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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.

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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 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 that 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

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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.

Breuer and McDermott (2012), which facilitates exchange and increases scale.² 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 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 In our earlier paper, 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>.

2. A theoretical framework

In this section we outline a theoretical framework to explain why we think respect and responsibility are important for economic development. The full model is available as an online appendix.

2.1. Respect, responsibility, and growth

In his book *The Moral Foundation of Economic Behavior*, 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 common 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.

Using a model of labor teams cooperating with capital, it can be shown that aggregate productivity depends on scale generated by respect. Consider the standard production function for Country j :

$$Y_j = K_j^\alpha (A_j H_j)^{1-\alpha} \quad (1)$$

where K is physical capital, $H \equiv hL$ is aggregate human capital (L is labor and h is individual human capital) and A is factor productivity. As usual, the parameter $\alpha < 1$. The key feature of our model is that A depends on *respect* through scale.

The model is presented in detail in the online appendix, but the key idea is that there is a limit to the number of people that any firm can employ. The strict limit on employee size reflects 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. Given a firm production function that rewards labor variety, national output will rise if firms can be larger. *Respect* allows greater firm size, which will show up in the national statistics as greater productivity and greater output per capita.

In *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. Adam Smith called this virtue *self-command* and considered it the virtue of most use to the individual (Smith, 1794; Part 4, IV, 17). More recently, Doepke and Zilibotti (2008) use the concept of *patience* in the same cultural sense.

People who are *Responsible* 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. This logic

establishes the presumption that societies endowed with a cultural bias to be responsible also have a low rate of time preference, ρ , and that human and physical capital will therefore be higher.

In the online appendix, we integrate these ideas about *Respect* and *Responsibility* into a model of endogenous growth and derive empirical implications of culture on development. There, we show that growth in the steady state is given by:

$$\gamma_j = \frac{1}{\theta} \left(B [A(R_{c,j})]^{1-\alpha} - \delta - \rho(R_{n,j}) \right) \quad (2)$$

where γ_j is the growth rate of both h and y in Country j . In this equation, the net return to both human and physical capital is $BA^{1-\alpha} - \delta$, where δ is the common rate of depreciation and $B \equiv \alpha^\alpha(1-\alpha)^{1-\alpha}$ is a constant. Productivity A is now written as an explicit, positive function of $R_{c,j}$, which stands for the cultural value *Respect* in Country j . *Respect* raises the growth rates of h and y by raising the return to capital of both types. Time preference ρ is expressed as an explicit, inverse function of $R_{n,j}$, which stands for the value *Responsibility* in Country j . *Responsibility* raises the growth rate by reducing the rate of time preference. For simplicity, we do not allow R_n to influence firm productivity A directly, but it seems plausible that a great number of responsible individuals might have an independent, positive effect on A .

2.2. Empirical implications

Respect and *Responsibility* work by increasing saving and investment, which have permanent effects on the growth rates of y and h . 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 A 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 Hall and Jones (1999), Klenow and Rodríguez-Clare (1997) and Mankiw et al. (1992). From Eq. (1) this yields:

$$y_j = A_j \kappa_j h_j \quad (3)$$

where $\kappa \equiv \left(\frac{K}{Y}\right)^{\frac{\alpha}{1-\alpha}}$ is the economy's "capital intensity".⁴

Human capital per worker h , like per worker output y , grows at the rate γ given in Eq. (2). It follows that h should be positively related to both respect and responsibility: the greater is A and the smaller is ρ , the higher the level of h observed in a cross-section of countries.

Productivity A and capital intensity κ , on the other hand, are constant over time. Their levels, not their rates of growth, depend on core values.

Capital intensity is constant because K and Y grow at the same rate. 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 . Capital intensity, as we show in the online appendix, can be written as⁵:

$$\kappa = [A(R_c)]^{-\alpha} \beta^{-\alpha} \quad (4)$$

where $\beta \equiv \frac{1-\alpha}{\alpha}$. The inverse relationship between respect R_c and capital intensity κ is a testable implication of our theory.

⁴ 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.

⁵ It is possible to write κ this way because K is proportional to H in balanced growth.

