Trustworthiness and economic performance

Breuer, Janice Boucher and McDermott, John

University of South Carolina, University of South Carolina

March 2009

Trustworthiness and Economic Performance

Janice Boucher Breuer and John McDermott*

March 2, 2009

Department of Economics, University of South Carolina, Columbia, SC 29208

Abstract

Intrinsically trustworthy agents never cheat. A society's willingness to trust and the quality of its institutions have their origins in the intrinsic trustworthiness of its citizens. Trustworthiness is the basis for maximizing output in economic exchange and in explaining differences in standards of living around the world. We measure intrinsic trustworthiness with a question from the World Values Survey and estimate its effect using a sample of 60 countries. We find that trustworthiness is important for output per capita and that the effect of trust is likely to come from trustworthiness.

*We would like to thank participants of the Conference of the International Society for New Institutional Economics in Toronto, and the Economics Workshop at the University of South Carolina for helpful comments.

Surprisingly much of the literature on trust hardly mentions trustworthiness, even though much of it is primarily about trustworthiness, not trust. Hardin (1992)

1 Introduction

Casual observation suggests that trustworthy behavior is an important determinant of economic outcomes. If people are not trustworthy, a general lack of trust is inevitable, and commerce suffers. One purpose of this paper is to clarify the roles of trust and trustworthiness in economic exchange and the generation of per capita income. We argue that trustworthiness is more basic, and more important, than trust. The second purpose is to test this hypothesis using a new measure of trustworthiness.

The theoretical framework has two parts. In the static part, we take the levels of trusting and trustworthy behavior as given. Trust is important because people who trust are those who *initiate* transactions. If an individual trusts, she offers a contract to jointly produce with someone of unknown type. There are two types: the "intrinsically trustworthy" who always fulfill contracts, and "conditional operators" who either fulfill the contract or cheat, depending on the expected reward. An initiated transaction creates maximum output only if the contract is fulfilled.

In the second part, we outline a theory of the evolution of trust and trustworthy behavior. We assume that the proportion of individuals who

are intrinsically trustworthy in any society changes only slowly over time. We believe that, historically, countries with a high proportion of trustworthy people created good institutions that induced conditional operators to act as if they were trustworthy. They did so by establishing fair and efficient mechanisms to punish cheating. With more trustworthy *behavior*, initiators had greater reason to trust. This led to an expansion of transactions and output. For countries with few intrinsically trustworthy people, the development of good institutions proceeded at a slower pace. Hence, these countries have achieved smaller gains from scale and specialization.

To date, the empirical literature in economics has focused on trust and its effect on economic growth. This literature has found that more trusting societies achieve higher rates of growth. Knack and Keefer (1997), Zak and Knack (2001), and Tabellini (2006) use the World Values Survey (2006) for a measure of trust, whereas Temple and Johnson (1998) construct a measure of "social capital" and Hall and Jones (1999) employ a measure of "social infrastructure" – concepts closely related to trust. In this literature, trusting behavior is said to generate cooperation and civic engagement, which can enhance output.[1] Many authors recognize that trustworthiness is important, but there has been virtually no cross-country empirical work that deals with it in a rigorous way.

[1]See Coleman (1988), Putnam (1993), La Porta et al. (1997), and others who consider the effects of trust in organizations and social groups. Guiso et al. (2005) show that trust is related to culture, and that low trust between countries results in low levels of trade and capital flows.

In this paper, we construct a measure of trustworthiness that allows us to investigate the relative value of trust and trustworthiness in explaining GDP per capita across countries. Like the usual measure for trust, our measure of trustworthiness comes from the World Values Survey (2006). The measure is based on a question that elicits from parents their subjective view of the importance of teaching children tolerance and respect for others.[2]

Our base sample consists of 60 countries. In our econometric tests, we find that trustworthiness consistently performs well in explaining per capita output. The inclusion of control variables, including trust, changes the magnitude, but not the significance of trustworthiness. At first, we maintain the hypothesis that trustworthiness is exogenous. Later, we allow it to be endogenous and use four different instruments to control for endogeneity. In almost all of the cases, trustworthiness has a significant, first-order impact on per capita income. Our data also support the structural framework that we propose to explain why trustworthiness is fundamental in a way that trust is not.

The paper is organized as follows. The next section discusses trust and trustworthiness as these concepts have been used in the literature of political science, sociology, and psychology. We also distinguish between our notion of trustworthiness and that found in the experimental literature. In Section 3, we construct a simple model of output per capita based on the

[2]The current paper builds on preliminary results in a our working paper, Breuer and McDermott (2008)

existence of agents who each have two characteristics or dimensions, trust and trustworthiness. After that, we outline a process by which the intrinsically trustworthy create institutions that encourage conditional operators to behave as if they were trustworthy, thus inducing trust. Section 4 describes the data that we use. Section 5 presents our econometric specifications and results. Finally, Section 6 concludes.

2 Trust and Trustworthiness

In his book *Trust*, Fukuyama (1995, p. 26) states that trust is "*the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on the part of the members of that community.*" Gambetta (1988) defines trust as "*a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action.*" In each of these, trust is equated with an expectation about behavior. More importantly, these definitions point out that the behavior of the party on the other end of the transaction is critical. Trustworthiness matters.

In our view, trust is more than an expectation about behavior; trust is based on an obligation agreed to in the face of uncertainty about whether a counterparty will, in fact, fulfill an agreement. Trustworthiness means that the counterparty fulfills the obligation. Without an obligation agreed on by both parties, the issue of trusting is moot. A thought experiment might help

clarify the point. Suppose we deposit $X into a bank account. For sake of discussion, assume the 'bank' has no legal obligation to pay interest or return our deposit. In this case, we are not really trusting that the bank will return our money; we are simply making a guess about what it will do. We hope the 'bank' will return our money with interest but we have no basis to say "we trust the bank" because it is not obligated to do anything. The same is true of trustworthiness. An action cannot be defined as trustworthy without first defining an obligation. In our thought experiment, because the bank is under no obligation to return money to us, if it returns nothing, it cannot be considered 'untrustworthy.' Neither is it 'trustworthy' if it returns money.

There is a growing body of experimental literature that attempts to measure trust and trustworthiness with experiments similar to the thought experiment above using a trust-honor (investment under uncertainty) game. But, almost all of the experiments lack an obligation as a reference point in the game design.[3] This absence makes it difficult to interpret whether trust and trustworthiness are being measured. Other researchers who use the game have acknowledged that their results may be picking up cooperation, reciprocity, unconditional kindness, altruism, inequity aversion, and warm glow.[4] Because our model is based on economic exchange where obli-

[3]The original game is from Berg et al. (1995). Modifications to the game include Ashraf et al. (2006) who incorporate "expectations of return"; Ben-Ner and Putterman (2008) who allow for pre-play communication and contracting; and Charness et al. (2008) who allow for punishment by a third-party. Glaeser et al. (2000) correlate outcomes from experiments from a trust-honor game and an envelope drop experiment with survey data.

