DOES TRUST PROMOTE GROWTH?

ROMAN HORVATH,
Institute of Economic Studies, Faculty of Social Sciences,
Charles University, Prague, Czech Republic

Abstract
We examine the effect of generalized trust on long-term economic growth. Unlike previous studies in this stream of literature, we use the Bayesian model averaging to deal rigorously with model uncertainty and the attendant omitted variable bias. In addition, we address en- dogeneity and assess whether the effect of trust on growth is causal. Examining more than forty regressors for nearly fifty countries, our estimates show that trust exerts a positive effect on long-term growth and suggest that trust is one of important drivers of long-term growth. Our results also show that trust is especially important for growth in countries with the weak rule of law.
Keywords*: trust, economic growth, Bayesian model averaging.*

JEL Classification: O 43; O 10; Z 13;
Preliminary communication
Received: February 01, 2012 / Accepted: April 07, 2012

1. Introduction

The importance of trust has been recognized for a long time in economic literature. Many scholars with a major impact on economic profession highlighted the role of trust for economic development (Smith (1997 [1766]) or Keynes (1936), among others).

Knack and Keefer (1997) and Zak and Knack (2001) pioneer the modern literature on trust-growth relationship using the data on generalized trust obtained from the World Values Survey database. Controlling for several standard determinants of growth, they document that trust is positively associated with growth. Their contribution has been followed by a number of studies (Aghion et al. (2010), Algan and Cahuc (2010), Nunn and Wantchekon (2011), Tabellini (2010), among others), which focus on evaluating the casual effect of trust on growth in a greater detail and find that trust has indeed a positive effect on growth.

A related stream of literature highlights the role of model uncertainty, which has been emphasized as highly important issue in empirical growth literature (Fernandez et al. (2001a), Sala-i-Martin et al. (2004), Ley and Steel (2009), Eicher et al. (2011)). The potentially plentiful determinants of growth with many competing growth theories naturally give rise to large uncertainty about which model represents the correct model of economic growth (Durlauf et al., 2008).[1] Therefore, the true growth model is treated as unknown in this literature. Beugelsdijk et al. (2004) and Berggren et al. (2008) examine the effect of trust on growth using the updated version of original dataset of Zack and Knack (2001). To assess the the model uncertainty, Beugelsdijk et al. (2004) and Berggren et al. (2008) employ extreme bounds analysis. Their results suggest that the effect of trust on growth is sensitive to the conditioning set of regressors and to the composition of the sample.

To summarize, previous literature has produced two types of studies: 1) the studies explicitly dealing with the endogeneity of trust, but addressing the issue of model uncertainty in a

[1] Model uncertainty has been recognized as important issue in political science literature, too. See Montgomery and Nyhan (2010) for a recent discussion.

somewhat *ad hoc* manner (i.e. failing to deal with model uncertainty and the attendant omitted variable bias formally), and 2) the studies addressing the issue of model uncertainty more consistently, but ignoring the endogeneity of trust.

We contribute to this literature and try to avoid the pitfalls of studies in 1) and 2). We investigate the effect of trust on growth and deal *both* with the endogeneity and model uncertainty and the attendant omitted variable bias formally. Therefore, we examine whether the somewhat pessimistic view put forward by Beugelsdijk et al. (2004) and Berggren et al. (2008) about the importance of social capital indeed holds. For this reason, we deal rigorously with model uncertainty within formal probabilistic reasoning - using Bayesian model averaging (BMA). Unlike extreme bounds analysis[2], BMA is well grounded in statistical theory (Raftery, 1995, Raftery et al., 1997). Model uncertainty is a part of estimation procedure and the assumption that all specifications are equally likely to be true is relaxed. In addition, Beugelsdijk et al. (2004) and Berggren et al. (2008) do not address the issue that trust is likely to be simultaneously determined with growth and therefore, the corresponding coefficient of the effect of trust on growth would be estimated inconsistently. We follow the methodology employed by Durlauf et al. (2008) and use the BMA together with the two stage least squares to address the endogeneity of trust.

In addition, the BMA is able to evaluate the effect of dozens of regressors jointly within a coherent framework and therefore, substantially reduce the concerns about omitted variable bias, which is an issue for studies using more traditional model selection approach. The BMA also gives the posterior inclusion probability (PIP), which indicates the probability with which the given regressor should be included in the correct model of economic growth. As a consequence, we are able to rank all regressors according to the PIP. Clearly, this is impossible without BMA techniques. This sheds more light on the importance of trust on growth in comparison to other growth theories and to our knowledge, this evidence is not available so far.

Examining more than forty regressors for nearly fifty countries around the world, our results suggest that the generalized trust is a robust determinant of long-term economic growth. Our BMA estimation shows that trust exhibits a high posterior inclusion probability (between 0.6-0.8), which indicates that trust is likely to belong in the correct model of economic growth with a high probability. Therefore, our results do not support the previous findings claiming that the effect of trust on growth is sensitive to the conditioning set of regressors. In addition, we find that trust is especially conducive to growth in countries with the low quality of formal institutions.

The paper is organized as follows. Section 2 discusses the relevant literature. Section 3 briefly introduces the Bayesian model averaging. Section 4 presents the data. The results are available in section 5. Conclusions are provided in section 6. Appendix with additional results follow.

2. Related Literature

An excellent survey of the literature evaluating the effect of culture of growth is provided by Guiso et al. (2006). Their survey is very broad and here we take much narrower focus and discuss only the recent studies on the effect of macro trust on economic performance. How can trust affect growth? Theoretically, there are more ways how trust influence economic activity.

First, trust may be related to schooling, as in high-trust environment human capital may transmit more easily (Bjornskov, 2012). Using data on 50 countries in 1976-2005, Dearmon and Grier (2011) find that trust is conducive for human capital accumulation. Similarly, Ozcan and Bjornskov (2011) find that trust exerts a positive effect on human development. Bjornskov (2012) estimates a system of equations model, in which generalized trust can affect growth via several transmission mechanisms such as via schooling, international trade, rule of law or investments. Examining these transmission mechanisms, Bjornskov (2012) finds the strongest effect via schooling and governance.

[2]Leamer (1978) develops extreme bounds analysis as an *ad hoc* sensitivity analysis to address model uncertainty.

Second, trust may also be linked to governance. Undertaking reforms and policy innovations may be more beneficial for policy makers in more trustful societies. Citizens are more likely to believe that policy innovations are not the consequence of special interest groups and therefore, they are more likely to reward the politicians favorably. For example, Knack (2002) shows that reforms are more likely in those U.S. states, which exhibit more trust.