In balanced growth, we can eliminate capital intensity in Eq. (1) using Eq. (4) and show that per capita output is:

$$y = A^{1-\alpha} h \beta^\alpha \quad (5)$$

Respect – through A 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.

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.⁶

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 as⁷:

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 varies across countries but typically ranges from 1000 to 1300. 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

⁶ 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.

⁷ 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.

Table 1
Testable Hypotheses.

Effect of ↓ on →	Sign			
	A	κ	h	y
Respect R_c	+	–	+	+
Responsibility R_n	0	0	+	+

waves have very few countries in common. Wave 5 is essentially non-OECD countries, while Wave 6 is 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 Eq. (3). 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%; for the next four, 10.1%; after that, it is 6.8%. 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: $K_0 = \frac{I_0}{\gamma + \delta}$. In this expression, I_0 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 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.⁸ 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.⁹

Productivity A is found as the residual once the other series in Eq. (3) have been constructed.

The sources and descriptions of the variables are provided in Appendix A. 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*.

⁸ Easterly and Levine (2002) construct a capital stock series in a similar way but use larger values for both γ and δ .

⁹ We thank an anonymous referee for emphasizing the importance of capital construction.

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.

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:

$$Q_{j,k} = \alpha_0 + \alpha_1 R_{c,j,k} + \alpha_2 R_{n,j,k} + \alpha_3 X_j + \epsilon_{j,k} \quad (6)$$

Here, $Q_{j,k}$ represents an element of the set of the outcome variables: $(A_j, \kappa_j, h_j, y_j)$, 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 that $R_{c,j}$ 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 A 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 Eq. (6) 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 Eq. (6) 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 h , and output per worker

Table 3
OLS results.

	Panel A: dependent = A			Panel B: dependent = κ			Panel C: dependent = h			Panel D: dependent = y						
<i>Respect for others</i>	2.05** [0.00]		1.45** [0.00]	0.92* [0.04]	-0.03 [0.53]	-0.13* [0.04]	-0.17** [0.01]	0.58** [0.00]	0.40** [0.00]	0.20* [0.02]	2.61** [0.00]	1.72** [0.00]	0.95* [0.04]			
<i>Responsibility</i>		1.79** [0.00]	1.22* [0.04]	0.96* [0.04]		0.15** [0.01]	0.21** [0.01]	0.19** [0.01]	0.54** [0.00]	0.38** [0.00]	0.28** [0.00]	2.48** [0.00]	1.81** [0.01]	1.43** [0.04]		
<i>Latitude</i>				1.82** [0.00]				0.13* [0.02]			0.64** [0.00]			0.13** [0.00]		
<i>Constant</i>	7.29** [0.00]	7.42** [0.00]	6.81** [0.00]	6.58** [0.00]	0.48** [0.00]	0.34** [0.00]	0.40** [0.01]	0.38** [0.00]	0.44** [0.00]	0.56** [0.00]	0.39** [0.00]	0.31** [0.00]	8.31** [0.00]	8.33** [0.00]	7.60** [0.00]	7.27** [0.00]
<i>Observations</i>	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239
<i>Adj. R²</i>	0.10	0.09	0.13	0.26	0.00	0.03	0.04	0.07	0.13	0.13	0.18	0.45	0.12	0.14	0.18	0.39

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

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% of the country-wave variation in productivity. This rises to 26% 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%; with *Latitude* it jumps to 45%. 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% 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%. The inclusion of *Latitude* dampens the effect, but it still remains large at 2.4%.

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 (Guiso et al., 2009; Knack and Keefer, 1997; Zak and Knack, 2001). In this section, we include the well-known trust question from the World Values Survey (2006) in Eq. (6), to see if it adds anything to the determination 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 *Trust* 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 A 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 Alesina and Ferrara (2005), Easterly and Levine (1997), Mauro (1995), and Montalvo and Reynal-Querol (2005) reports that societies that are highly fractious or polarized along ethnic or religious lines are likely to be under-performers.¹⁰ We question whether *Respect for others* and *Responsibility* may ameliorate the negative influences of societal divisions on physical and 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 A).

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

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

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% 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*.¹¹ (See Appendix A 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 $Cov(R_i, \varepsilon) \neq 0$ for $i = (c, n)$ in Eq. (6) 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.