[4]See Andreoni (1990), and Fehr and Schmidt (1999).

gations, whether explicit or implicit, are commonplace, we will define trust and trustworthiness around an obligation. In doing so, we depart from the experimentalist's notion of trust and trustworthiness.

We make an important distinction between *intrinsic* trustworthiness and *conditional* trustworthiness. Intrinsic trustworthiness is unconditional; regardless of the costs of behaving trustworthily, an individual who is intrinsically trustworthy, will always act so. The existence of individuals who are intrinsically trustworthy has been assumed in the game-theoretic work of Frank (1987), Harrington (1989), Huang and Wu (1994), and Bohnet et al. (2001) in a similar context. Sen (1977) also assumes there are individuals who are willing to take action that conflicts with self-interest (a type he calls "committed"). In his study of rotating credit institutions in Peru, Karlan (2005) conjectures that some of the respondents may have been innately trustworthy.

In contrast, conditional trustworthiness is trustworthy behavior that is conditional on the costs and benefits to behaving trustworthily. Both are important. Whereas economies are endowed with a level of intrinsic trustworthiness, conditional trustworthiness is generated by good institutions. We elaborate on this idea in Section 3.2.

Trustworthy behavior, therefore, comes from both intrinsically trustworthy types and from conditional operators who have chosen to fulfill their obligations. In this environment, trust ultimately depends on the expectation of being cheated, which in turn depends on the fraction of the population

that does not cheat – that is, acts in a trustworthy manner. Trust is "calculative", to use Williamson's (1993) term, and has no intrinsic component. Fehr (2008) suggests that trust arises from beliefs about trustworthiness and preferences toward risk.[5] We are aware that the experimental literature imputes to some people a feeling of deep satisfaction from trusting others – such as giving money to an individual who comes up short in paying for groceries while standing in line. Although some may consider this behavior a form of intrinsic trust, we think of it as 'kindness' because there is no explicit or implicit expectation about the behavior of the counterparty.

3 Theoretical Framework

3.1 Production

In this section, we outline a simple theory of exchange to illustrate how trust and trustworthiness matter for aggregate output. First, we assume that agents extend trust to other agents to produce output. They extend trust when they expect that counterparties will fulfill their end of an explicitly specified bargain. Counterparties can be two types – intrinsically trustworthy or conditional operators. Intrinsically trustworthy types always agree to and do fulfill the obligation to participate in the production of output. Conditional operators agree whether they intend to fulfill their obligations or not.

[5]See Breuer and McDermott (2009) for a model of risk aversion, institutions, and expectations that determines aggregate trustworthiness, trust, and output per person.

Because conditional operators conceal their true intent from the initiator, their true type is not revealed until production occurs.

Individuals are defined along two dimensions: whether or not they trust others and whether or not they can be trusted to completely fulfill a bargain. There are, accordingly, four distinct types of individual in the economy defined by the absence (0) or presence (1) of the two behaviors. Each person is represented by her type a_{ij} where $i = (0, 1)$ represents trust and $j = (0, 1)$ represents trustworthy behavior. For example, a person of type a_{01} does not trust others but does demonstrate trustworthy behavior; a person of type a_{00} neither trusts nor can be trusted.

Trustworthy types – those with trait a_{i1} — may be intrinsically trustworthy or may be a conditional operator seeking to avoid penalties. It is immaterial for production. We conceive of the production process as follows. There are N agents who meet other agents over the course of the year; in the limit, assume each agent encounters every other agent. Under this scheme, there would be $N(N-1)$ meetings every year. Any two agents meet twice, once as the *initiator* and once as the *receiver*. When a trusting agent (type a_{1j}) meets an individual who is trustworthy (type a_{i1}) the maximum output – which we call y_m– is produced. Moreover, this output is divided equally between the two parties.

When the same trusting agent (type a_{1j}) meets an agent who does *not* behave trustworthily (type a_{i0}) output is lower, at the value y_l. There is a deadweight loss associated with deception. We express this loss as $y_l = \delta y_m$

where $\frac{1}{2} < \delta < 1$. When cheating occurs, we assume that the cheater gets *all* of the output. Otherwise, people would always initiate transactions since that would be better than refusing to initiate. [6]

Aggregate output in the year depends on the proportions of people who trust and can be trusted. Let the total fraction of people who behave trustworthily be

$$p_{TW} = r_{TW} + v_{TW} < 1 \tag{1}$$

where r_{TW} is the fraction of people in the economy who are intrinsically trustworthy and v_{TW} is the fraction who are conditionally trustworthy. Furthermore, let

$$p_T < 1 \tag{2}$$

be the fraction of people who trust others and initiate transactions.

Let $M = N(N-1)$ be the number of meetings between different individuals. Then:

$$Y = p_T p_{TW} M y_m + p_T (1 - p_{TW}) M y_l \tag{3}$$

The number of meetings initiated by those who trust and directed to someone who is trustworthy is $p_T p_{TW} M$. Each of these meetings results in output of y_m. The other meetings that result in output yield y_l, and there are $p_T(1 - p_{TW})M$ of these. We add the two to get (3).[7]

[6] In our model, agents do not play a game: types are determined prior to the current period, but no one knows the type of the person on the other side of the transaction. The payoff matrix, however, is similar to the Trust-Honor variant of the prisoner's dilemma game in Bohnet et al. (2001) and Berg et al. (1995), among many others.

[7] Because self-meetings yield zero output, Equation (3) is an approximation to the true

It is useful to write per capita output $y = \frac{Y}{N}$ as follows:

$$y = \left(1 + \delta \frac{(1 - p_{TW})}{p_{TW}}\right) p_T p_{TW} \, y_m \, (N - 1) \tag{4}$$

where $\delta = \frac{y_l}{y_m}$ is the relative shortfall of output when people are not trustworthy. We observe that living standards rise with both the fraction of people who are trusting p_T and the fraction who act honestly p_{TW}. Living standards also rise with y_m, δ, and scale, N.

3.2 Intrinsic Trustworthiness, Institutions, and Trust

If everyone were intrinsically trustworthy, there would be no need for institutions. No one would ever cheat and agents would soon learn to trust everyone. Output would be at a maximum. Unfortunately, this is never the case. Countries have legal and economic institutions to make people *behave* as if they were naturally trustworthy. Institutions elicit honest behavior through threat of punishment or social pressure. Where institutions are good at suppressing cheating, they induce conditional operators to behave honestly.[8]

value of output, except in the case of $p_T = p_{TW} = 1$, in which case it is exact. The error is very small for large N, however; it is on the order of about one one-hundreth of a percent.

[8]The link between institutions and trust has been prominent in the work of Putnam (1993), Coleman (1988), Beugelsdijk (2006), and Huck (1998), among others. There is, on the other hand, a strand of the game-theory literature that examines how cooperative behavior can evolve without the intervention of government institutions. See Axelrod (1984), Ellison (1994), Huang and Wu (1994), and Kandori (1992).