Third, a number of studies document a positive link between trust and investment (Zak and Knack, 2001, Carlin et al., 2009, Bjornskov, 2012). In this respect, Zak and Knack (2001) develop a theoretical model, in which economic agents may either engage in production or in verifying whether the activity of other economic agents is opportunistic. As a consequence, economic agents in high-trusting environment enjoy lower transaction costs, which stimulates the economic activity. Ahlerup et al. (2009) develop a simple game-theoretical model, in which they show that the effect of social capital on growth depends on the quality of institutions. With well-functioning formal institutions, the effect of social capital is subdued. On the other hand, the importance of social capital rises in an environment of weak institutions. Guiso et al. (2008) show that the trust determines stock market participation. Additionally, they show that even if individuals participate in stock market, they buy less stocks in an environment characterized by less trust.

Forth, trust may be conducive for trade. Greif (1994) documents that trust was an important aspect for international trade already in Medieval times. Yu et al. (2011) examines the impact of trust on trade using the European data in 1996-2009. They find that the effect of trust is more important, if the quality of formal institutions is low. Therefore, their results suggest that trust and institutions are substitutes. Guiso et al. (2009) find that the trust exerts a positive effect on international trade and the importance of trust rises, when more sophisticated products are traded.

Fifth, trust may have an effect on various government measures. Aghion et al. (2010) investigate the effect of distrust on government regulation and find that regulation serves as the substitute for trust. In this respect, Carlin et al. (2009) develop a theoretical model predicting that when social capital is valuable, trust and regulation are substitutes. On the other hand, trust and regulation can be complements in an environment of less valuable social capital. These theoretical predictions are confirmed with empirical data.

The empirical literature investigating the effect of culture on growth has also focused on examining to what extent the effect of culture on growth is robust to the inclusion of institutions and which dimensions of culture are the most conducive for growth. Tabellini (2005) shows how culture, which is measured as the set of indicators including the trust, has significantly affected the economic development in Europe. Gorodnichenko and Roland (2011) analyze, which dimensions of culture are the most supportive for growth. Their regression analysis shows that even though many dimensions of culture are likely to have an effect on growth, the degree of individualism is the most important and robust determinant of growth. Similarly, Jellema and Roland (2011) use the principal components analysis to examine which of the institutional factors matter the most for growth and find that, as concerns the cultural variables, authoritarian culture is detrimental for long-term growth.[3]

The previous literature also documented the extreme persistence of culture. Nunn and Wantchekon (2011) analyze the impact of slave trade on mistrust in Africa. They find slave trade shocks have very persistent effect literally lasting for centuries. Similarly, Guiso et al. (2009) and Grosjean (2011) show that the change in trust is very low and the large shocks typically persist over centuries. Algan and Cahuc (2010) highlight the importance of inherited trust for economic growth in the 20th century.

[3] Note that principle components are one way how to deal with multicollinearity. Alternatively, BMA can be employed to address this issue. More on this in the following section.

Related stream of literature highlighted the importance of the measurement of social trust. Beugelsdijk (2006) questions the validity of generalized trust measures from the World Values Surveys, i.e. the source of data that is typically used by researchers for the estimation of the effect of trust on economic performance. He argues that this measure strongly reflects the quality of institutions. On the other hand, Uslaner (2008) is more skeptical about the role of institutions for trust, but understand trust to be driven more by income inequality. La Porta et al. (1997), Glaeser et al., (2000), Alesina and La Ferrara (2002) and Bjornskov (2006) analyze the determinants of trust empirically. Nevertheless, to address the concerns put forth by Beugelsdijk (2006) in an empirical analysis, it is advisable to control for as many regres- sors as possible, including those capturing the quality of institutions. The use of BMA is especially fruitful in this regard, as the BMA approach may effectively deal with dozens of regressors jointly in a systematic manner. Related empirical evidence by Gorodnichenko and Roland (2012) shows that the effect of culture on growth remains robust even after controlling for various measures of institutions.

Using the data on trust in U.S. regions, Dincer and Uslaner (2010) widens the scope of possible impact of trust and show that trust positively contributes not only on economic growth, but also on the growth rate of housing prices and the growth rate of employment.

3. Bayesian Model Averaging

Following its development in statistics primarily in the 1980s, BMA has gained popularity in economic literature in the 1990s and 2000s. It is typically applied to assess transparently and rigorously the robustness of results especially in an environment of many competing theories and many possible determinants. In a similar vein, BMA techniques are often applied for forecasting in a data rich environment. The textbook treatment of BMA is available in Koop (2003) and Koop et al. (2007). Feldkircher and Zeugner (2009), Ley and Steel (2009) or Eicher et al. (2011) discuss BMA in relation to the determinants of long-term growth. BMA was introduced to political science by Bartels (1997), but somewhat surprisingly was not followed by many other applications. For this reason, Montgemery and Nyhan (2010) provide an extensive discussion of BMA with the emphasis how BMA can be useful in political science.

We continue with a brief formal description of BMA. Suppose we have a dependent variable *Y* (for example, GDP growth) with a number of observations *n* (the number of countries in the case of cross-sectional growth regressions) and *k* regressors X_1 .... X_k. The researcher is interested to understand, which regressors Xi .... X_k are robust determinants of *Y*. The researcher typically specifies some core model with a subset of regressors X_1 .... X_k and then includes additional regressors within the set of X_1 X_k to assess the robustness of core model results. In many applications, this is done in somewhat idiosyncratic and non-transparent manner. This procedure is also vulnerable to inflating the true significance of regression coefficients. Clearly, the risk of omitting some important regressor is far from negligible. The BMA offers an alternative to this somewhat vague model search procedure, and as the name suggests it focuses on model averaging rather than on model selection.

The standard procedure in a cross-sectional growth determinants literature is to estimate model $Y = a_1X_1 + .. + a_kX_k + e$, where $e \sim N(0, a^2 1)$ (assume for simplicity that X_1 is a constant) using OLS. Typically, there is a substantial uncertainty, which of possibly plentiful *X*'s should be included. In consequence, there are $I = 2^k$ subsets of *X*'s that can be considered as regressors and therefore $M_1....Mi$ regression models to be examined. Let us denote the vector of parameters of *i-th* model as *9i = (a, a)* .The likelihood function of *i-th* model, *pr (D | d_i, Mi),* summarizes all the information about Q_i based on available data D. The marginal likelihood, the probability density of the data, *D,* conditional on *Mi* can be written as follows

$$pr(D \mid M_i) - \int pr(D \mid \theta_i, M_i)\, pr(\theta_i \mid M_i)\, d\theta_i, \qquad (1)$$

the marginal likelihood is therefore a product of the likelihood function $pr(D \mid 9_i, M_i)$ and prior density $pr(9_i \mid M_i)$ integrated over the parameter space. Using $pr(D \mid Mi)$ one can derive the prior probability that M_i is a correct model, which we denote as $pr(M_i)$. Bayes's theorem gives the posterior model probability of M_i, $pr(M_i \mid D)$,

$$pr(M_i \mid D) - \frac{pr(D \mid \theta_i, M_i)\, pr(M_i)}{\sum_{l-1}^{i} pr(D \mid M_l)\, pr(M_l)} \qquad (2)$$

the posterior inclusion probability of given regressor, $pr(aj = 0 \mid D)$, is then received by taking a sum of posterior model probabilities across those models that include the regressor. Posterior inclusion probability is of primary importance here, since it measures the probability that given regressor belongs to the correct model. This approach has been recently generalized to panel data setting to explicitly account for unobserved heterogeneity among countries (Moral-Benito, 2012).