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 Eq. (6). 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 Eq. (6).¹²

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 Eq. (6) by adding, one by one, each of the other eight values from the *Qualities Group* described in Section 3.1.¹³

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, 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,

¹² The results reported in Tables 4 and Table 5, where we included *trust* and *ethnic fractionalization*, can be viewed as ways to lessen omitted variable bias.

¹³ 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.

¹¹ 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			Panel C: dependent = h			Panel D: dependent = y		
<i>Ethnic Fractionalization</i>	-1.34** [0.00]	-1.15** [0.00]	-0.69** [0.01]	-0.05 [0.18]	-0.04 [0.36]	-0.00 [0.92]	-0.28** [0.00]	-0.21** [0.00]	-0.01 [0.84]	-1.66** [0.01]	-1.40** [0.00]	-0.69* [0.02]
<i>Respect for others</i>		1.42** [0.00]	1.00* [0.02]		-0.13* [0.04]	-0.17** [0.01]		0.39** [0.00]	0.20* [0.02]		1.69** [0.00]	1.04* [0.02]
<i>Responsibility</i>		0.91† [0.10]	0.82† [0.09]		0.20** [0.01]	0.19** [0.01]		0.32** [0.00]	0.28** [0.00]		1.42* [0.02]	1.29** [0.01]
<i>Latitude</i>			1.47** [0.00]			0.13* [0.03]			0.66** [0.00]			2.26** [0.00]
Constant	9.16** [0.00]	7.41** [0.00]	6.98** [0.00]	0.47** [0.00]	0.41 [0.06]	0.38** [0.00]	1.04** [0.00]	0.51** [0.00]	0.32 [0.00]	10.67** [0.00]	8.38** [0.00]	7.68** [0.00]
Observations	239	239	239	239	239	239	239	239	239	239	239	239
Adj. R ²	0.12	0.22	0.29	0.01	0.05	0.07	0.08	0.23	0.46	0.14	0.28	0.41

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

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 Eq. (6) may persist because of important omitted unobservables. 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 Eq. (6) should be replaced with:

$$Q_{j,k} = b + \alpha_1 R_{c,j,k} + \alpha_2 R_{n,j,k} + \beta_1 X_j + \beta_2 C_{j,k} + \epsilon_{j,k}. \tag{7}$$

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

$$C_{j,k} = \mathbf{V}_{j,k}\gamma + c_{j,k}. \tag{8}$$

If $Cov(R_c, c) \neq 0$ or $Cov(R_n, c) \neq 0$ 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 unobservables 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_1 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 Eq. (6). These $\hat{\alpha}_i$ estimates are reported in Table 3 using Eq. (6). We then estimate two variants of a full model, V_1 and V_2 . V_1 adds *Trust* and *Ethnic Fractionalization* to Eq. (6). 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 labeled $\hat{\alpha}_{i,Vj}$.

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

$$T_{ij} = \hat{\alpha}_{i,Vj} / (\hat{\alpha}_i - \hat{\alpha}_{i,Vj}) \quad (i = R_c, R_n) \quad (j = 1, 2). \tag{9}$$

Under the assumption that the true effect $\alpha_i = 0$, we know that $T_{ij} = Cov(R_i, C_j) / Cov(R_i, V_j)$ so we can use it to consider the plausibility that our results are driven by unobservables in Eq. (6).¹⁴ If we form $T_{1,1}$ using the coefficient estimate on *Respect* $\hat{\alpha}_1$ from Eq. (6) 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_{ij} 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 Eq. (9) using $\hat{\alpha}_{i,V1}$ 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 appear to be a problem.

5.4. Demographic adjustment

Another source of bias may arise because of measurement error. Typically, measurement error is explored in the context of one explanatory variable. Our problem of measurement error is compounded by the fact that our two key explanatory variables are 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 variable 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

¹⁴ See the Appendix of Bellows and Miguel (2009) for more details on this method.

Table 6
Added qualities.

