

Do Trust and Trustworthiness Pay Off?¹

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Abstract

Are individuals who trust others better off than those who do not? Do trustworthy people prosper more than untrustworthy ones? A matching model can provide testable empirical predictions regarding the relationship between observed individual behavior, average attitudes, and individual prosperity. We evaluate these predictions empirically using household-level data for eighteen (mostly developed) countries from the 1990 wave of the World Values Survey. We find that, on average, a trusting attitude has a positive impact on income, while trustworthiness has a negative impact on income. In addition, we find evidence of a positive relationship between the payoff to these two attitudes and the average levels of the complementary attitudes. Most strikingly, the payoff to being trustworthy depends positively on the average amount of trust in a given country.

1 Introduction

The notions of trust and trustworthiness have received much recent attention in social science, stimulated in part by the work of Putnam (1993) and Fukuyama (1995), but with antecedents in, for example, Coleman (1990). Economists have for a long time recognized the critical role played by trust in economic performance. Arrow (1972), for example, remarks: “Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can plausibly be argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence.” In high-trust societies, individuals need to spend less resources to protect themselves from being exploited in economic transactions. Knack and Keefer (1997) argue that trusting societies tend to have stronger incentives to innovate and to accumulate both physical and human capital and, as a result, grow faster.

The flip side of trust is trustworthiness. Glaeser et al. (2000) distinguish between trusting behavior, which they define as “the commitment of resources to an activity where the outcome depends upon the cooperative behavior of others,” and trustworthy behavior, which “increases the returns to people who trust you.” The idea of reputation—the level of trust one is perceived to merit—has also been examined. As Axelrod (1986) puts it, an individual’s reputation derives from adherence to or violation of a norm that others view as a signal about the individual’s future behavior in a wide variety of situations.

Whether an individual trusts a potential business partner has traditionally been modelled in the economic literature as a matter of the partner’s reputation for his type or, more precisely, a belief about the partner’s type when this type is imperfectly observed. One strand of literature, represented by the work of Sobel (1985), Watson (1999), and Blonski and Probst (2000), analyzes the formation of reputation in repeated games with a fixed set of players. These authors show that mutual trust builds up over time as partners start by committing small amounts of resources early in the game to “get to know” their opponents, and successful experiences then lead to an increase in the scale of cooperation over time.

However, most realistic situations involve games in which the identity of opponents may change over time. To address this, another strand of research uses random matching models of the kind pioneered by Rosenthal (1979) to address the issues of trust and trustworthiness. Tirole (1996), using a matching model with nonrepeated matches, considers the case of imperfect observability of individual reputations, which leads players to utilize both individual and collective reputations when forming their beliefs about their potential business partners’ types. Ghosh and Ray (1996), using a matching model with no observability of individual reputations, allow for repeated interaction within a given match. This repeated interaction leads to the buildup of mutual trust as in a repeated game with a fixed set of players.

Katuscak and Slemrod (2002) develop a matching model where individuals face repeated choices between trusting and not trusting, and between being trustworthy and cheating. This model extends the previous literature in three important aspects. First, it allows for both an arbitrary degree of observability of individual reputations

from one match to another and also for an arbitrary durability of (successful) individual matches over time. Second, it features an arbitrary intensity of the matching process, which generally leads to a subset of players who are unmatched in a given period. Third, individuals differ in their predispositions for trusting and trustworthy behavior in a more general way than in Ghosh and Ray (1996) or Tirole (1996).¹ In addition to these intrinsic preferences, each person is strategic: he considers how his actions may affect his chance of developing and sustaining a current match and forming beneficial matches in the future. In equilibrium, his strategic actions are guided by the equilibrium distribution of his opponents' actions, i.e., by the equilibrium probability that a randomly chosen unmatched individual will trust, and will act in a trustworthy manner. This model implies that, to the extent that countries differ predominantly in terms of their people's behavioral predispositions or patience, the pecuniary payoff to trust is strictly increasing in the trustworthiness of the individuals one is likely to encounter when forming a new match. The intuition behind this result is straightforward. On the other hand, the pecuniary payoff to trustworthiness may be increasing, decreasing, or "hill-shaped" in the trust of the individuals one is likely to encounter when forming a new match. Which of these three cases obtains depends on the likelihood with which individual reputations, or histories of play, are observable. If this observability is sufficiently high, the pecuniary payoff to trustworthiness is strictly increasing in the average trust. If this observability is sufficiently low, this payoff may² be strictly decreasing in the average trust. For the intermediate range of observability of individual reputations, this payoff is hill-shaped in the average trust.