We express this relationship as follows:

$$\ln \widehat{v}_{TW,j} = \alpha_V + \beta_V I_j + \eta_{Vj} \tag{5}$$

where $\widehat{v}_{TW} \equiv 1 + \frac{v_{TW}}{r_{TW}}$ and I stands for institutions. The ratio of conditionally trustworthy agents to intrinsically trustworthy agents increases linearly with the quality of institutions. We also introduce an error term η_{Ij} since this relation is part of an empirical model to be estimated.

In itself, a rise in conditionally trustworthy behavior v_{TW} is good: it increases p_{TW} in (1) which raises y by (4). But there is an added benefit: as the mass of trustworthy agents rise, people learn to trust others. The trust that we observe – the p_T in (4) – is due to the existence of trustworthy agents, whether intrinsic or induced by institutions. It is irrational to trust others in an environment of dishonest agents. We assume this relationship is linear in logs:

$$\ln p_{T,j} = \alpha_T + \beta_T \ln p_{TW,j} + \eta_{Tj} \tag{6}$$

In countries with more trustworthy behavior, trust itself is higher.

Another key building block is that we assume good institutions come fundamentally from r_{TW}, the fraction of intrinsically trustworthy people in society. Our reasoning has two elements. First, the intrinsically trustworthy fundamentally embrace a respect for others in society. Thus, they value the security of property and rule of law as devices to protect not only their own freedom, but that of others, too. Good institutions may be seen as

commitment mechanisms designed to ensure individual freedoms and the protection of property rights over time. They increase the probability of catching cheaters and to increase the penalty if a cheater is caught. Both of these reduce the expected utility from cheating. At the margin, this causes those who are not intrinsically trustworthy to behave honestly. As noted in (5), it raises v_{TW}. Changing probabilities or penalties, however, requires institutional reform.

Second, a large share of intrinsically trustworthy agents r_{TW} in the general population is necessary to secure enough votes (or persuade enough influential political leaders) to establish institutions that effectively punish cheaters with high probability. We hypothesize that the greater is r_{TW}, the better the institutional environment:

$$I_j = \alpha_I + \beta_I \ln r_{TW,j} + \eta_{Ij} \tag{7}$$

It is possible that this relationship is not linear; a threshold value of r_{TW} may be necessary before any appreciable improvement in institutions occurs. After that, the quality of institutions may increase rapidly with the share r_{TW}, causing v_{TW} to rise as well.

Lastly, we assume that human capital is itself an institution. Glaeser et al. (2004) argue that human capital may be more deeply rooted and persistent than some of the measures (like Expropriation Risk from the International Country Risk Guide) that are used to represent high quality governmen-

tal institutions. Since intrinsically trustworthy types respect the rights and freedoms of others, it is natural to hypothesize that they also promote and expand educational opportunities. Therefore, analogous to (7), we write:

$$X_j = \alpha_X + \beta_X r_{TWj} + \eta_{Xj} \tag{8}$$

where X is a measure of human capital. We think this is consistent with the ideas of Acemoglu et al. (2005) who hypothesize that both education and institutions (in their case, democracy) are determined by a third, common variable. For us, that variable is trustworthiness.

The ideas in this section are no more than a sketch of a model designed to help with the logic of the empirical section to follow. We now turn to a discussion of the data that we use to test the importance of trustworthiness in economic performance.

4 Data and Country Sample

Construction of our sample was guided by several considerations. First, we use the question on trust from the World Values Survey (2006) that has been used frequently in previous research.[9] This question is A165 and is available

[9]The *World Values Survey*, initiated in 1981 as a companion of the *European Values Survey* and the *General Social Survey*, contains thousands of questions on topics ranging from "Perceptions of Life" to "Religion and Morale", with useful sociodemographic information. Between 1,000 and 2,000 people are interviewed in each country in each wave. The *World Values Survey* is downloadable from wvs `http://www.worldvaluessurvey.com/services/index.html`.

in Wave 1 (1981), Wave 2 (1990), Wave 3 (1995), and Wave 4 (2000) of the survey. The 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*
> 2. *Can't be too careful*

The question has been used by many authors in a wide variety of disciplines, but there have been critics. It has been criticized, for example, as reflecting the state of institutions and not a cultural or natural trait (see, for example, Beugelsdijk (2006)). It has also been criticized by Miller and Mitamura (2003) who argue that responses to the trust question may be influenced by a society's level of caution. A low trust society, by this measure, could instead simply be more cautious or more prudent in their dealings. Taken in this light, low trust may be considered a positive, instead of a negative factor for an economy. Last, responses to the trust question measure "generalized trust". Since the trust question is vague, it is not clear what types of situations people have in mind when they respond.

In spite of these concerns, we measure the fraction of those who trust in a country p_T using affirmative response rates (Answer 1) to the question. An affirmative answer seems to reflect, at least in part, people's confidence in not being cheated. There is no way to tell if people are answering that "most people can be trusted" because they believe in the innate goodness of others

(i.e. the respondent views others as intrinsically trustworthy) or because they have faith that institutions will discourage untrustworthy types from cheating them (i.e. institutions have induced the respondent to be trusting).

To measure intrinsic trustworthiness r_{TW} we use responses to question A035 from the World Values Survey.[10] Question A035 is part of a series of questions that asks respondents to select up to five qualities that children can be encouraged to learn at home. In Waves 3 and 4 of the World Values Survey, respondents were given a list of ten qualities. These include good manners, independence, hard work, feelings of responsibility, thrift, determination and perseverance, religious faith, unselfishness, obedience, and tolerance and respect for others. The qualities listed across each wave vary to some degree, but question A035 appears in all four waves.[11] Each question begins with:

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

Each question in the series is then followed by just one "quality", e.g independence, thrift, etc. Those who chose "tolerance and respect for others" we

[10] We considered several other questions – a question on honesty (A031) and a question on lying (F127) used by Slemrod and Katuscák (2005). A031 was only asked in the 1981 survey and F127 only in the 1990 survey. We also considered questions that Knack and Keefer (1997) used to construct a measure of civic norms (which they mention may be associated with trustworthiness). We did not use these questions because they are situational and there may be a wide range of circumstances that respondents consider when answering.

[11] We are aware of only one other paper that uses this question. Tabellini (2006) includes it in his cultural index.

consider to be intrinisically trustworthy.

This question, we believe, elicits the true character of the *parent*, not the child. Respondents who feel it important to teach their children tolerance and respect for others, in our view, do so because they themselves possess these basic qualities.

Because survey respondents are asked to select five questions from a list of 10 qualities, there is an opportunity cost to selecting any question. We think that this cost elicits a true response. If, for example, the question were framed as the direct "do you think it is important to teach your children tolerance and respect for a others?" then people might respond "yes" even if they did not really value it. Unlike responses to the trust question, we assume that our measure of trustworthiness does not include a component that may be induced by institutions. Our maintained hypothesis is that conditional operators do not code "tolerance and respect for others" based on the legal or social ramifications. In other words, we think that Question A035 measures r_{TW} and not p_{TW}.