Even with modern computers, it is computationally prohibitive to evaluate all the possible models and we use MC³ algorithm to reduce the computational requirements (Madigan and York, 1995). MC³ approximates the posterior distribution of model space by simulating a sample from it. We take 1 000 000 burn-ins and 3 000 000 draws, which leads to a sufficiently high correlation between analytical and MC³ posterior model probabilities (about 0.99 in our case).

The parameter priors have to be specified in order to implement BMA. In general, priors specify researcher's information or beliefs before seeing the actual data. Since the degree of belief is not particularly high in the growth regressions context, uninformative priors are typically employed. The priors affect the marginal likelihood in (1). For this reason, Eicher et al. (2011) and Ley and Steel (2009) analyze, which parameter priors (as well as model priors, more on these priors below) are preferable. This is evaluated by comparing the predictive accuracy of identical regression models, which differ only in terms of priors. Eicher et al. (2011) find that among 12 candidate parameter priors the Unit Information Prior (UIP) with uniform model prior tend to provide more accurate forecasts than the other considered priors. On the other hand, the results by Feldkircher and Zeugner (2009) give more support to hyper g-priors. To deal with this issue, we carry out the estimations using several parameter priors to shed further light on the robustness of results.

The first prior is defined as follows.

$$pr(D \mid M_i) \approx c - 1/2BIC_i, \qquad (3)$$

where

$$BIC_i = n \log\left(1 - R_i^2\right) + p_i \log(n) \qquad (4)$$

$$pr(\alpha_1 \mid M_i) \propto 1, \qquad (5)$$

$$pr(\sigma \mid M_i) \propto 1, \qquad (6)$$

In (3) and (4), c is a constant, R^2 stands the coefficient of determination and p_i for the number of regressors. This prior is typically labeled as UIP. Next, we consider the following prior, so-called g-prior,

proposed by Fernandez et al. (2001b):

$$pr\left(\alpha^{(k)} \mid \sigma, M_i\right) \sim N\left(0, \left(g_k Z^{(k)'} Z^{(k)}\right)^{-1}\right), \qquad (7)$$

where Zdenote the matrix of size $n \times p_k$ with p_k demeaned regressors included in M_i. It is noteworthy that the values of g close to zero imply less informative prior and $g = 1$ gives the

same weight to the information contained in data and in prior. Two different values of g are examined. First, $g = 1/\max(N, k^2)$ is the one preferred by Fernandez et al. (2001b) and is called BRIC. Second, $g = 1/(\ln N)^3$ corresponds to Hannah-Quinn criterion. The third commonly employed g-prior set $g = 1/k^2$ (Foster and George, 1984), but this is in our setting identical to $g = 1/\max(N, k^2)$.

Next, we also use parameter priors not employed previously in the growth literature (except Feldkircher and Zeugner, 2009), the so-called hyper-g prior (Liang et al, 2008).

We use two different hyper-g priors. The first one sets the prior expected value of shrinkage factor to correspond to UIP, the second one sets it to conform to BRIC. All in all, this makes five different parameter priors that we employ for the empirical investigation of the effect of interpersonal trust on long-term economic growth.

As for the model prior, we use a uniform model prior, which gives equal prior probability to all models M_i. In consequence, $pr(Mi)=1/L$ for each i. We choose this model prior, because Eicher et al. (2011) show that it performs well in forecasting exercise.

All regressors except trust are constructed in the way that they are exogenous to growth (see the following section for the data description). As a consequence, trust and growth can be simultaneously determined. To deal with the endogeneity of trust, we follow the methodology developed by Durlauf et al. (2008), instrument trust by the genetic distance data (from Spolaore and Wacziarg, 2009), the absolute latitude and the dummy for former colonies (instruments are described in the data section in a greater detail) and use the predicted trust as the regressor in our BMA model[4].

It is important to note that IV regressions give consistent estimates, but these may be severely biased, if instruments are weak. We use the F-statistic from the first stage regression to assess whether our instruments are weak. Staiger and Stock (1997) show that the F-statistic from the first stage regression should be sufficiently high and as a rule of thumb, propose the statistic to be above 10. In such case, the bias is likely to be small. In addition, instruments must be exogenous to the regressand - economic growth in our case. Clearly, the absolute latitude and the the classification, whether country was under colonial rule in the 19th century is exogenous to the recent economic growth. The the current genetic distance data are very likely to be exogenous to current growth, since the degree of migration among countries is unlikely to be so high that this would substantially change the typical genetic pattern in the given country. For the robustness check, we also use the genetic distance data as of the year 1500, but fail to find any consequence for our regression results.

4. Data

To analyze the cross-sectional growth determinants, the widely used Fernandez et al. (2001a) dataset is employed.[5] The original dataset contains 41 regressors from 72 countries leading to a total of 2^{42} models (e.g. more than 2 trillion). The measure of interpersonal or generalized trust, which is obtained from the World Values Survey[6], is available for 46 out of these 72 countries. The World Values Survey is conducted in dozens of countries with typically more than 1000 respondents in each country giving their answer to various questions related to their values. The survey also includes a question on the degree of trust; respondents are asked whether they

[4] Recently, two unpublished papers develop full fledged instrumental variables BMA methodology, see Eicher et al. (2012) an Koop et al. (2011). Given that we have only one endogenous regressor, we stick to the Durlauf et al. (2008) methodology.

[5] The alternative is to use the dataset from Berggren et al. (2008). The original dataset contains 24 regressors from 64 countries. Nevertheless, there are missing observations for various countries and this consequently decreases the number of countries for the BMA to 45. The cross-country coverage of this dataset is thus similar to the modified dataset of Fernandez et al. (2001a), but the number of possible determinants of growth is lower. Therefore, the Fernandez et al. (2001a) dataset is employed.

[6] These data are kindly provided by Berggren et al. (2008) at the authors' website.

agree that 'Generally speaking would you say that most people can be trusted or that you can't be too careful in dealing with people?'. The additional change to this dataset is that we use the long-term growth between 1960-2005. The dataset is largely representative, as there are both developed and developing countries. In addition, it is noteworthy that various economic, political, geographical, demographic social or cultural variables are considered as the potential determinant of growth.