In this paper, we begin the task of linking the microeconomic theory to empirical evidence based on micro data. We estimate a model of the private return to trust and trustworthiness, using data for individuals in eighteen countries from the 1990 wave of the World Values Survey. We find evidence that the return to trustworthiness is negative on average and depends on the average amount of trust in the society. In particular, this return is negative in low-trust countries and positive in high-trust countries. We also find that the return to trust is positive on average and it is positively related to the average amount of trustworthiness in the society. However, the latter relationship appears to be statistically less robust than the previous one, although the sign pattern is consistent throughout various specifications. Strikingly, these results suggest the possibility that a country might be in an equilibrium trap

¹Katuscak and Slemrod (2002) model heterogeneity by continuous distributions of disutilities from not trusting and being untrustworthy. This contrasts with the heterogeneity considered in Ghosh and Ray (1996) and Tirole (1996), who separate players into "rational" ones (i.e., the ones who maximize their payoff) and "dogmatic" ones (i.e., the ones who always follow some prescribed strategy). Therefore rather than having the dogmatic players following their prescribed course of action and all the rational players following a (uniform) utility maximizing action, the players in Katuscak and Slemrod (2002) continuously sort between trusting and not trusting and between being trustworthy and being untrustworthy based on strategic considerations as well as their individual behavioral predispositions.

²The uncertainty captured in "may" stems from the fact that for some combinations of parameters, even no observability of individual reputations would yield the pecuniary payoff to trustworthiness that is strictly increasing in average trust. The same caveat also applies for the intermediate range of observability of individual reputations.

where it is not in most people’s interest to invest in either trust or trustworthiness, and, as a consequence, productive relationships are largely foregone.

The paper is structured as follows. Section 2 reviews previous empirical work. Section 3 describes the dataset we use. Section 4 contains our empirical results. Section 5 concludes.

2 Previous Empirical Literature³

There is some empirical evidence that trust and civic duty among a country’s citizens contribute to growth. Knack and Keefer (1997) tested the impact of these attitudes on both growth and investment rates in a cross-section of 29 countries, using measures of trust and civic norms from the World Values Surveys of 1981 and 1990. They find that social capital variables exhibit a strong and significant positive relationship to economic growth. As they note, the causality of this relationship could go in either direction: trust could be a product of optimism generated by high or growing incomes, or it could be that trust facilitates prosperity. However, they find that trust is more correlated with per capita income in later years than with income in earlier years, suggesting that the causation runs from trust to growth more so than vice versa.

Zak and Knack (2001) extend the Knack and Keefer framework by separately testing for the effect on growth of proxies for the presence of formal institutions, social distance, and discrimination and for whether their effect remains significantly correlated with growth controlling for measures of trust. They find that trust is positively and significantly related to growth even in the presence of measures of formal institutions or of social distance, but that most of the influence of the latter on growth occurs through their impact on trust. The one exception is a measure of property rights, which retains its independent positive association with growth even in the presence of a trust variable. They justify this finding by noting that this index includes government actions against private agents. In contrast, the trust measure is “likely to be little affected by perceptions of the trustworthiness of government...” (p. 316)

Slemrod (2003), using country averages from 25 countries in the 1990 wave of the World Values Survey, finds evidence that real per capita income is higher in more trusting societies, holding constant measures of physical and human capital as well as the size of government. However, in countries with bigger governments, there is a breakdown in the trustworthiness its citizens exhibit toward government, as measured by the acceptability of tax evasion.

La Porta, Lopez-de-Silvanes, Shleifer, and Vishny (1999) find that, across countries, a one-standard deviation increase in the measure of trust increases judicial efficiency by 0.7 of a standard deviation and reduces government corruption by 0.3 of a standard deviation. Putnam (1993) examines cross-regional Italian data and

³In this review, we focus on the impact of trust and trustworthiness on economic outcomes. There is also literature studying the determinants of trust. See Alesina and Ferrara (2000) for a recent contribution.

concludes that local governments are more efficient where there is a greater civic engagement.

In what follows, we examine household-level, rather than country-level, data from 18 countries. In particular, we estimate regression equations explaining household income with a specification that is based on the standard earnings equations from labor economics, but that is augmented to test for the impact of trust, trustworthiness and their interaction with average levels of the complementary attitude.

3 Data

Although the theory provides a consistent framework in which to evaluate data, it leaves open the precise relationship between income and personal and country characteristics. To shed empirical light on the issues discussed in the previous section, one needs measures of individual well-being, personal trust, trustworthiness and, preferably, some additional sociodemographic variables. To our knowledge, only two datasets provide this information: the National Opinion Research Center's General Social Survey (GSS) and the World Values Survey (WVS). In order to identify the impact of average trust and trustworthiness within the society, we use WVS (1999), as it, unlike the GSS, provides individual-level data for multiple countries.