For each country, we tabulate the percentage of total respondents who answered "most people can be trusted" to question A165 and those who selected "tolerance and respect for others" to question A035. These percentages correspond to p_T and r_{TW}. There is a fair amount of variation in our data. For example, p_T and r_{TW} are 36% and 80% for the United States, but only 3% and 60% for Brazil. The first two lines of Table 1 show that overall the fraction of people who are trusting is significantly smaller than the number

who are intrinsically trustworthy. This could be picking up the fact that some people who appear not to trust are really just cautious.

In constructing our data set from the World Values Survey, we decided to exclude Waves 1 and 2 from the analysis because these waves are heavily weighted with Western European and advanced economies and provide substantially less variation. Instead, we combined the countries from Waves 3 and 4 but eliminated duplicates; we only used data from Wave 3 if there is no data from Wave 4 for that country.[12]

We also use data on GDP per capita (y) in purchasing power parity dollars from the Penn World Table (v. 6.2); years of schooling in the population aged 25 or older from Barro and Lee (2001) for human capital (X); and the index of security of property rights from the Heritage Foundation, as a proxy for institutions (I). A higher value implies better institutions (we recoded property rights to make it conform to this rule).

The combined data yields a base set of observations for 60 countries. Country coverage includes developed, developing, emerging, and transition economies.[13] Table 1 gives the basic descriptive statistics. We present the

[12] As a robustness check, we ran all of our main results using the opposite rule: discarding the data for Wave 4 if there were duplicates. The results were virtually unchanged in terms of the significance of the key coefficients.

[13] The countries is our sample are the following: Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Czech Republic, Denmark, Dominican Republic, Egypt, Arab Rep., El Salvador, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Japan, Jordan, Korea, Rep., Malta, Mexico, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Singapore, Slovak Rep., Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan (China), Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Zimbabwe

Table 1: Descriptive Data

Variable	Mean	Std.Dev.	Min	Max
p_T	0.298	0.163	0.028	0.665
r_{TW}	0.708	0.099	0.525	0.923
$\frac{y_j}{y_{US}}$	0.416	0.276	0.031	1.0
$\frac{Years\,Schooling_j}{Years\,Schooling_{US}}$	0.627	0.204	0.20	1.0
Property Rights	3.70	1.021	1	5

data for y, and *Years Schooling* relative to the United States. *Property Rights* is based on a scale running from 1 to 5, with an average of 3.75.

Our basic result from Equation (4) is that both trust and trustworthiness contribute to greater output per capita. Figures 1 and 2 show the scatter plots of y against p_T and y against r_{TW}. The scatter plots reveal a clear positive relationship, although there are significant outliers. Letting j index countries, the bivariate regressions corresponding to the plots (robust standard errors are in parentheses) are given by [14] :

$$y_j = \underset{(1978)}{6961} + \underset{(69.00)}{243.05}\, p_{T,j} \qquad R^2 = 0.21 \tag{9}$$

$$y_j = \underset{(5134)}{-26293} + \underset{(72.53)}{572.36}\, r_{TW,j} \qquad R^2 = 0.42 \tag{10}$$

[14] We multiplied p_T and r_{TW} by 100 to convert them to percent.