More specifically, the list of regressors is as follows: GDP level in 1960, Fraction Confucian, Life Expectancy, Equipment investment, Sub-Saharan dummy, Fraction GDP in mining, Fraction Hindu, Non-equipment investment, Rule of law, Degree of capitalism, Size labor force, Fraction Muslim, Fraction Protestants, Black market premium, Latin American dummy, Higher school enrollment, Ethnolinguistic fractionalization, Primary school enrollment, Civil liberties, Fraction Buddhist, Spanish colony dummy, Number of years open economy, Fraction of population speaking English, French colony dummy, Outward orientation, Political rights, Age, War dummy, British colony dummy, Fraction Catholic, Public education share, Primary exports, Exchange rate distortions, Fraction speaking foreign language, Absolute latitude, Population growth, Area, (scale effect), Ratio workers to population, SD of black market premium, Fraction Jewish, Revolutions and coups. Some regressors such as the Sub-Saharan dummy are exogenous to economic growth by construction. Other regressors are constructed in the way to minimize potential endogeneity issues, i.e. the data comes typically from 1950s or 1960s. The further details about the dataset are available in Fernandez et al. (2001a).

These regressors are available for the following countries: Algeria, Argentina, Australia, Austria, Belgium, Bolivia, Botswana, Brazil, Cameroon, Canada, Chile, Colombia, Congo, Costa Rica, Cyprus, Denmark, Dominican Rep., Ecuador, El Salvador, Ethiopia, Finland, France, Germany West, Ghana, Greece, Guatemala, Haiti, Honduras, Hong Kong, India, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Madagascar, Malawi, Malaysia, Mexico, Morocco, Netherlands, Nicaragua, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Senegal, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Tunisia, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Zaire, Zambia, Zimbabwe.

To instrument trust, we use the following variables: the genetic distance data, the absolute latitude and the dummy for former colonies. As concerns the genetic distance data, we use F_{ST} distance from Spolaore and Wacziarg (2009). F_{ST} distance is a measure of genetic differences based on indices of heterozygosity, i.e. the probability that two alleles at a given locus selected randomly from two populations will be different. As a consequence, a larger F_{ST} distance means a longer separation between populations. We expect that more distant populations experiencing less mixing are likely to trust each other less due to the lack of knowledge about different population (i.e. the correlation between F_{ST} distance and generalized trust is expected to be negative). Note that Desmet et al. (2011) show that genetic distance data are well correlated with cultural heterogeneity. More specifically, we use the weighted F_{ST} distance, which represents the expected genetic distance between two randomly selected individuals, one from each country. As in Gorodnichenko and Roland (2012), the U.S. is used as benchmark given its high degree of individualism.

We expect that the absolute latitude and generalized trust will be negatively correlated. One reason behind can be that the countries closer to the equator have higher prevalence of infectious diseases and experience lower trust (see Hall and Jones, 1999, for a further discussion and the use of absolute latitude as the instrumental variable). The absolute latitude as the instrumental variable for trust has been also used by Ahlerup et al. (2009).

Finally, we use the dummy variable on whether the country was a former colony. The dummy variable takes the value of one, if the country was a colony of European countries in the 19th century. We hypothesize that the past colonial experience will have a negative effect on current generalized trust. For example, Nunn and Wantchekon (2011) find very persistent effect (persisting about 400 years) of slave trade on distrust. We also used the dummy for Africa and

the dummy, whether the country was a colony of European countries in the 20th century, but it had little effect on the results.

5. Results

5.1 Baseline Results

Figure 1 presents the scatter plot between generalized trust and growth and clearly documents that there is a positive relationship between these two variables. This is reconfirmed by a simple correlation coefficient with the value of 0.43. The value is different from zero at 1% significance level.

Figure 1: Trust and growth, cross-country evidence

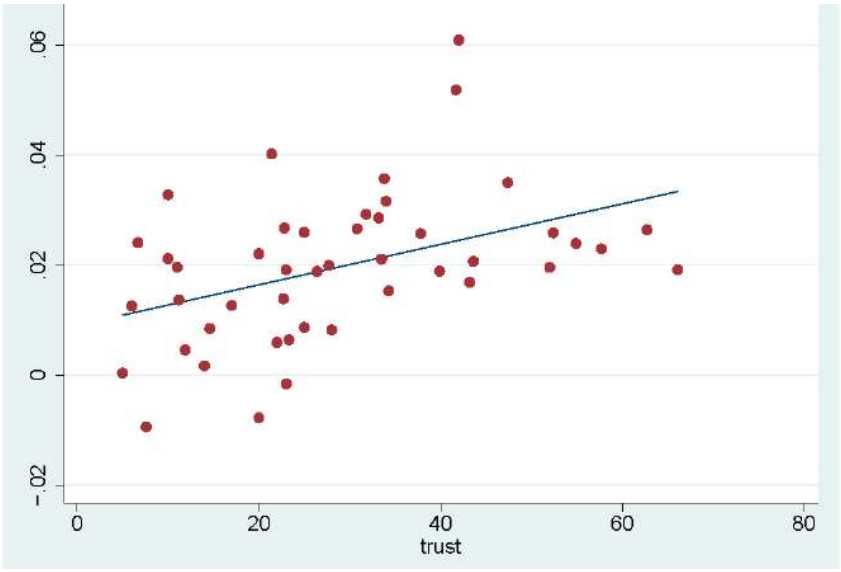

Table 1 presents the baseline results on the determinants of long-term growth. For the baseline case, we choose the UIP prior with uniform model prior. Table 1 shows the posterior inclusion probability (i.e. probability that given regressor is included in the correct or ideal model, abbreviated as the PIP), posterior mean and posterior standard deviation for all 42 regressors. The variables are ranked according to their PIP.

The results indicate that trust is a vital determinant of long-term economic growth. As expected, the posterior mean is positive. This suggests that the long-term economic growth is higher in countries with greater generalized trust. This is in line with previous evidence emphasizing that trust improves the smooth functioning of business, or more generally reduces transaction costs in a society, and ultimately contributes to growth (Whiteley (2000), Keefer and Zak (2001) or Dincer and Uslaner (2010)). On the other hand, the results show that the effect of trust on growth is more robust than previously thought (see Beugelsdijk et al. (2004) and Berggren et al. (2008)).[7] In general, our findings for other regressors are broadly in line with previous evidence on the cross-sectional growth determ inants the within BMA framework (Fernandez et al., 2001a)[8].

[7] Berggren et al. (2008) find that outliers play a role for the estimated effect of trust on growth. They emphasize that China represents a main outliers contributing to the positive effect of trust on growth. Note that our sample does not contain China.