The purpose of the WVS is to facilitate cross-national comparisons of values, norms, and attitudes. The survey was conducted in multiple waves, with limited national modifications, in several dozen countries. It asked about attitudes concerning work, family, religion, politics, and contemporary social issues and gathered a limited amount of demographic data as well. Although the data are subject to the usual reservations about attitude surveys, and in particular cross-country attitude surveys, the data has been widely and fruitfully used by political scientists and sociologists, not to mention Knack and Keefer (1997) and Zak and Knack (2001). For an extensive, albeit incomplete, list of its use in research, see Inglehart, Basanez, and Moreno (1998). We use the data from the 1990-93 wave for 18 developed and developing countries.⁴ We excluded the former communist countries because their economic and incentive structure as of the time of the survey was not conducive to trust and trustworthiness having much effect on individual prosperity.⁵ We supplement the WVS data with Summers and Heston (1991) Penn World Tables (PWT), Mark 5.6 to be able to make real income comparisons across countries.⁶

⁴We use the following countries: Austria, Belgium, Brazil, Britain, Canada, Chile, Finland, India, Italy, Japan, Mexico, the Netherlands, Portugal, South Africa, Spain, Turkey, USA, and West Germany.

⁵As for the remaining countries in the 1990-93 wave, we could not use Argentina, Denmark, Ireland, Nigeria, Norway, Sweden, and Switzerland because the income category thresholds that we use for measuring real household income (see below) were not available. We could not use France because the household income data records did not precisely match with the available income category thresholds. We could not use Iceland because of the missing household income data. Finally, we could not use South Korea because of the missing education data.

⁶Note, however, that to the extent that we induce a measurement error into the real household income by deflating the nominal household income by PPP-based exchange rates from Summers

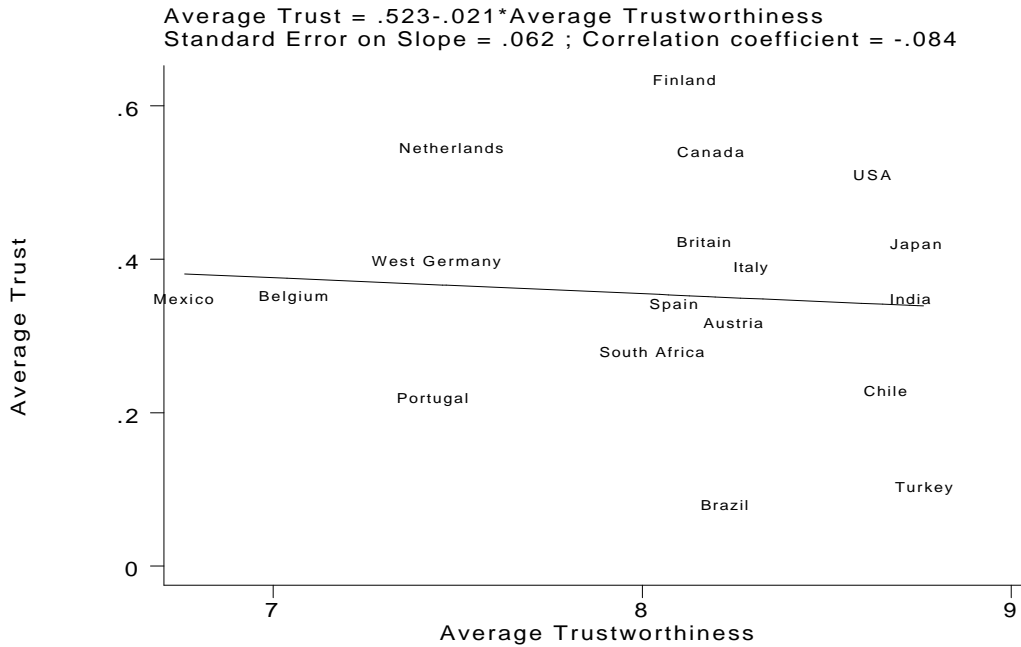
Our measure of trust is based on the following WVS question: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" This question offered two responses: "can't be too careful" and "most people can be trusted". We associate the former answer with "mistrusting" individuals and the latter answer with "trusting" individuals. Based on these survey responses, we create a binary variable TRUST indicating the trusting individuals. Our measure of trustworthiness is based on the following WVS question: "Please tell me whether you think lying in your own interest can always be justified, never be justified, or something in between." This question offered 10 responses ordered from 1 (never justified) to 10 (always justified). In order to measure trustworthiness, we reversed the scale and call the resulting variable TRUSTW.