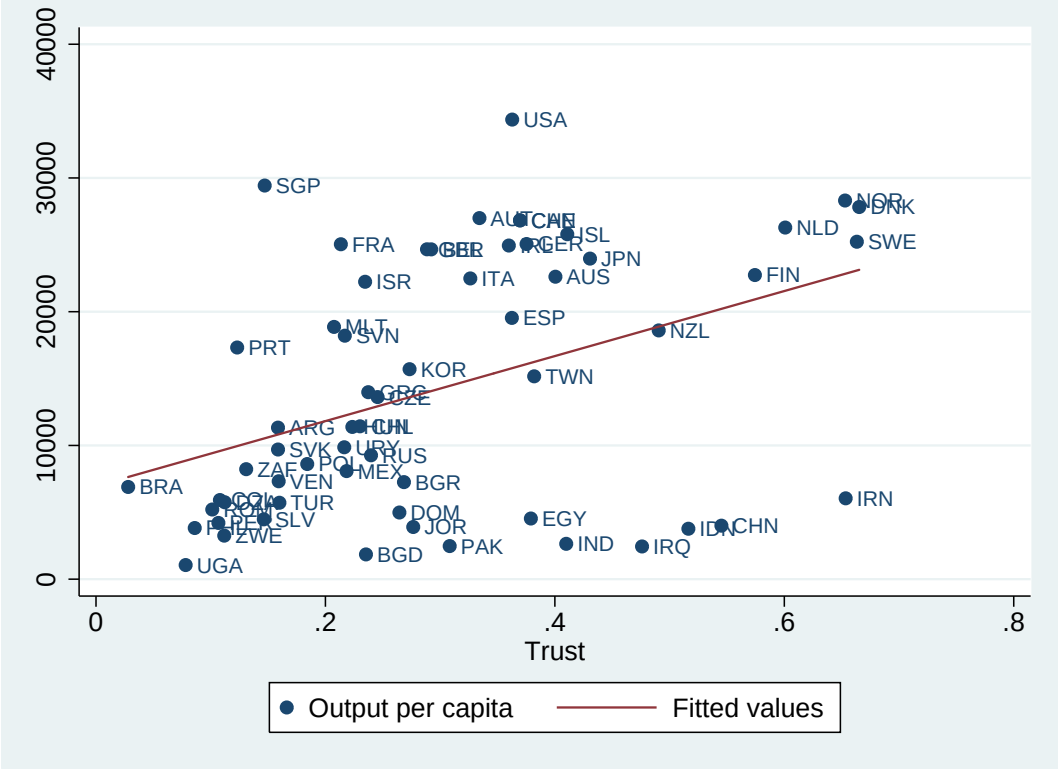

Figure 1: Trust and Output per capita

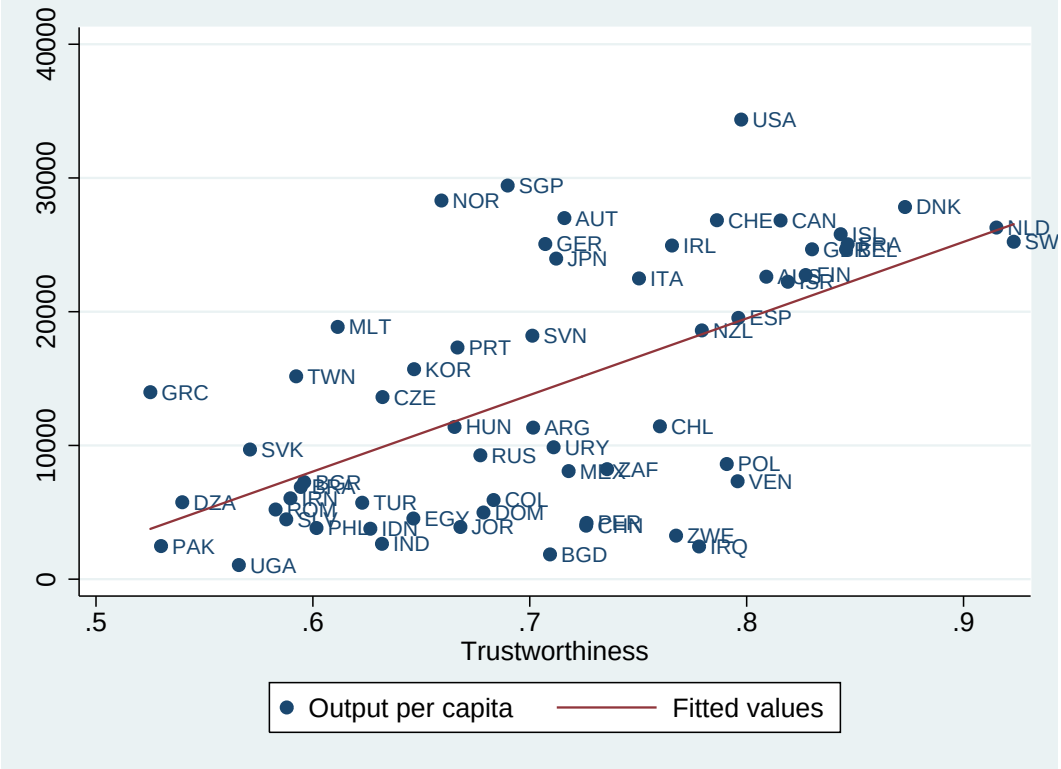

Figure 2: Trustworthiness and Output per capita

These equations show that both trust and intrinsic trustworthiness are significantly and positively correlated with output per person.

5 Estimation

5.1 A Basic OLS Model

A model for output per capita based on (4) may be specified as:

$$\ln y_j = \alpha_0 + \alpha_1 \ln p_{T,j} + \alpha_2 \ln p_{TW,j} + \alpha_3 \ln X_j + \mu_j \tag{11}$$

where we include human capital X_j as a proxy for the value of each transaction y_m in (4). We cannot estimate the relationship in this form, however, because we do not have a measure of trustworthy behavior p_{TW}.

We noted in (1) that p_{TW} is equal to the sum of the natively trustworthy r_{TW} and the conditionally trustworthy v_{TW}. In logs, :

$$\ln p_{TW,j} = \ln r_{TW,j} + \ln \widehat{v}_{TW,j} \tag{12}$$

where, as noted earlier, $\widehat{v}_{TW} \equiv 1 + \frac{v_{TW}}{r_{TW}}$. In Section 3.2 we proposed three structural equations to represent the basic theoretical framework. We collect these and repeat them here:

$$\ln \widehat{v}_{TW,j} = \alpha_V + \beta_V I_j + \eta_{Vj} \qquad (5)$$

$$\ln p_{T,j} = \alpha_T + \beta_T \ln p_{TW,j} + \eta_{Tj} \qquad (6)$$

$$I_j = \alpha_I + \beta_I \ln r_{TW,j} + \eta_{Ij} \qquad (7)$$

$$X_j = \alpha_X + \beta_X \ln r_W + \eta_{Xj} \qquad (8)$$

To proceed, we substitute (5) into (12) and the result into (11). This yields our first estimating equation:

$$\ln y_j = \beta_0 + \beta_1 \ln p_{T,j} + \beta_2 \ln r_{TW,j} + \beta_3 I_j + \beta_4 \ln X_j + \epsilon_j \qquad (13)$$

where, as noted earlier, we use *Property Rights* for I and *Years of Schooling* to represent human capital X.

Our initial strategy is to estimate Equation (13) with OLS. This is primarily a benchmarking exercise, since it is likely that the regressors – with the possible exception of r_{TW} – are correlated with the error ϵ in our cross section data set.

Table 2 presents the results from estimating (13). The first two columns show the results when the logs of p_T and r_{TW} are included one at a time, with no other regressors. Both are quite significant, as we expect, given the levels regressions reported earlier. And, like the levels regressions, trustworthiness has a much larger coefficient than trust. The third column shows the results

when we put the two together. In this case, only trustworthiness is significant.

The last three columns add *Property Rights* and *Schooling*, but otherwise repeat the first three columns.[15] Trustworthiness remains significant, although the magnitude of its coefficient falls appreciably. Trust, on the other hand is not significant in any specification. *Property Rights* and *Schooling* are also highly significant and the highest adjusted R^2 is 75%.

The results of Table 2 show a much stronger correlation between trustworthiness and performance than between trust and performance.

In Section 4 we noted that there were a total of 10 different "qualitities" or "virtues" that a parent could teach their children. We are focussing on one of those, "tolerance and respect for others", which we have linked to intrinsic trustworthiness. As a check to the robustness of our results, we added each of the remaining nine virtues, one at a time, to the last specification in Table 2. That is, we ran the regression:

$$\ln y_j = \beta_0 + \beta_1 \ln p_{T,j} + \beta_2 \ln r_{TW,j} + \beta_3 I_j + \beta_4 \ln X_j + \beta_5 \ln Z_j + \epsilon_j \qquad (14)$$

where Z is one of the other virtues in the list that respondents were asked to consider. Also, we put all 10 virtues in together. The results of this exercise are shown in Table 3. In all cases, r_{TW} remained correctly signed and significant, almost always at 3% or better. Four of the remaining nine were also significant: Hard Work (a030), Responsibility (a032), Religious Faith

[15] Our sample size decreases by three when we add *Property Rights*.

Table 2: Basic OLS

Dependent variable: $\ln y$

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
$\ln Trust$ ($\ln p_T$)	0.53** [0.00]		0.28 [0.13]	0.16 [0.21]		0.1 [0.46]
$\ln Trustworthiness$ ($\ln r_{TW}$)		3.25** [0.00]	2.74** [0.00]		1.00** [0.01]	0.84* [0.04]
Property Rights Index				0.38** [0.00]	0.36** [0.00]	0.36** [0.00]
ln *Schooling*				0.92** [0.00]	0.87** [0.00]	0.84** [0.00]
Constant	10.00** [0.00]	10.42** [0.00]	10.62** [0.00]	6.26** [0.00]	6.56** [0.00]	6.69** [0.00]
Observations	60	60	60	57	57	57
Adj R^2	0.14	0.27	0.29	0.74	0.75	0.75
Notes: Robust p values in brackets. **significant 1%; * at 5%; + at 10%						

(a040), and Obedience (a042). However, only one of these, Responsibility, had the correct sign. The other three not only had a negative sign, they were also small in magnitude. When the other nine virtues were all included with r_{TW} in the same regression, only r_{TW} was significant. No other virtue came close to being significant.

5.2 A Reduced-form Model

Our main interest is in exploring the relationship between trustworthiness and output per capita. However, equation (13) and the results in Table 2 may suffer from endogeneity bias. We are concerned that p_T, I, and X may be correlated with the error ϵ. First, consider institutions. As emphasized by Acemoglu et al. (2001), rich countries may prefer better institutions. Or, there may be a bias in the subjective construction of the property rights index, such that evaluators see better institutions in richer economies. Finally, measurement error may be particularly acute in studies like these.