Added value	Panel A: dependent = A			Panel B: dependent = κ			Panel C: dependent = h			Panel D: dependent = y		
	Added	R _c	R _n	Added	R _c	R _n	Added	R _c	R _n	Added	R _c	R _n
<i>Independence</i>	−0.07 [0.80]	0.92* [0.04]	0.99* [0.05]	−0.02 [0.64]	−0.17** [0.01]	0.20** [0.01]	0.13* [0.03]	0.19* [0.03]	0.22** [0.01]	0.04 [0.88]	0.95* [0.04]	1.41** [0.01]
<i>Hard work</i>	−1.51** [0.00]	0.07 [0.86]	0.90* [0.02]	0.01 [0.74]	−0.16** [0.01]	0.19** [0.01]	0.05 [0.12]	0.24** [0.01]	0.29** [0.00]	−1.45** [0.00]	0.15 [0.73]	1.38** [0.00]
<i>Perseverance</i>	−1.41** [0.00]	1.22** [0.01]	1.42** [0.01]	0.02 [0.83]	−0.17** [0.01]	0.18* [0.03]	0.18* [0.03]	0.19* [0.03]	0.24** [0.01]	−1.21** [0.00]	1.23** [0.01]	1.83** [0.00]
<i>Thrift</i>	−1.58** [0.00]	0.56 [0.18]	1.46** [0.00]	0.12† [0.08]	−0.14* [0.04]	0.15† [0.06]	−0.00 [0.97]	0.20* [0.03]	0.28** [0.00]	−1.47** [0.00]	0.63 [0.15]	1.89** [0.00]
<i>Imagination</i>	0.14 [0.81]	0.87 [0.12]	0.95* [0.05]	−0.11 [0.26]	−0.12 [0.15]	0.20** [0.01]	−0.20* [0.05]	0.30** [0.00]	0.32** [0.00]	−0.17 [0.77]	1.05† [0.07]	1.46** [0.00]
<i>Religious faith</i>	−0.53† [0.08]	1.03* [0.02]	0.79† [0.09]	0.06 [0.30]	−0.17** [0.01]	0.21** [0.01]	−0.13† [0.07]	0.22** [0.01]	0.24** [0.00]	−0.60† [0.07]	1.08* [0.02]	1.23** [0.01]
<i>Unselfishness</i>	1.09** [0.00]	0.48 [0.31]	1.11* [0.01]	−0.12* [0.04]	−0.12† [0.10]	0.17* [0.02]	0.09 [0.17]	0.18† [0.06]	0.30** [0.00]	1.05** [0.00]	0.53 [0.28]	1.58** [0.00]
<i>Obedience</i>	−0.51 [0.25]	1.12* [0.02]	0.80† [0.10]	−0.10 [0.14]	−0.13* [0.05]	0.16* [0.04]	−0.28** [0.00]	0.31** [0.00]	0.19* [0.04]	−0.89† [0.07]	1.29** [0.01]	1.15* [0.02]

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

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 A). There are approximately 250,000 individual 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:

$$S_{i,j,k} = \beta_0 + \beta_1 \text{Age}_{i,j,k} + \beta_2 \text{Gender}_{i,j,k} + \beta_3 \text{Educ}_{i,j,k} + \sum_{k=3}^6 \theta_k \text{Wave}_k + \sum_{j=2}^{82} \varphi_j \text{Country}_j + \varepsilon_{i,j,k} \quad (10)$$

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 Eq. (10) 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^k 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^k 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 θ_3 – θ_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 Eq. (6) and supplementing it with *Trust*, *Ethnic Fractionalization*, or one additional quality as in Table 6.¹⁵ 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 Eq. (6). 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. These results are reported in Table 8, panel A and Table 9, panel D. By comparison, with the unadjusted data, there were a total of seven exceptions out of 16 – four for A and three for y . For κ in Table 8 panel B, *Responsibility* retains its significance always and *Respect* is always negative – as the theory predicts – and significant in seven of the eleven cases. For human capital h in Table 9 panel C, *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.

5.5. Simultaneous equation bias and instrumental variable estimation

Cultural traits appear to be persistent,¹⁶ 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

¹⁵ 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.

¹⁶ 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.

Table 7
 T_{ij} selection on observables.

Variant ↓/outcome →	T-ratios for Respect			
	A	k^p	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^p	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.

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 Eq. (6) – 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 a little independent effect on our outcome variable y .