Glaeser et al. (2000) measure trust and trustworthiness by conducting experiments with monetary rewards. They find that the standard question used to measure trusting behavior - used in the WVS as well as the GSS - does not have a significant correlation with trusting choices in either of two experiments. Two other questions, specifically about trusting strangers, do, though, predict trust (of strangers, in their experiments). Furthermore, the answers to questions about trustworthiness are not significantly related to trustworthy behavior. Surprisingly, a self-reported trusting attitude does appear to predict trustworthy behavior. Danielson and Holm (2002) conduct a similar experiment in Tanzania. They confirm that the standard survey question used to measure trust does not predict actual trusting behavior in their experimental setting. Unlike Glaeser et al. (2000), though, they find that the specific trust questions do not predict actual trusting behavior and that the general trust question does not predict trustworthy behavior. They also find that self-reported trustworthiness does in fact predict trustworthy behavior, but this effect disappears when donation motives are controlled for.

Glaeser et al. (2000) and Danielson and Holm (2002) conclude that empirical work based on the WVS/GSS survey questions about trust needs to be reinterpreted. While we take seriously the possibility that self-reported attitudes and behavior may not be highly correlated, we do find below that these self-reports help explain individual incomes with a systematic pattern, and so we conclude that they do reflect individual behavior in an important sense. Finally, although experimental evidence could certainly extend our knowledge of these issues, we expect that such evidence will not be available across countries in the near future, rendering the current study infeasible from this angle.

We measure individual prosperity by real household income based on the following WVS question: "Here is the scale of incomes and we would like to know in what group your household is, counting all wages, salaries, pensions and other incomes that come in. Just give the letter of the group your household falls into, before taxes and other deductions." This question offered 10 country-specific ranges for income. We convert the thresholds into 1990 purchasing power parity U.S. dollars using the PWT measure of PPP-based exchange rates. Our measure of real house-

and Heston (1991), this measurement error only affects our summary statistics, but not our regression analyses. This is because all of our regression specifications use the natural logarithm of household income as the dependent variable and they contain country fixed effects.



(a) Average Trust vs. Average Trustworthiness

FIGURE 1: Average trust vs. average trustworthiness

Notes: The averages are based on survey weights provided with the data with the sums of weights equalized across countries.

hold income is a midpoint of each range and 150% of the highest threshold for the top range. Summary statistics for household income, trust and trustworthiness by country are reported in Table 1. It is also interesting to inspect the cross-country variation in trust and trustworthiness in relation to each other and GDP per capita. Figure 1 plots average trust against average trustworthiness level by country, revealing that there is no apparent simple correlation between the two. Figures 2 and 3 plot average trust and average trustworthiness, respectively, against PPP GDP per capita. While trustworthiness is not statistically significantly correlated with GDP per capita, trust is positively correlated with it.

Because individual trust and trustworthiness are certainly not to be the only determinants of individual income, we examine additional sociodemographic information provided by WVS. Our measure of respondent education is based on the following WVS question: "At what age did you or will you complete your full time education, either at school or at an institution of higher education? Please exclude apprenticeships." This question offered a 10-point scale ranging from 1 (12 years of age or earlier) to 10 (21 years of age or older). In addition, we use the data on respondent age and gender. It is important to note that the measure of income we investigate relates to the household, but both the attitude indicators and sociodemographic variables refer to the respondent. We will have more to say later about how that affects the interpretation of our results.

TABLE 1: Summary statistics of real household income, trust and trustworthiness by country