[8] For example, the correlation of PIPs of our sample and Fernandez et al. (2001a) is 0.63. The correlation is statistically different from zero at any conventional levels, but a bit far from one. This is not so surprising, because we

As a robustness check of our BMA, we estimate simple OLS model with the regressors, which obtained the PIP greater than 0.5 (i.e. those, which are likely to be effective determinant of long-term growth). Our results show that all these regressors are statistically significant at 5% level (with the exception of population growth, which is significant at 10% level) with the coefficient sign as in Table 1. The R-squared for this regression is 0.95.[9]

Table 2 focuses on the sensitivity to selected prior structures and reports the results on the effect of trust and of squared trust on growth. For simplicity, the PIP, posterior mean and posterior standard deviation for all other 41 regressors is not reported, but available upon request. Eicher et al. (2011) find that the PIPs for some growth determinants, to a certain extent, varies depending on the prior structure. We find that the PIP is around 0.8 for fixed-g priors and somewhat lower for hyper-g priors. The posterior mean remains positive. The conditional posterior sign is positive in 99.7-99.9% of the cases depending on prior structure (not reported). This confirms that the sign of the effect of trust on growth is stable.[10]

5.2 Endogeneity Issues

The World Values Survey reports the first cross-country measures of trust at the beginning of 1980s, but for many countries these data are not available sooner than in the 1990s and clearly, trust can be endogenous to growth. In such case, the baseline BMA analysis would estimate the effect of trust on growth inconsistently.

Table 1: The determinants of growth, baseline results

Variable	PIP	Post Mean	Post SD
GDP level in 1960	1	-0.015066	0.002473
War dummy	0.97	-0.008385	0.002699
Fraction Confucian	0.97	0.089060	0.026909
SD of black market premium	0.96	-4.94E-05	1.62E-05
Fraction Hindu	0.95	-0.091265	0.030508
Population growth	0.95	-0.589666	0.212866
Fraction GDP in mining	0.94	0.105029	0.039356
Size labor force	0.94	3.24E-07	1.16E-07
Fraction Jewish	0.90	-0.526445	0.245591
Degree of capitalism	0.89	0.002593	0.001290
Fraction Protestants	0.86	-0.010658	0.005917
Outward orientation	0.82	0.003396	0.002174
Trust	0.81	0.000179	0.000117
Life Expectancy	0.69	0.000387	0.000344
Public education share	0.57	0.097867	0.109924
Number of years open economy	0.42	0.002494	0.003841
Primary school enrollment	0.38	0.004341	0.008086

reduce the sample size from 72 to 46 countries and the data on trust are missing especially in low income (typically African) countries. To a certain degree, the correlation is driven by 3 outliers. If we exclude them, the correlation rises to 0.85. Which are these outliers? War dummy, primary exports and sub-Saharan dummy - i.e. the variables that are likely to matter more in sample with more low income countries. Therefore, these results are broadly in line with Masanjala and Papageorgiou (2008), who find that the drivers of growth in Africa are different from those in the rest of the world.

[9]These results are available upon request.

[10]In addition, we also assess whether the squared trust determines growth. Using several cross-sectional and panel data models, Roth (2009) finds the curvilinear relationship between trust and growth suggesting that too much trust harm growth (the squared trust is found to have a negative effect on growth). We subject this finding to a robustness check within our econometric framework. However, our results do not give support to the finding that a high level of trust is detrimental for growth. To the contrary, we find that the squared trust exerts a positive effect on growth albeit the posterior standard deviations are typically large. The PIP of squared trust is around 0.3 and the PIP of trust somewhat decreases to 0.7 using our baseline specification of prior structure. These results are available upon request.

Rule of law	0.35	0.003299	0.006148
Political rights	0.29	-0.000300	0.000736
Equipment investment	0.28	0.016934	0.039397
Sub-Saharan dummy	0.28	-0.001173	0.004685
Age	0.28	-6.80E-06	1.49E-05
Higher school enrollment	0.27	-0.008393	0.023815
Civil liberties	0.27	-0.000251	0.000791
Ratio workers to population	0.25	-0.000378	0.007735
Fraction Muslim	0.24	0.001189	0.004948
Fraction Catholic	0.23	0.000778	0.003581
French colony dummy	0.22	0.000735	0.002209
Fraction Buddhist	0.21	0.001735	0.005875
Primary exports	0.20	-0.001206	0.004988
Latin American dummy	0.19	-0.000191	0.001881
Ethnolinguistic fractionalization	0.19	0.000463	0.002003
Revolutions and coups	0.18	-0.000239	0.002032
British colony dummy	0.18	0.000252	0.001406
Non-equipment investment	0.17	0.002077	0.010338
Spanish colony dummy	0.16	-2.44E-05	0.001426
Area (scale effect)	0.16	3.15E-08	1.72E-07
Black market premium	0.16	0.000174	0.002170
Exchange rate distortions	0.16	-1.26E-06	1.62E-05
Absolute latitude	0.16	-1.49E-06	5.42E-05
Fraction of pop. speaking English	0.15	0.000131	0.001404
Fraction speaking foreign language	0.15	7.90E-05	0.001032

Table 2: The effect of trust on growth, various prior structures

Posterior inclusion probability	0.81	0.84	0.64
Posterior mean	0.018	0.019	0.017
Posterior standard deviation	0.009	0.009	0.009
Parameter prior	g	g	hyper-g
Par. prior value	UIP	Hannah	BRIC
Model prior	Uniform	Uniform	Uniform

Notes: The posterior mean and standard deviation multiplied by 100. For the sake of brevity, the results for other 41 regressors not reported

Given that the generalized trust is unlikely to change rapidly over time[11], it can be argued that the endogeneity bias is small. Nevertheless, this claim is important to verify empirically to have more confidence that the estimated effect of trust on growth is causal. We follow the methodology put forward by Durlauf et al. (2008), who deal with endogeneity within BMA model. Our first stage regressions are reported in Table A.1. We find that all instruments are statistically significant at 5% level with the expected coefficient sign and explain more than 60% of the variation in trust. The corresponding F-statistic is sufficiently above 10 (the value of F-statistic is 25.9).

Our results are available in Table 3. We find that the PIPs remain high between 0.65-0.7 and trust is still an important variable for growth. The coefficient on the effect of trust on growth is positive. As in Guiso et al. (2009), the coefficient on trust is larger (almost as twice as large) once the trust is instrumented for.