There is a rich tradition of using instruments in the literature on economic growth,¹⁷ 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 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

¹⁷ To mention a few: *Acemoglu and Johnson (2005)*, *Acemoglu et al. (2001)*, *Glaeser et al. (2004)*, *Hall and Jones (1999)*, and *Sachs (2000)*.

Table 8
OLS results using demographically-adjusted response rates.

Added variable ↓	Panel A: dependent = A			Panel B: dependent = κ		
	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]
<i>Trust</i>	0.49	2.40**	2.11**	0.00	–0.18*	0.22**
	[0.26]	[0.00]	[0.00]	[0.97]	[0.04]	[0.01]
<i>Ethnic Fractionalization</i>	–0.68*	2.33*	2.28**	0.04	–0.17†	0.23**
	[0.02]	[0.02]	[0.00]	[0.50]	[0.07]	[0.01]
<i>Independence</i>	0.31	2.25**	2.38**	–0.04	–0.16†	0.23**
	[0.31]	[0.00]	[0.00]	[0.55]	[0.08]	[0.00]
<i>Hard work</i>	–1.49**	0.63	1.80**	–0.02	–0.19*	0.21*
	[0.00]	[0.99]	[0.00]	[0.73]	[0.03]	[0.02]
<i>Perseverance</i>	–1.15**	2.53**	2.68**	–0.03	–0.17†	0.22**
	[0.01]	[0.00]	[0.00]	[0.82]	[0.06]	[0.01]
<i>Thrift</i>	–1.09**	1.76**	2.77**	0.15†	–0.09	0.18*
	[0.01]	[0.00]	[0.00]	[0.06]	[0.38]	[0.03]
<i>Imagination</i>	–0.76	2.82**	2.56**	–0.18	–0.05	0.23**
	[0.28]	[0.002]	[0.00]	[0.19]	[0.68]	[0.01]
<i>Religious faith</i>	–0.26	2.27**	2.32**	0.09	–0.15†	0.26**
	[0.38]	[0.00]	[0.00]	[0.16]	[0.10]	[0.00]
<i>Unselfishness</i>	1.61**	1.65**	2.71**	–0.15*	–0.10	0.20*
	[0.00]	[0.00]	[0.00]	[0.05]	[0.26]	[0.02]
<i>Obedience</i>	–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%.

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 1 A.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, institutions in 1972 will be reliable measures of historical values. Moreover, past institutions will influence y mainly through cultural values.

Since our main OLS estimating Eq. (6) 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* (*Latitude* is an included exogenous regressor, and is always in the instrument set).

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 regressor becomes more difficult. If good instruments are not found, problems associated with *2SLS* are exacerbated.

For that reason, in this section we first estimate Eq. (6) by *2SLS* with only one endogenous regressor, R_c or R_n . The results are reported in the first two columns of *Table 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

Table 9
OLS results using demographically adjusted response rates, continued.

Added variable	Panel C: dependent = h			Panel D: dependent = y		
	Added	R_c	R_n	Added	R_c	R_n
–	–	0.18	0.42**	–	2.33**	2.49**
<i>Trust</i>	–0.25**	0.27*	0.46**	0.25	2.49**	2.78**
	[0.00]	[0.03]	[0.00]	[0.60]	[0.00]	[0.00]
<i>Ethnic Fractionalization</i>	–0.00	0.18	0.42**	–0.64*	2.34**	2.93**
	[0.95]	[0.14]	[0.00]	[0.04]	[0.00]	[0.00]
<i>Independence</i>	0.18*	0.14	0.36**	0.45	2.23**	2.97**
	[0.01]	[0.22]	[0.00]	[0.15]	[0.00]	[0.00]
<i>Hard work</i>	0.07	0.29*	0.47**	–1.43**	0.73	2.47**
	[0.15]	[0.05]	[0.00]	[0.00]	[0.30]	[0.00]
<i>Perseverance</i>	0.13	0.18	0.42**	–1.05*	2.54**	3.30**
	[0.23]	[0.12]	[0.00]	[0.03]	[0.00]	[0.00]
<i>Thrift</i>	0.06	0.21†	0.41**	–0.87*	1.88**	3.35**
	[0.52]	[0.10]	[0.00]	[0.04]	[0.00]	[0.00]
<i>Imagination</i>	–0.31**	0.40**	0.46**	–1.24†	3.15**	3.24**
	[0.01]	[0.01]	[0.00]	[0.10]	[0.00]	[0.00]
<i>Religious faith</i>	–0.17*	0.15	0.34**	–0.33	2.27**	2.92**
	[0.04]	[0.19]	[0.00]	[0.31]	[0.00]	[0.00]
<i>Unselfishness</i>	0.07	0.17	0.44**	1.53**	1.72**	3.35**
	[0.40]	[0.18]	[0.00]	[0.00]	[0.01]	[0.00]
<i>Obedience</i>	–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%.