COUNTRY	HOUSEHOLD INCOME			TRUST			TRUSTWORTHINESS		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Austria	1414	18.28	11.65	1301	0.318	0.466	1440	8.27	2.04
Belgium	1705	21.14	13.29	2576	0.332	0.471	2730	7.04	2.62
Brazil	1679	6.36	9.69	1766	0.067	0.249	1774	8.20	2.73
Britain	1101	24.80	17.47	1440	0.436	0.496	1473	8.17	2.08
Canada	1461	35.88	23.50	1673	0.524	0.500	1712	8.18	2.24
Chile	1470	6.74	7.22	1458	0.227	0.419	1495	8.65	2.23
Finland	586	29.52	15.13	558	0.627	0.484	580	8.13	1.97
India	2429	4.77	3.87	2365	0.343	0.475	2480	8.76	2.03
Italy	1424	21.52	23.12	1932	0.371	0.483	1987	8.33	2.19
Japan	896	32.39	18.98	911	0.417	0.493	968	8.75	1.83
Mexico	1451	19.29	29.68	1384	0.335	0.472	1513	6.76	2.95
Netherlands	790	23.60	15.26	965	0.558	0.497	1010	7.49	2.11
Portugal	1124	13.24	10.27	1149	0.214	0.410	1169	7.47	2.68
South Africa	2456	24.68	18.69	2594	0.283	0.450	2681	8.05	2.89
Spain	3431	11.19	8.04	3887	0.338	0.473	4042	8.07	2.32
Turkey	1007	12.50	18.27	1012	0.100	0.300	1017	8.72	2.23
USA	1696	34.83	22.44	1782	0.500	0.500	1821	8.59	2.02
West Germany	1932	23.68	14.27	1725	0.378	0.485	2013	7.46	2.34
TOTAL	28052	20.24	19.28	30478	0.354	0.478	31905	8.06	2.40

Notes: All summary statistics are weighted averages based on survey weights provided with the data. The household income figures are in thousands of PPP adjusted 1990 US dollars.

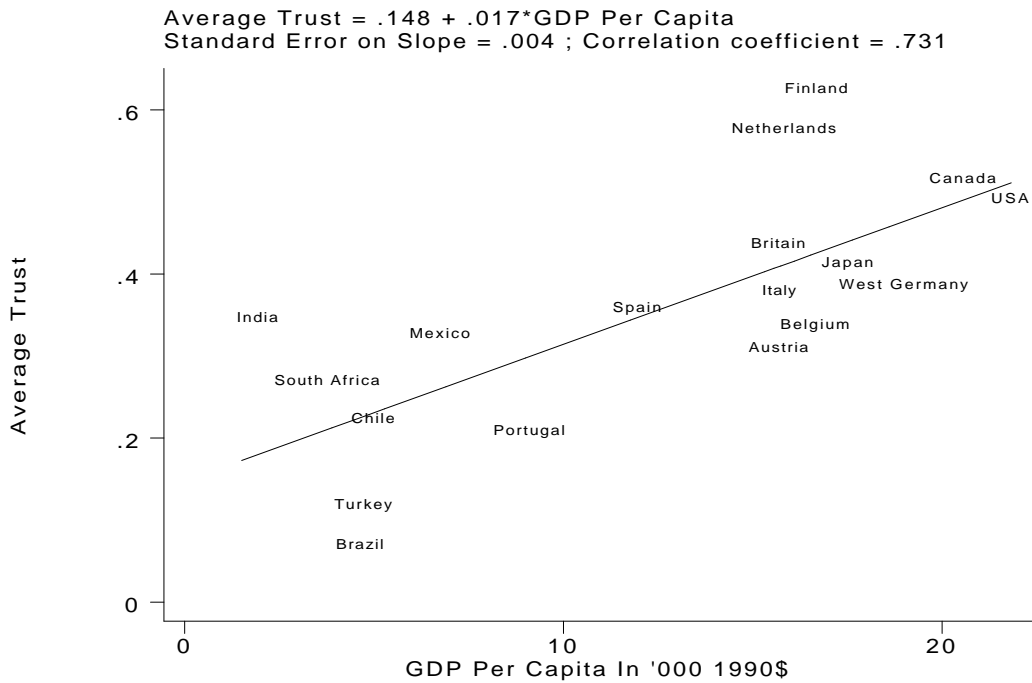
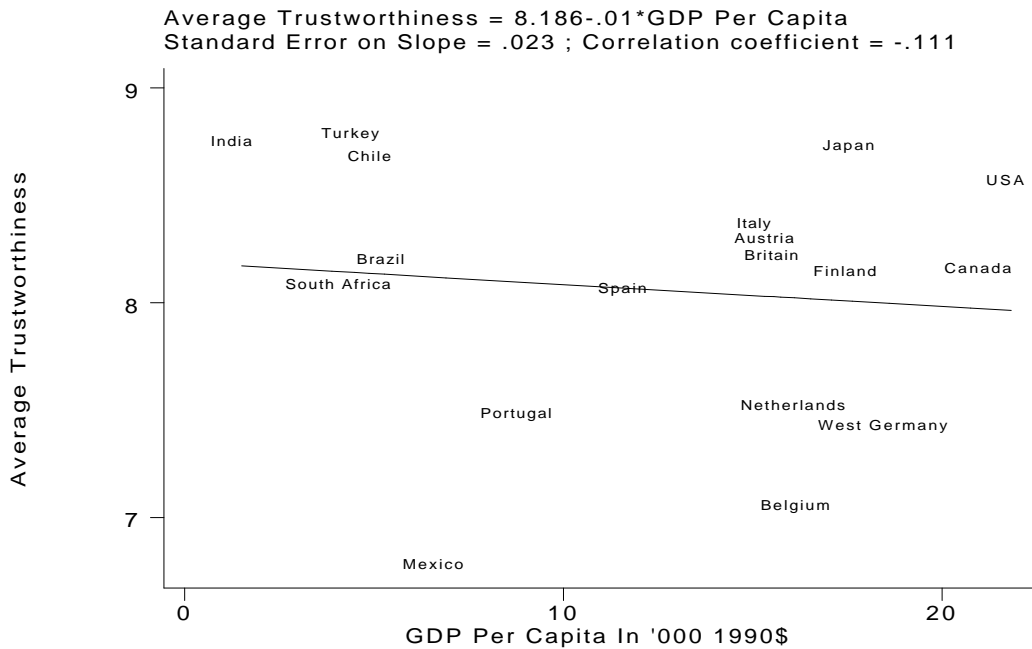