The results for other regressors remain largely unchanged. The results are reported in Table A.2 in the Appendix and are based on the exactly same prior structure as for Table 1. The

[11] The correlations of trust among various waves of World Values Survey are higher than 0.9. Bjornskov (2012) argues that the benefits of panel data estimation is likely to be small.

initial level of GDP, war dummy, the fraction of Confucian, the volatility of black market premium, the fraction of Hindu consistently rank among the most important drivers of long-term economic performance irrespective of the prior structure. In our baseline regression reported in Table 2, the generalized trust ranks thirteenth out of forty two regressors according to the PIP. When we address endogeneity, the importance of trust somewhat rises and trust ranks seventh or twelfth. According to the 2SLS-BMA results, trust is more important for growth both absolutely (its coefficient increases) as well as relatively (its ranking according to the PIP improves) in comparison to baseline estimation. All in all, these results confirm the baseline results in the sense that trust is a robust and vital determinant of long-term economic growth.

Table 3: The effect of trust on growth - instrumenting trust, various prior structures

	(1)	(2)	(3)
Posterior inclusion probability	0.67	0.68	0.66
Posterior mean	0.030	0.030	0.031
Posterior standard deviation	0.028	0.027	0.030
Parameter prior	g	g	hyper-g
Par. prior value	UIP	Hannah	BRIC
Model prior	Uniform	Uniform	Uniform

Notes: The posterior mean and standard deviation multiplied by 100. For the sake of brevity, the results for other 41 regressors not reported

5.3 Sub-sample issues

To evaluate thoroughly the robustness of results, previous literature on the determinants of long-term growth using BMA has emphasized not only the importance of examining the prior structure, but also the composition of the sample (Zak and Knack, 2001). Eicher et al. (2007) employ the iterative BMA and find that the drivers of growth differ sharply for the OECD and non-OECD countries. Similarly, Masanjala and Papageorgiou (2008) show that the drivers of growth in Africa are different from the rest of the world.[12]Therefore, we examine to what extent the composition of the sample has an effect on the trust-growth nexus. Unlike Eicher at al. (2007) and Masanjala and Papageorgiou (2008), we do not exclude the non-African or non-OECD countries, but to contribute to this stream of literature, we exclude the countries with the strong rule of law (i.e. those with well-functioning formal institutions). Several previous studies on the effect of social capital on growth have been concerned about the interplay of social capital and formal institutions (Ahlerup et al., 2009, Guiso et al., 2009, Yu et al., 2011). We follow this literature and examine using the 2SLS-BMA whether the estimated effect of trust on growth is indeed stronger in the countries with the weak rule of law.[13] We exclude all countries, which received the highest score in the rule of law variable (the value of one).[14] However, it is noteworthy that Uslaner (2008) emphasizes that trust has emerged at the global level and has been influenced by country-to-country interactions. Therefore, the interpretation of the results based on sub-sample must be taken with caution.

[12] On the other hand, Dearmon and Grier (2009) argue that the effect of trust on growth is not so sample dependent.
[13] Another reason is that we do not have as many data for African countries as Masanjala and Papageorgiou (2008).
[14] These are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Japan, Netherlands, Portugal, Spain, Sweden, Switzerland, Taiwan, United Kingdom, and United States. Following the exclusion of these countries, the number of regressors exceeds than the number of countries. Therefore, we have to exclude some regressors. We choose the regressors, which are found in Table 1 to have the PIP smaller than 0.25 as well as the fraction Confucian and fraction Jewish, which took the value of zero in most observations. As a result, we have 23 regressors and 31 countries for this exercise.

Our results are reported in Table 4. The importance of trust for long-term growth increases in terms of the PIP, which achieves the values between 0.740.84. In addition, the estimated coefficient for trust rises further by about one third. In line with Ahlerup et al. (2009) or Yu et al. (2011), this suggests that trust is indeed more important in countries with weaker formal institutions. In terms of the overall ranking of regressands according to the PIP, we can see that trust figures among top three drivers of growth. This is reported in Table A.3 in the Appendix and the prior structure used for the BMA estimation is the same as for Tables 1 and A.2 to facilitate comparison.

Table 4: The effect of trust on growth in countries with weak rule of law, various prior structures

	(1)	(2)	(3)
Posterior inclusion probability	0.84	0.84	0.74
Posterior mean	0.048	0.049	0.036
Posterior standard deviation	0.028	0.028	0.030
Parameter prior	g	g	hyper-g
Par. prior value	UIP	Hannah	BRIC
Model prior	Uniform	Uniform	Uniform

Notes: The posterior mean and standard deviation on trust multiplied by 100. For the sake of brevity, the results for other 41 regressors not reported. Trust is instrumented by the genetic distance data, absolute latitude and dummy for former colonies.

5. Concluding Remarks

We examine the effect of generalized trust on long-term economic growth. Growing empirical literature put forward that trust has a causal effect on growth (see Aghion et al. (2010), Algan and Cahuc (2010) or Zak and Keefer (2001), among others). Nevertheless, existing evidence also put forward that the effect of trust on growth is far from robust (Beugelsdijk et al. (2004) and Berggren et al. (2008)). Therefore, we focus on the robustness of relationship between trust and growth and assess the role of model uncertainty in a full manner.

The typical article within this stream of literature regressed trust on growth and varied the conditioning set of variables to get a feeling of the robustness of the results. It has been shown that this strategy is more likely to lead in significant results (Raftery et al., 1997). In addition, the choice of conditioning set of regressors is somewhat *ad hod,* especially for growth literature with dozens of possible determinants of growth (and thus with a high degree of model uncertainty). Sala-i-Martin et al. (2004) or Fernandez et al. (2001) examine about forty different growth determinants within unified framework suitable to deal with model uncertainty - Bayesian model averaging. However, any of previous studies does not examine the role of generalized trust within this framework. We bridge this gap and investigate whether trust is a robust determinant of growth using the dataset very similar to widely used dataset of Fernandez et al. (2001) and Sala-i-Martin et al. (2004). Importantly, the previous studies dealing with model uncertainty has not addressed the simultaneous determination of trust and growth. Therefore, we follow the approach developed by Durlauf et al. (2008) and mix 2SLS model for trust with the BMA to extend previous literature.

Our results show that trust is indeed a vital determinant of long-term growth and the countries with higher level of interpersonal trust grow more. Our Bayesian model averaging estimates show a very high post inclusion probability (around 0.6-0.8) for trust. This suggests that trust belongs among top determinants of long-term economic growth and in general, gives support to the literature emphasizing the importance of social capital for growth (Tabellini, 2010). This finding is also robust to using various parameter priors as well as to endogeneity concerns in the trust-growth relationship. Finally, we find that the effect of trust on growth is stronger in coun-

tries with the weak rule of law suggesting that trust and formal institutions are substitutes, rather than complements.

References

Aghion, P., Algan, Y., Cahuc, P. and A. Shleifer, 2010. Regulation and Distrust. *Quarterly Journal of Economics,* 125(3): 1015-1049.