Our measure of trust p_T is also likely to be correlated with the error. As argued earlier – see Equation (6) – trustworthy behavior p_{TW}, whether intrinsic r_{TW} or conditional υ_{TW}, determines trust p_T. It does so because we believe that trust is impossible without the expectation that the other party is likely to be trustworthy. Use (5) in (12) and the result in (6) to see that p_T is correlated with institutions:

$$\ln p_{T,j} = \delta_0 + \delta_1 \ln r_{TW,j} + \delta_2 I_j + \upsilon_j \tag{15}$$

Table 3: Other Virtues Included: OLS

Dependent variable: $\ln y$				
Virtue	(1)	(2)	(3)	(4)
	β_2 =Coef r_{TW}	β_5 = Coef Other	N	Adj-R^2
Independence	1.00* [0.01]	0.01 [0.96]	57	0.75
Hard Work	0.70+ [0.08]	-0.16* [0.04]	56	0.75
Responsibility	0.94* [0.01]	0.55+ [0.09]	57	0.76
Imagination	1.30* [0.01]	-0.11 [0.44]	56	0.74
Thrift	1.08* [0.01]	0.09 [0.49]	57	0.75
Determination	1.05* [0.01]	-0.01 [0.94]	56	0.74
Religious Faith	0.86* [0.02]	-0.19* [0.05]	56	0.76
Unselfishness	1.01* [0.03]	0.03 [0.77]	56	0.74
Obedience	1.09** [0.01]	-0.17+ [0.09]	57	0.76
All Nine Other Virtues	1.27+ [0.071]	27 na	55	0.73

Notes: Robust p values in brackets. **significant 1%; * at 5%; + at 10%. All regressions were run with *Property Rights* and *Ln Schooling* included.

Therefore, if I is correlated with the error in (13), so will be p_T.

Human capital X will be correlated with the error also if the shocks that determine I are correlated with those that determine X; that is, if $Cov\left(\eta_I, \eta_X\right) \neq 0$.

One way around the endogeneity problem is to estimate our system in reduced form. That does not allow us to estimate the structural coefficients, but it does allow us to gauge the strength of trustworthiness's overall impact on income. The four structural relations (5), (6), (7), and (8), along with the identity (12), can be combined with our initial estimating equation (13) to produce a reduced-form equation in which y depends only on intrinsic trustworthiness r_{TW}. We continue to assume that trustworthiness is exogenous. Accordingly, we estmate the following reduced form:

$$\ln y_j = \gamma_0 + \gamma_1 \ln r_{TW,j} + \vartheta_j \tag{16}$$

We estimate this equation using OLS and the results are shown in Table 4.

The first column repeats Column 2 of Table 2. The rest of the table adds regional or income indicator variables to see if we are inadvertently picking up the influence of a some third effect that is correlated with both y and r_{TW}. The second column of Table 4 adds indicator variables for Sub-Saharan Africa ($SBSA$), East Asia and the Pacific, (EAP) and Latin America and Caribbean (LAC). Trustworthiness continues to be significant and the African and Latin American indicators are significantly negative, but

there is no explanatory power from the EAP indicator. Column 3 uses indicators from the World Bank for low-income countries (LID) and high-income countries (HID). Trustworthiness retains significance (although the magnitude falls) and both of these indicators are significant with the expected signs. Column 4 repeats the exercise with a single dummy for OECD countries. The results are similar: trustworthiness is significant and so is the indicator. The adjusted R^2 reaches 85% for the third specification.

The last two columns divide the sample into countries with income above the sample median, and those with income below it. In the above-median group, trustworthiness continues to be very significant. In the last column, we see that trustworthiness is not significant for the below-median income group. The adjusted R^2 is only 3%. The mean trustworthiness for this group is only 66% as compared to 75% for the higher income group. As we expect, trust is also lower on average (23% compared to 36%). Neither is as pronounced as the difference in mean income per capita, however, which is \$5,800 vs. \$22,626.[16]

5.3 Instrumental Variables

To this point we have maintained the hypothesis that our measure of trustworthiness r_{TW} is exogenous. Recall that r_{TW} measures the proportion of the population of the country that identifies "tolerance and respect for others" in

[16]The units for income per capita are International dollars of 2000, as reported in the Penn World Table (Heston et al., 2006).

Table 4: Reduced-form OLS

Dependent variable: $\ln y$						
	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample	Full Sample	Full Sample	Full Sample	$y \geq y_{med}$	$y < y_{med}$
	OLS	OLS	OLS	OLS	OLS	OLS
$\ln Trustworthiness$ ($\ln r_{TW}$)	3.25** [0.00]	2.91** [0.00]	0.80* [0.02]	1.20+ [0.05]	1.09** [0.00]	0.9 [0.37]
$SBSA$		-1.37** [0.00]				
EAP		-0.58 [0.16]				
LAC		-0.58** [0.00]				
LID			-1.07** [0.00]			
HID			1.17** [0.00]			
$OECD$				1.11** [0.00]		
$Constant$	10.42** [0.00]	10.50** [0.00]	9.09** [0.00]	9.26** [0.00]	10.31** [0.00]	8.91** [0.00]
Observations	60	60	60	60	30	30
Adjusted R^2	0.27	0.42	0.85	0.56	0.3	0.03
Notes: Robust p values in brackets. **significant 1%; * at 5%; + at 10%						

the World Values Survey to be an important quality to teach their children. We claimed that this proportion corresponds to a deep-seated character trait and does not depend on income or institutions.

There are reasons, however, to be concerned about our exogeneity assumption. If our measure of intrinsic trustworthiness r_{TW} is correlated with the error ϑ in (16), then the coefficient of interest γ_1 is biased.

First, it is possible that we are measuring intrinsic trustworthiness with error. After all, the question we use asks about respect and tolerance, not trustworthiness *per se*. Second, since our measure of intrinsic trustworthiness is based on a survey, it is possible that survey bias has occurred. If survey respondents were over-sampled in urban regions – where individuals are more likely to value "tolerance and respect for others" – that would introduce an overestimate of the national average r_{TW}.

Third, r_{TW} and y may evolve together over time from the influence of common, unobserved variables. We think of r_{TW} as highly persistent over time, but not completely constant. For example, families may first be only conditionally trustworthy, but slowly develop intrinsic trustworthiness from both habit and association with those that have the trait. The same forces that encourage the acquisition of such morals may also lead to higher income.

A fourth possibility is that r_{TW} is more dependent on current y than we have assumed. Although we do not believe this to be the case, it is possible that r_{TW} is higher because y is higher. If true, however, it means that y and r_{TW} are simultaneously determined. This is a classic problem that causes

correlation between the regressor and the error.

To correct for endogeneity, we instrument for r_{TW}. We consider four different instruments: two past values of "Constraint on the Executive" (lags of 50 and 100 years) from the Polity IV database, which we label $Constraint\,Exec\,50$ and $Constraint\,Exec\,100$; the variable *Latitude*, which is the absolute value of the country's latitude measured as a fraction of 90 degrees; and $Mortality$, which is the measure of potential European settler mortality from Acemoglu et al. (2001). Constraint on the Executive has been used by Acemoglu and Johnson (2005) and others as a measure of the quality of institutions.