FIGURE 2: Average trust vs. GDP per capita

Notes: The averages are based on survey weights provided with the data with the sums of weights equalized across countries.



(c) Average Trustworthiness vs. GDP Per Capita

FIGURE 3: Average trustworthiness vs. GDP per capita

Notes: The averages are based on survey weights provided with the data with the sums of weights equalized across countries.

4 Empirical Results

4.1 Baseline Results

Table 2 reports our baseline results.⁷ It presents the results of regressing the logarithm of real household income against variables that are standard in micro earnings equations plus indicators of the individual’s level of trust and trustworthiness, sometimes interacted with the mean level of these variables in the respondent’s country. All of the regressions include country dummy variables (coefficients of which are not reported here), and so all the estimated coefficients are identified from within-country variation only. In all reported specifications, these country dummies are jointly significant at 1 percent level. The specification in Column (1) contains only the standard variables in an earnings equation. The results are in line with the empirical literature discussed above, lending credence to the survey-based measures of income, education, age, and gender. The marginal return to the respondent’s education level is always positive within the observed range (between 6 and 15 years), although decreasing. Based on the estimated coefficients, going from zero to ten years of education adds 87 percent to income. Furthermore, the marginal return is 11.1 percent per year at 0 years, and falls to 6.29 percent at 10 years. These results are within the range reported in the literature, as discussed earlier.⁸ The respondent’s age, which is undoubtedly partly a proxy for work experience, initially has a positive impact on income, but its impact peaks at age 38.8, and it has a marginal negative effect thereafter. The marginal return falls from 1.78 percent per year at age 20 to -2.96 percent per year at age 70.⁹ Households with male respondents have an 8.37 percent higher income. Although this is lower in absolute value than the findings in the literature¹⁰, the difference is unsurprising as our results relate to household income rather than the respondent’s income. In the next subsection, we restrict the sample to include only those households in which the major earn-

⁷The regressions are calculated using observations unweighted within countries and with sums of weights equalized across countries. We have also estimated analogous regressions without any (cross-country) weight adjustment and with weighting within and across countries combined. None of the principal results reported in this section are affected by this change.

⁸In the human capital earnings approach standard in labor economics, more recent estimates of the return to education fall anywhere between 0.023 (Isacsson (1999)) and 0.153 (Harmon and Walker (1995)) per additional year of schooling, depending on the dataset used, the set of control variables and the econometric technique. Card (1999) provides a good summary of this literature. Our marginal effect estimates lie within this range.

⁹Angrist and Krueger (1999), using 1990 Census and March 1990 CPS samples, report coefficient estimates on potential experience around 0.041 per year for the Census data and 0 or 0.013 for the CPS data, depending on whether they do or do not use the allocated CPS values. The coefficient estimates on potential experience squared are from -0.00057 to -0.00055 for the Census data and they are statistically insignificant for the CPS data. Our results are similar to these estimates.

¹⁰Altonji and Blank (1999), using the Current Population Survey (CPS) data, estimate the coefficient on a female indicator variable to be -0.421 in 1979 when the additional controls are education, experience and region, and -0.348 when occupation, industry and job characteristics are controlled for as well. In 1995, these estimates are -0.272 and -0.221 , respectively. When using the National Longitudinal Survey of Youth data from 1994, the coefficient estimates on the female dummy are approximately -0.24 to -0.20 .