Ahlerup, P., Olsson, O. and D. Yanagizawa, 2009. Social Capital vs Institutions in the Growth Process, *European Journal of Political Economy,* 25(1): 1-14.

Alesina A. and E. La Ferrara, 2002. Who Trusts Others?, *Journal of Public Economics,* 85(2): 207-234.

Algan, Y and P. Cahuc, 2010. Inherited Trust and Growth. *American Economic Review,* 100: 2060-2092.

Bartels, L.M. 1997. Specification uncertainty and model averaging. *American Journal of Political Science,* 41: 641-74.

Berggren, N., Elinder, M. and H. Jordahl, 2008. Trust and growth: a shaky relationship. *Empirical Economics,* 35: 251274.

Beugelsdijk S., de Groot H.L.F. and A.B.T.M. van Schaik, 2004. Trust and economic growth: a robustness analysis. *Oxford Economic Papers,* 56:118-134.

Beugelsdijk S., 2006. A Note on the Theory and Measurement of Trust in Explaining Differences in Economic Growth, *Cambridge Journal of Economics,* 30, 371-387.

Bjornskov, C., 2006. Determinants of Generalized Trust: A Cross-Country Comparison, *Public Choice,* 130: 1-21.

Bjornskov, C., 2012. How Does Social Trust Affect Economic Growth?, *Southern Economic Journal,* forthcoming.

Carlin, B.I., Dorobantu, F. and S. Viswanathan, 2009. Public Trust, the Law, and Financial Investments, *Journal of Financial Economics,* 92, 321-341.

Dearmon, J. and K. Grier, 2009. Trust and Development, *Journal of Economic Behavior & Organization,* 71: 210-220.

Dearmon, J. and R. Grier, 2011. Trust and the Accumulation of Physical and Human Capital, *European Journal of Political Economy,* 27: 507-519.

Desmet, K., Le Breton, M., Ortuno, I. and S. Weber, 2011. The Stability and Breakup of Nations: A Quantitative Analysis. *Journal of Economic Growth,* 16: 183-213.

Dincer, O. and E. Urlaner, 2010. Trust and Growth, *Public Choice,* 142(1): 59-67.

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

Eicher, T., Papageorgiou, C. and O. Roehm, 2007. Unraveling the Fortunes of Fortunate: An Iterative Bayesian Model Averaging Approach, *Journal of Macroeconomics,* 29: 494-514.

Eicher, T., Papageorgiou, C. and A. E. Raftery. 2011. Default Priors and Predictive Performance in Bayesian Model Averaging, with Application to Growth Determinants. *Journal of Applied Econometrics* 26(1): 30-55.

Eicher, T., Lenkoski, A. and A. E. Raftery, 2012. Bayesian Model Averaging and Endogeneity under Model Uncertainty, University of Washington mimeo.

Feldkircher, M. and S. Zeugner. 2009. Benchmark Priors Revisited: On Adaptive Shrinkage and the Supermodel Effect in Bayesian Model Averaging. IMF Working Paper 09-202.

Fernandez, C., Ley, E. and M. Steel. 2001a. Model Uncertainty in Cross-Country Growth Regressions. *Journal of Applied Econometrics* 16(5): 563-576.

Fernandez, C., Ley, E. and M. Steel. 2001b. Benchmark Priors for Bayesian Model Averaging. *Journal of Econometrics* 16(5): 563-576.

Foster, D.P. and E.I. George. 1984. The Risk Inflation Criterion for Multiple Regressions. *The Annals of Statistics* 22: 19471975.

Glaeser E.L., Laibson D.I., Scheinkman J.A. and C.L. Soutter, 2000. Measuring trust. *Quarterly Journal of Economics,* 115: 811-846.

Gorodnichenko, Y. and G. Roland, 2011. Which dimensions of culture matter for long run growth?. *American Economic Review Papers and Proceedings,* 101: 492-498.

Gorodnichenko, Y. and G. Roland, 2012. Culture, Institutions and the Wealth of Nations. University of California, Berkeley, mimeo.

Greif, A., 1989. Reputation and Coalition in Medieval Trade: Evidence on Maghribi Traders, *Journal of Economic History,* 49 (4): 857-882.

Grosjean, P., 2011. The Weight of History in European Cultural Integration: A Gravity Approach, *American Economic Review,* Papers&Proceedings, 101: 504-508.

Guiso, L., Sapienza, P. and L. Zingales, 2006. Does Culture Affect Economic Outcomes?. *Journal of Economic Perspectives,* 20: 23-48.

Guiso, L., Sapienza, P. and L. Zingales, 2008. Trusting the Stock Market. *Journal of Finance,* 63(6): 2557-2600.

Guiso, L., Sapienza, P. and L. Zingales, 2009. Cultural Biases in Economic Exchange?, *Quarterly Journal of Economics,* 124(3): 1095-1131.

Hall, R. and C. I. Jones, 1999. Why Do Some Countries Produce So Much More Output per Worker than Others?, *Quarterly Journal of Economics,* 114(1): 83-116.

Jellema, J. and G. Roland, 2011. Institutional clusters and economic performance, *Journal of Economic Behavior & Organization,* 79: 108-132.

Keynes, J. M., 1936. General Theory of Employment, Interest and Money, London: Macmillan.

Knack S. and P. Keefer, 1997. Does social capital have an economic payoff? A cross-country investigation. *Quarterly Journal of Economics,* 112:1251-1288.

Knack, S. 2002. Social Capital and the Quality of Government: Evidence from the US States, *American Journal of Political Science,* 46: 772-785.

Koop, G. 2003. Bayesian Econometrics. Wiley, Chicester, UK.

Koop, G., Leon-Gonzales, R. and R. Strachan, 2011. Bayesian Model Averaging in the Instrumental Variable Regression Model, The Rimini Centre for Economic Analysis, WP 11-09.

Koop, G., D.J. Poirier and J. Tobias. 2007. Bayesian Econometric Methods. Cambridge University Press.

La Porta R., Lopez-de-Silanes F., Schleifer A. and R.W. Vishny, 1997. Trust in large organizations. *American Economic Review,* 87:333-338.

Leamer, E.E., 1978. Specification Searches: Ad Hoc Inference with Nonexperimental Data, Wiley, New York.

Ley, E. and M. Steel. 2009. On the Effect of Prior Assumptions in Bayesian Model Averaging with Applications to Growth Regression. *Journal of Applied Econometrics* 24(4): 651-674.

Liang, F., Rui, P., German, M., Clyde, M., and J. Berger. 2008. Mixtures of *g*-priors for Bayesian Model Selection. *Journal of the American Statistical Association* 89: 1535-46.

Madigan, D. and J. York. 1995. Bayesian Graphical Models for Discrete Data. *International Statistical Review* 63: 1023-1036.