shows that using more than one 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 interpretive issues rises in this case. In these latter two regressions, we use all four instruments.

Table 10
2SLS results.

	Dependent variable is y			
	R_c	R_n	<i>pcR</i>	Both
<i>Respect for others</i>	9.75**	–	–	5.50**
	[0.00]			[0.00]
<i>Responsibility</i>	–	6.37**	–	4.86**
		[0.00]		[0.00]
<i>Principal component</i>	–	–	1.00**	–
			[0.00]	
<i>Latitude</i>	1.33*	2.04**	1.42**	1.42**
	[0.03]	[0.00]	[0.00]	[0.00]
<i>Constant</i>	2.70*	4.49**	9.50**	2.02†
	[0.05]	[0.00]	[0.00]	[0.06]
<i>Observations</i>	217	227	208	208
<i>Instrument set</i>	<i>CP80 and CL72</i>	<i>Muslim80 and SAI</i>	<i>CP80, Muslim80 CL72, and SAI</i>	
<i>First stage F-test</i>	15.31	10.53	11.79	R_c 13.00 R_n 9.57
<i>Shea's Partial R²</i>	–	–	–	R_c 0.20 R_n 0.11
<i>Stock–Yogo weak identification test</i>	–	–	–	9.51 ^a
<i>Overidentification test</i>	0.00	0.65	2.50	2.50
	[0.99]	[0.42]	[0.47]	[0.29]

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

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's (1997)* 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.

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

unobservables 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.

Appendix A. Data appendix

We used the following data in the paper.

- Respect*. Proportion of individuals selecting *Respect* – Question a035. Source: *World Values Survey*.
- Responsibility*. Proportion of individuals selecting *Responsibility* – Question a032. Source: *World Values Survey*.
- A. Total factor productivity. Source: Constructed as the residual $A = \frac{y}{k^\alpha h^\beta}$ where $\rho \equiv \frac{\alpha}{1-\alpha}$.
- 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*.
- h*. Human capital per capita. Source: Constructed using the method of Hall and Jones (1999) using the data from Barro and Lee (2001).
- y*. Output per worker; series *RGDPWK*. Source: *Penn World Table v. 7.0*
- Latitudes*. Absolute value of latitude. Source: La Porta et al. (1998).
- Trust*. Proportion of individuals selecting “most people can be trusted” – Question a165. Latest of 1995 or 2000. Source: the *World Values Survey*.
- Ethnic Fractionalization*. Measure of number of different ethnic groupings within a country. Various years. Source: Alesina et al. (2003).
- 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*.
- Age*. Categorical age variable of survey respondents. Six categories of ages. Source: *World Values Survey*.
- Gender*. Binary indicator of the gender of survey respondents. Male = 1; Female = 2. Recoded as male = 0; female = 1. Source: *World Values Survey*.
- Education*. Categorical education variable of highest level of educational attainment of survey respondents. Eight categories. Source: *World Values Survey*.
- CP80*. Proportion of the population with religious faith identified as Catholic or Protestant. Source: La Porta et al. (1999).
- Muslim80*. Proportion of the population with religious faith identified as Muslim. Source: La Porta et al. (1999).
- 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).
- CL72*. Index of Civil Liberties in 1972. (Re-coded) scale of 1–7, with 7 indicating the most free. Source: *Freedom House*.
- pcR*. Principal component of *Respect* and *Responsibility*.

Appendix B. Theoretical Appendix

The theoretical appendix to this article can be found online at <http://dx.doi.org/10.1016/j.jdeveco.2013.06.004>.

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