TABLE 2: Regressions results: The impact of trust and trustworthiness on real household income

	Dependent variable: Log of Real Household Income						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Education	0.111 (0.0175)***	0.111 (0.0180)***	0.109 (0.0176)***	0.110 (0.0181)***	0.112 (0.0180)***	0.106 (0.0176)***	0.108 (0.0181)***
Education Squared $\times 10^{-2}$	-0.241 (0.0778)***	-0.247 (0.0799)***	-0.230 (0.0781)***	-0.244 (0.0802)***	-0.250 (0.0799)***	-0.217 (0.0781)***	-0.235 (0.0801)***
Age $\times 10^{-1}$	0.368 (0.0192)***	0.362 (0.0198)***	0.374 (0.0193)***	0.370 (0.0199)***	0.361 (0.0198)***	0.375 (0.0193)***	0.370 (0.0199)***
Age Squared $\times 10^{-3}$	-0.474 (0.0204)***	-0.469 (0.0211)***	-0.477 (0.0206)***	-0.474 (0.0212)***	-0.469 (0.0211)***	-0.479 (0.0205)***	-0.475 (0.0212)***
Male	0.0837 (0.0108)***	0.0866 (0.0111)***	0.0822 (0.0109)***	0.0855 (0.0111)***	0.0870 (0.0111)***	0.0836 (0.0109)***	0.0874 (0.0111)***
Trust		0.0733 (0.0118)***		0.076 (0.0118)***	-0.448 (0.197)**		-0.394 (0.198)**
Trustworthiness $\times 10^{-1}$			-0.117 (0.0246)***	-0.124 (0.0251)***		-0.362 (0.0718)***	-0.347 (0.0721)***
Trust*Av.Trustworthiness					0.0647 (0.0241)***		0.0581 (0.0243)**
Trustworthiness*Av.Trust						0.0750 (0.0193)***	0.0685 (0.0192)***
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26046	24544	25675	24235	24544	25675	24235
R-squared	0.42	0.42	0.42	0.43	0.42	0.42	0.43

Note 1: The regressions are calculated using observations unweighted within countries and with the sums of weights equalized across countries.

Note 2: Heteroscedasticity consistent robust standard errors are in parentheses. Significance level notation: * at 10%, ** at 5%, *** at 1%.

ers are the respondents and observe a much larger estimated male-female income differential.

Columns 2 through 4 show the estimated return to individual trust and trustworthiness, ignoring any country-level interaction effect. The results suggest that trust, but not trustworthiness, is associated with higher income. Complete trust increases income by 7.33 percent compared to no trust at all. In contrast, complete trustworthiness decreases income by 10.53 percent compared to no trustworthiness at all.¹¹ A one standard deviation increase in trust increases income by 3.50 percent, and a one standard deviation increase in trustworthiness decreases income by 2.81 percent. Column 4 shows that the point estimates are not notably changed by including both variables at once.

Columns 5 and 6 present our central results that allow for interaction between personal characteristics and country-level means of trust and trustworthiness. Column 5 reveals that the personal return to trust is larger, the greater is the prevalence of trustworthy people in the country. Moreover, the personal return to trusting behavior is negative unless these behavioral patterns are rewarded. The return to trust is negative in countries that have average trustworthiness below 6.92, and is positive in countries above that. All of the countries in our sample, except for Mexico, have means greater than 6.90, and hence the return to trust is almost always positive in our sample.

Column 6 shows that the same pattern applies to trustworthiness: its effect on individual income is negative unless one lives in a country where the level of trust is above 0.48. In contrast to column 5, though, in all but four countries the mean level of trust falls short of this figure, with the four exceptions being Canada, Finland, the Netherlands and the U.S. Thus, our results suggest that trustworthiness is in most countries not rewarded with higher income—dishonesty pays. How much it pays varies widely. In a very low trust country like Brazil, a one standard deviation increase in trustworthiness is associated with an 8.6 percent decrease in income.

Column 7 shows that the principal results from columns 5 and 6 are unchanged when both attitude variables and both interaction terms are included in the same equation, although statistical significance decreases due to multicollinearity. The results in this column imply that the return to trust is positive if average trustworthiness exceeds the threshold of 6.78 and the return to trustworthiness is negative unless average trust exceeds 0.507.

As suggested earlier by the gender differential estimates, a potential problem with these results is that we use *household* real income as a dependent variable and *respondent* attitudes and demographic characteristics as independent variables. However, it has been shown (see, for example, Mare (1991) and the references contained therein) that most married or cohabiting couples are characterized by assortative matching by education, age and many other characteristics, thus lending more credibility to our results. Another potential problem is that we restrict the coefficient estimates to be the same across all the countries. It is also possible that trust and trustworthiness are endogenous to income. We address all of these issues

¹¹We obtain this numeric result by multiplying the coefficient of 1.17 percent by 9, which is the numeric difference between maximum (10) and minimum (1) measured trustworthiness.

in the next subsection.