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

Montgomery, J.M. and B. Nyhan. 2010. Bayesian Model Averaging: Theoretical Developments and Practical Applications. *Political Analysis* 18: 245-270.

Moral-Benito, E. 2012. Determinants of Economic Growth: A Bayesian Panel Data Approach. *Review of Economics and Statistics,* forthcoming.

Nunn, N. and L. Wantchekon, 2011. The Slave Trade and the Origins of Mistrust in Africa, *American Economic Review,* 101: 3221-3252.

Ozcan, B. and C. Bjornskov, 2011. Social Trust and Human Development. *The Journal of Socio-Economics,* 40: 753-762.

Raftery, A .E., 1995. Bayesian Model Selection for Social Research. *Sociological Methodology,* 25: 111-163.

Raftery, A.E., Madigan, D. and J.A. Hoering. 1997. Bayesian Model Averaging for Linear Regression Models. *Journal of the American Statistical Association.* 83: 1023-1036.

Roth, F., 2009. Does too much trust hamper economic growth? *Kyklos,* 62 (1): 103-128.

Sala-i-Martin, X., Doppelhofer, G. and R. Miller. 2004. Determinants of Long-Term Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach. *American Economic Review* 94(4): 814-835.

Smith, A. (1997/1766). Lecture on the influence of commerce on manners. Reprinted in (D. B. Klein, ed.) Reputation: Studies in the Voluntary Elicitation of Good Conduct, University of Michigan Press.

Spolaore, E. and R. Wacziarg, 2009. The Diffusion of Development. *Quarterly Journal of Economics,* 124(2): 469-529.

Staiger, D. and J.H. Stock (1997). Instrumental variables regression with weak instruments. *Econometrica,* 65(3): 557-586.

Tabellini, G. 2010. Culture and Institutions: Economic Development in the Regions of Europe. *Journal of the European Economic Association,* 8(4): 677-716.

Uslaner, E.M., 2008. The Foundation of Trust: Macro and Micro, *Cambridge Journal of Economics,* 32: 289-294.

Whiteley, P.F., 2000. Economic Growth and Social Capital, *Political Studies.* 48: 443-466.

Yu, S., de Haan, J. and S. Beugelsdijk, 2011. Trade, Trust and Institutions, CESifo Working Paper Series No. 3571.

Zak P.J. and S. Knack, 2001. Trust and growth. *Economic Journal,* 111:295-321.

Appendix

Table A.1: Are instruments relevant for trust?

	Coefficient	Standard error
Absolute latitude	0.29**	(0.13)
Dummy for colonies	-16.88***	(4.28)
Genetic distance data	-0.004**	(0.002)
Adj. R-squared		0.63
F-statistic		25.92
No. of observations		46

Note: *, **, *** denotes significance at the 10%, 5% and 1% level, respectively.

Table A.2: The determinants of growth, trust instrumented

Variable	PIP	Post Mean	Post SD
GDP level in 1960	1	-0.015109	0.002897
War dummy	0.90	-0.007250	0.003567
Fraction Confucian	0.90	0.076333	0.036816
SD of black market premium	0.85	-3.72E-05	2.19E-05
Fraction Hindu	0.85	-0.065698	0.039285
Size labor force	0.79	2.36E-07	1.59E-07
Life Expectancy	0.73	0.000448	0.000354
Fraction GDP in mining	0.72	0.064403	0.052293
Degree of capitalism	0.71	0.001968	0.001577
Fraction Jewish	0.70	-0.402270	0.333405
Fraction Protestants	0.70	-0.006856	0.006006
Trust	0.66	0.000297	0.000279
Outward orientation	0.61	-0.002480	0.002498
Population growth	0.60	-0.271131	0.280456
Rule of law	0.54	0.007735	0.009321
Public education share	0.51	0.100027	0.124037
Fraction Muslim	0.38	0.003524	0.006751
Primary school enrollment	0.38	-0.003822	0.008561
Fraction Buddhist	0.36	0.005171	0.009316
Non-equipment investment	0.36	0.011960	0.021167
Number of years open economy	0.34	-0.001810	0.003979
Fraction Catholic	0.30	0.000413	0.004149
Sub-Saharan dummy	0.30	4.97E-05	0.006081
Civil liberties	0.28	-0.000345	0.000955

Exchange rate distortions	0.26	-9.26E-06	3.59E-05
Political rights	0.25	-0.000218	0.000773
Ratio workers to population	0.25	-0.000719	0.005530
Age	0.25	-6.02E-06	1.49E-05
Higher school enrollment	0.23	-0.001826	0.020188
Absolute latitude	0.22	-5.61E-07	0.000100
Primary exports	0.22	-0.001077	0.003870
Latin American dummy	0.22	0.000250	0.002311
Fraction speaking foreign language	0.20	0.000217	0.001660
Equipment investment	0.20	0.007797	0.028969
Spanish colony dummy	0.20	0.000268	0.001876
Revolutions and coups	0.19	0.000186	0.002237
French colony dummy	0.19	0.000411	0.002069
Black market premium	0.18	0.000251	0.002544
British colony dummy	0.18	0.000215	0.001377
Ethnolinguistic fractionalization	0.17	6.77E-05	0.001804
Area (scale effect)	0.16	2.05E-08	1.79E-07
Fraction of pop. speaking English	0.16	0.000148	0.001636

Table A.3: The determinants of growth, trust instrumented, weak rule of law

Variable	PIP	Post Mean	Post SD
GDP level in 1960	0.94	-0.011470	0.004754
SD of black market premium	0.87	-3.17E-05	1.77E-05
Trust	0.84	0.000485	0.000283
War Dummy	0.77	-0.005862	0.004165
Rule of Law	0.76	0.014249	0.010337
Age	0.57	-4.35E-05	4.81E-05
Life Expectancy	0.49	0.000327	0.000434
Equipment Investment	0.37	0.063448	0.111047
Fraction Muslim	0.36	0.002507	0.004638
Degree of capitalism	0.36	0.021996	0.043425
Outward Orientation	0.33	-0.001751	0.003541
Ratio workers to population	0.33	-0.003755	0.007675
Size labor force	0.31	-1.48E-08	3.14E-08
Sub-Saharan dummy	0.27	0.000463	0.006184
Primary school enrollment	0.26	-0.002925	0.008964
Public education share	0.26	0.038196	0.101961
Civil Liberties	0.26	-0.000487	0.001471
Rule of Law	0.23	0.000305	0.000926
Fraction GDP in mining	0.20	-0.005935	0.028922
Political Rights	0.19	-2.74E-05	0.000890
Population growth	0.19	-0.035296	0.143074
Number of years open economy	0.19	0.000527	0.002762
Fraction Protestants	0.18	-0.002266	0.011692