We consider the first two to be measures of the quality of early institutions, which we think are highly correlated with early intrinsic trustworthiness. It is likely that the value of r_{TW} in the past – not the present – is the key to institution formation. Since we do not have data on historical values of r_{TW}, we assume that today's value of r_{TW} for which we do have data, is highly correlated with past values of I.

Latitude has been used by Hall and Jones (1999) and Glaeser et al. (2004) among others to instrument for current institutions. Hall and Jones use it as a measure of Western European influence on the set-up and subsequent development of social infrastructure. The idea is that higher latitudes were both sparsely populated and similar in climate to Western Europe itself, both of which encouraged settlement and colonization by Europeans who brought their institutions with them.

We extend the argument to distinguish between types of settlers: we

conjecture that more trustworthy Europeans migrated to higher latitudes because the difficult working conditions and the small size of settlements made life difficult for dishonest agents. Small settlement size, for example, made detection of transgressions easier. The lack of large-scale extractive industries – which were found mainly at low latitudes – made it more difficult to find profitable opportunities to take advantage of native peoples or other settlers.

Settler mortality was introduced by Acemoglu et al. (2001) as an instrument for current institutions. The idea is similar: where settler mortality was low Europeans were more likely to settle and construct good institutions.

We estimate Equation (16) using instruments for $\ln r_{TW}$. This estimation strategy is valid if all of our instruments work *only* through current intrinsic trustworthiness. We think this is a reasonable working hypothesis and, in any case, there is much precedent for similar strategies in the recent literature.[17] As a check, we also include our instruments one at a time as exogenous regressors (and instruments) in some specifications.

Table 5 presents the main results. The first column uses $Constraint\,Exec\,50$ and *Latitude* as instruments for r_{TW}; the second uses $Constraint\,Exec\,100$ and *Latitude*. The results are broadly similar: the log of r_{TW} is highly significant in explaining y; moreover, the magnitude of the point estimate is quite large. Columns (3) – (6) include the instruments as regressors one at a time.

[17] Most of the work on institutions and growth, including Acemoglu et al. (2001); Glaeser et al. (2004); Hall and Jones (1999); Hausmann et al. (2005), employ a similar assumption.

Trustworthiness is significant at 5% or better in three of the four cases (and it is almost significant when *Constraint Exec* 100 is included). The included instruments are never significant. The last column uses *Mortality* as the lone instrument for $\ln r_{TW}$. Again, we see that trustworthiness is both highly significant and has a large impact on y.[18]

As a robustness check, we added another virtue, one at a time, to the basic specification. That is, instead of using (16), we ran:

$$\ln y_j = \gamma_0 + \gamma_1 \ln r_{TW,j} + \gamma_2 \ln Z_j + \vartheta_j \tag{17}$$

and used *Constraint Exec 50* and *Latitude* as instruments for both virtues. This gave us nine different point estimates for γ_1 and γ_2. In these pairs, γ_1 was significant in six of the nine cases, and γ_2 was *never* significant. As before, we take this as a strong indication that there is something unique about the quality "respect for others" that we have identified with trustworthiness.

Living standards as measured by y are strongly related to our measure of trustworthiness, no matter which technique we use.

5.4 Structural Estimation

In this section we test to see if there is support for the structure as described by Equations (5), (6), (7), and (8). These equations show that our mea-

[18]The first stages of the IV equations are reasonable. All are significant with one exception, *Latitude* when the other instrument is *Constraint Exec 100*. The adj-R^2s are not especially high, however, and are all around 16%.

Table 5: Instrumental Variables

Dependent variable: $\ln y$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	IV	IV	IV	IV	IV	IV	IV
Instruments →	*CE50 Lat.*	*CE100 Lat.*	*CE50, Lat.*	*CE100 Lat.*	*CE50 Lat.*	*CE100 Lat.*	*Mort.*
$\ln Trustworthiness$ $\ln r_{TW}$	9.54** [0.00]	9.09** [0.00]	11.48* [0.01]	10.82 [0.14]	7.25* [0.03]	8.14* [0.02]	11.31** [0.00]
Constraint Exec 50			-0.06 [0.55]				
Constraint Exec 100				-0.05 [0.78]			
Latitude					0.94 [0.35]	0.48 [0.71]	
Constant	12.53** [0.00]	12.52** [0.00]	13.48** [0.00]	13.33** [0.00]	11.36** [0.00]	11.99** [0.00]	13.27** [0.00]
Observations	48	36	48	36	48	36	24
$Prob > F$	0.000	0.002	0.007	0.035	0.000	0.004	0.000
Notes: Robust p values in brackets. **significant 1%; * at 5%; + at 10%.							

sures of trust, institutions, and human capital should all be determined by trustworthiness.

The first three columns of Table 6 run OLS regressions for trust, institutions, and human capital on $\ln r_{TW}$. In all cases, trustworthiness is significant at the 1% level. Since we cannot be sure that trustworthiness is exogenous, we also estimate each specification using $Constraint50$ – or $Constraint100$ – and *Latitude* as instruments for $\ln r_{TW}$. These results are shown in the last six columns of Table 6. The results in Columns (4) - (9) confirm that trustworthiness is highly correlated with all three structural variables. In each case, moreover, the coefficients rise substantially when we go to IV estimation.

These results support our idea that trust depends on trustworthiness. They are also consistent with the idea that institutions and education are, fundamentally, dependent upon the degree of trustworthiness in society.

6 Conclusion

In this paper we drew a distinction between two types of agents: the intrinsically trustworthy and conditional operators. The former always honor contracts; the latter do only if it is in their self interest. In our view, the proportion of the intrinsically trustworthy is the key to development and higher per capita income. The greater the fraction of natively trustworthy people, the greater the likelihood that institutions will be established to encourage

Table 6: Structural Equations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	IV	IV	IV	IV	IV	IV
Instruments →				*CE50, Lat.*	*CE50 Lat.*	*CE50, Lat.*	*CE100, Lat*	*CE100, Lat*	*CE100, Lat*
Dependent variable →	$\ln p_T$	*Property Rights*	$\ln School$	$\ln p_T$	*Property Rights*	$\ln School$	$\ln p_T$	*Property Rights*	$\ln School$
$\ln r_{TW}$	1.86** [0.00]	3.27** [0.00]	1.24** [0.00]	4.76** [0.00]	9.88** [0.00]	3.65** [0.00]	5.21* [0.03]	11.81** [0.00]	3.64** [0.00]
Constant	-0.71** [0.00]	4.87** [0.00]	2.42** [0.00]	0.33 [0.53]	7.07** [0.00]	3.25** [0.00]	0.4 [0.59]	7.77** [0.00]	3.27** [0.00]
Observations	60	57	60	48	45	48	36	33	36
Adj R^2	0.16	0.16	0.19						

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

conditional operators to behave in a trustworthy manner. As trustworthy behavior grows, so does trust, and output expands. Trust, while secondary, is still very important. Without trust, transactions would not be initiated and scale would be small.

