal of Political Economy*, 110(2):458–474.

Goodfriend, M. and McDermott, J. (1995). Early development. *American Economic Review*, 85(2):166–133.

Goodfriend, M. and McDermott, J. (1998). Industrial development and the convergence question. *American Economic Review*, 88(5):1277–89. available at http://ideas.repec.org/a/aea/aecrev/v88y1998i5p1277-89.html.

Grossman, G. M. and Helpman, E. (1993). *Innovation and Growth in the Global Economy*, volume 1 of *MIT Press Books*. The MIT Press.

Guiso, L., Sapienza, P., and Zingales, L. (2006). Does culture affect economic outcomes? *Journal of Economic Perspectives*, 20(2):23–48.

Guiso, L., Sapienza, P., and Zingales, L. (2008). Long term persistence. NBER Working Papers 14278, National Bureau of Economic Research, Inc.

Guiso, L., Sapienza, P., and Zingales, L. (2009). Cultural biases in economic exchange? *Quarterly Journal of Economics*, 124(3):1095–1131.

Hall, R. E. and Jones, C. I. (1999). Why do some countries produce so much more output per worker than others? *The Quarterly Journal of Economics*, 114(1):83–116.

Heston, A., Summers, R., and Aten, B. (2006). Penn world table version 6.2.

Inglehart, R. and Baker, W. E. (2000). Modernization, cultural change, and the persistence of traditional values. *American Sociological Review*, 65(1):19–42.

Klenow, P. and Rodríguez-Clare, A. (1997). The neoclassical revival in growth economics: Has it gone too far? In *NBER Macroeconomics Annual 1997, Volume 12*, NBER Chapters, pages 73–114. National Bureau of Economic Research, Inc.

Knack, S. (2002). Social capital and the quality of government: Evidence from the states. *American Journal of Political Science*, 46(4):772–785.

Knack, S. and Keefer, P. (1997). Does social capital have an economic payoff? a cross-country investigation. *The Quarterly Journal of Economics*, 112(4):1251–88.

La Porta, R., de Silanes, F. L., Shleifer, A., and Vishny, R. W. (1998). Law and finance. *Journal of Political Economy*, 106(6):1113–1155.

La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. (1999). The quality of government. *Journal of Law, Economics and Organization*, 15(1):222–79.

Lazear, E. P. (1999). Culture and language. *The Journal of Political Economy*, 107(6):S95–S126.

Mankiw, N. G., Romer, D., and Weil, D. N. (1992). A contribution to the empirics of economic growth. NBER Working Papers 3541, National Bureau of Economic Research, Inc.

Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics*, 110(3):681–712.

McCleary, R. M. and Barro, R. J. (2006). Religion and economy. *Journal of Economic Perspectives*, 20(2):49–72.

Montalvo, J. G. and Reynal-Querol, M. (2005). Ethnic diversity and economic development. *Journal of Development Economics*, 76(2):293–323. available at http://ideas.repec.org/a/eee/deveco/v76y2005i2p293-323.html.

Nunn, N. and Wantchekon, L. (2011). The slave trade and the origins of mistrust in africa. *American Economic Review*, 101(7):3221–52.

Psacharopoulos, G. (1994). Returns to investment in education: A global update. *World Development*, 22(9):1325–1343.

Rivera-Batiz, L. A. and Romer, P. M. (1991). Economic integration and endogenous growth. *The Quarterly Journal of Economics*, 106(2):531–55.

Romer, P. M. (1987). Growth based on increasing returns to specialization. *American Economic Review*, 98(3):56–62.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5):S71–102. available at http://ideas.repec.org/a/ucp/jpolec/v98y1990i5ps71-102.html.

Rose, D. C. (2011). *The Moral Foundation of Economic Behavior*. Oxford University Press.

Sachs, J. (2000). Tropical underdevelopment. CID Working Paper.

Shea, J. (1997). Instrument relevance in multivariate linear models: A simple measure. *The Review of Economics and Statistics*, 79(2):348–352.

Siegel, J. I., Licht, A. N., and Schwartz, S. H. (2011). Egalitarianism and international investment. *Journal of Financial Economics*, 102(3):621–642.

Smith, A. (1776). *An Inquiry Into the Nature and Causes of the Wealth of Nations*. Oxford University Press, 1981 edition.

Spolaore, E. and Wacziarg, R. (2009). The diffusion of development. *The Quarterly Journal of Economics*, 124(2):469–529.

Stock, J. H., Wright, J. H., and Yogo, M. (2002). A survey of weak instruments and weak identification in generalized method of moments. *Journal of Business & Economic Statistics*, 20(4):518–29.

Tabellini, G. (2008a). Presidential address institutions and culture. *Journal of the European Economic Association*, 6(2-3):255–294.

Tabellini, G. (2008b). The scope of cooperation: Values and incentives. *The Quarterly Journal of Economics*, 123(3):905–950.

Tabellini, G. (2010). Culture and institutions: Economic development in the regions of europe. *Journal of the European Economic Association*, 8(4):677–716.

Wilson, J. Q. (1993). *The Moral Sense*. Free Press.

World Values Survey (2006). European and world values survey four-wave integrated data file.

Zak, P. J. and Knack, S. (2001). Trust and growth. *Economic Journal*, 111(470):295–321.