To test our hypotheses we used a new question from the World Values Survey to measure intrinsic trustworthiness. This question elicits the respondent's feeling about the importance of a particular quality – "tolerance and respect for others" – out of a list of 10 such qualities. Using this as a proxy for intrinsic trustworthiness, we found that it was highly significant in explaining per capita income in a wide variety of specifications. In particular, it outperformed trust (measured by the usual question from the World Values Survey) when the two were in the same regression. It also outperformed all of the other nine virtues on the list when we added them one at a time to the basic specification. In addition to treating intrinsic trustworthiness as exogenous, we instrumented for it using lagged values of an institutional variable, latitude, and European settler mortality. In all cases, it was highly significant and it effect was large.

We also tested the structural building blocks of our theoretical framework, to see if trust, present institutions, and current human capital were determined by intrinsic trustworthiness. All appeared to be, using both ordinary least squares and instrumental variables.

The positive contribution of this paper is to point out the importance of cultivating trustworthiness in society. Where there is a long historical record

of conflict between groups or classes, or between citizens and the government, the process of transformation will be very difficult. Nevertheless, policies that succeed in the long run will be those that, whatever their economic merits, are fair and impartial and promote trustworthy behavior among all citizens.

References

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. available at http://ideas.repec.org/a/aea/aecrev/v91y2001i5p1369-1401.html.

Acemoglu, D., Johnson, S., Robinson, J. A., and Yared, P. (2005). From education to democracy? *American Economic Review*, 95(2):44–49.

Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving? *Economic Journal*, 100(401):464–77.

Ashraf, N., Bohnet, I., and Piankov, N. (2006). Decomposing trust and trustworthiness. *Experimental Economics*, 9(3):193–208.

Axelrod, R. (1984). *The Evolution of Cooperation*. Basic Books.

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.

Ben-Ner, A. and Putterman, L. (2008). Trust, communication and contracts: An experiment. Working Papers 0206, Industrial Relations Center, University of Minnesota (Twin Cities Campus).

Berg, J., Dickhaut, J., and McCabe, K. (1995). Trust, reciprocity, and social history. *Games and Economic Behavior*, 10(1):122–142. available at http://ideas.repec.org/a/eee/gamebe/v10y1995i1p122-142.html.

Beugelsdijk, S. (2006). A note on the theory and measurement of trust in explaining differences in economic growth. *Cambridge Journal of Economics*, 30(3):371–387. available at http://ideas.repec.org/a/oup/cambje/v30y2006i3p371-387.html.

Bohnet, I., Frey, B. S., and Huck, S. (2001). More order with less law: On contract enforcement, trust, and crowding. *American Political Science Review*, 95:131 – 144. Kennedy School of Government.

Breuer, J. B. and McDermott, J. (2008). Trust or trustworthiness? USC Working Paper.

Breuer, J. B. and McDermott, J. (2009). Trust. caution. USC Working Paper.

Charness, G., Cobo-Reyes, R., and Jiménez, N. (2008). An investment game with third-party intervention. *Journal of Economic Behavior & Organization*, 68(1):18–28.

Coleman, J. S. (1988). Social capital and the creation of human capital. *The American Journal of Sociology*, 94(1):95–120.

Ellison, G. (1994). Cooperation in the prisoner's dilemma with anonymous random matching. *Review of Economic Studies*, 61(3):567–88. available at http://ideas.repec.org/a/bla/restud/v61y1994i3p567-88.html.

Fehr, E. (2008). On the economics and biology of trust. IZA Discussion Papers 3895, Institute for the Study of Labor (IZA).

Fehr, E. and Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3):817–868.

Frank, R. H. (1987). If homo economicus could choose his own utility function, would he want one with a conscience? *American Economic Review*, 77(4):593–604. available at http://ideas.repec.org/a/aea/aecrev/v77y1987i4p593-604.html.

Glaeser, E. L., Laibson, D. I., Scheinkman, J. A., and Soutter, C. L. (2000). Measuring trust. *The Quarterly Journal of Economics*, 115(3):811–846. available at http://ideas.repec.org/a/tpr/qjecon/v115y2000i3p811-846.html.

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. available at http://ideas.repec.org/a/kap/jecgro/v9y2004i3p271-303.html.

Guiso, L., Sapienza, P., and Zingales, L. (2005). Cultural biases in economic exchange. CEPR Discussion Papers 4837, C.E.P.R. Discussion Papers. available at http://ideas.repec.org/p/cpr/ceprdp/4837.html.

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. available at http://ideas.repec.org/a/tpr/qjecon/v114y1999i1p83-116.html.

Hardin, R. (1992). The street-level epistemology of trust. *Analyse und Kritik*, 14:S. 152 – 176.

Harrington, Joseph E, J. (1989). If homo economicus could choose his own utility function, would he want one with a conscience?: Comment. *American Economic Review*, 79(3):588–93. available at http://ideas.repec.org/a/aea/aecrev/v79y1989i3p588-93.html.

Hausmann, R., Pritchett, L., and Rodrik, D. (2005). Growth accelerations. *Journal of Economic Growth*, 10(4):303–329.

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

Huang, P. H. and Wu, H.-M. (1994). More order without more law: A theory

of social norms and organizational cultures. *Journal of Law, Economics, and Organization*, 10(2):390–406.

Huck, S. (1998). Trust, treason, and trials: An example of how the evolution of preferences can be driven by legal institutions. *Journal of Law, Economics and Organization*, 14(1):44–60. available at http://ideas.repec.org/a/oup/jleorg/v14y1998i1p44-60.html.

Kandori, M. (1992). Social norms and community enforcement. *Review of Economic Studies*, 59(1):63–80. available at http://ideas.repec.org/a/bla/restud/v59y1992i1p63-80.html.

Karlan, D. S. (2005). Using experimental economics to measure social capital and predict financial decisions. *American Economic Review*, 95(5):1688–1699.

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. available at http://ideas.repec.org/a/tpr/qjecon/v112y1997i4p1251-88.html.

La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. W. (1997). Trust in large organizations. *American Economic Review*, 87(2):333–38. available at http://ideas.repec.org/a/aea/aecrev/v87y1997i2p333-38.html.

Miller, A. S. and Mitamura, T. (2003). Are surveys on trust trustworthy? *Social Psychology Quarterly*, 66(1):62–70.

Putnam, R. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press.

Sen, A. K. (1977). Rational fools: A critique of the behavioral foundations of economic theory. *Philosophy and Public Affairs*, 6(4):317–344.

Slemrod, J. and Katuscák, P. (2005). Do trust and trustworthiness pay off? *Journal of Human Resources*, XL(3):621–646.

Tabellini, G. (2006). Culture and institutions: economic development in the regions of europe. Levine's Working Paper Archive 321307000000000241, UCLA Department of Economics. available at http://ideas.repec.org/p/cla/levarc/321307000000000241.html.

Temple, J. and Johnson, P. A. (1998). Social capability and economic growth. *The Quarterly Journal of Economics*, 113(3):965–990. available at http://ideas.repec.org/a/tpr/qjecon/v113y1998i3p965-990.html.

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.