4.2 Robustness Analysis

In this subsection, we submit our baseline results to four robustness checks. The first two of them pursue the possibility that the key interaction terms are estimated with bias because they are picking up country-specific variations in the effect on income of education, age, and gender. The third check returns to the issue of using household rather than individual income as our dependent variable. Finally, we discuss the implications for our results and remedies for dealing with a potential endogeneity problem due to the possibility of reverse causal impacts running from income to trust and trustworthiness.

In the first robustness test, we retain the structure of our baseline regressions, but allow the coefficients on education, education squared, age, age squared and gender to vary across countries. The coefficient estimates on the variables of interest after enriching the regression specification in this way are shown in Table 3.¹² The sign pattern is completely unaffected. The absolute value of all the estimates are scaled back toward zero, by between one-fifth and three-fifths. Because the standard errors of these estimates fall only slightly, the t-statistics all decline, so that the confidence with which we can say these coefficients are not zero also falls. Notably, though, the relative magnitude of the individual and interaction terms in equations (5) and (6) are only slightly changed, so that the estimated cutoff levels of average trust and trustworthiness are not much different.

The second robustness test is even more rigorous. We conduct it in a two-step procedure. In the first step, we estimate regression equations (2), (3) and (4) separately for each country in the sample. This produces, for each equation, 18 separate estimates of the effect of trust or trustworthiness on real household income. These first-step estimates are presented in Panel A and Panel B of Table 4.¹³ The third panel in this table contains the average values of trust and trustworthiness in each country for comparison purposes. In the second step, we regress the estimated trust coefficients against the country average level of trustworthiness, and vice versa. This procedure imposes much less structure on the form of the interaction between individual characteristics and the average level of the complementary attitude.

The results of the second-stage regressions are shown in Table 5. Panel A reveals that the country-specific estimates of the effect of trust on real income are not significantly related to the average country level of trustworthiness, although the coefficient estimates are positive. This is likely a consequence of the fact that there are only 18 countries in our sample, and hence it is difficult to reach standard levels of significance. However, Panel B shows that, even with only 18 observations, the

¹²The regressions are calculated using observations that are unweighted within countries, but with the sums of weights equalized across countries. We have also estimated analogous regressions without any (cross-country) weight adjustment, and with weighting within and across countries combined. In this case the coefficient estimates are quantitatively more sensitive to the particular weighting scheme employed. However, the results are affected qualitatively only to the extent of marginal changes in statistical significance.

¹³These coefficient estimates are based on unweighted observations.

TABLE 3: Regressions results: impact of trust and trustworthiness on real household income when the coefficients on education, education squared, age, age squared and gender are allowed to vary across countries

	Dependent variable: Log of Real Household Income						
	(2)	(3)	(4)	(5)	(6)	(7)	
Trust	0.0665 (0.0112)***		0.0680 (0.0113)***	-0.3140 (0.1956)		-0.2738 (0.1970)	
Trustworthiness $\times 10^{-1}$		-0.0581 (0.0237)**	-0.0644 (0.0242)***		-0.183 (0.0701)***	-0.171 (0.0706)**	
Trust*Av.Trustworthiness				0.0472 (0.0240)**		0.0423 (0.0242)*	
Trustworthiness*Av.Trust					0.0380 (0.0188)**	0.0329 (0.0188)*	
Observations	24544	25675	24235	24544	25675	24235	
R-squared	0.50	0.49	0.50	0.50	0.49	0.50	

Note 1: The regressions are calculated using observations unweighted within countries and with the sums of weights equalized across countries.

Note 2: Heteroscedasticity consistent robust standard errors are in parentheses. Significance level notation: * at 10%, ** at 5%, *** at 1%.

Note 3: Regression equations are numbered according to Table 2.

TABLE 4: First stage: Trust and trustworthiness coefficients by country

COUNTRY	A: Trust coefficient				B: Trustworthiness coefficient				C: Country averages	
	Trustworthiness not included		Trustworthiness included		Trust not included		Trust included		Trust	Trustworthiness
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.		
Austria	0.0789	2.0629	0.0786	2.0216	-0.0088	-1.1291	-0.0094	-1.1663	0.318	8.266
Belgium	0.0543	1.7694	0.0635	2.0513	-0.0108	-1.8851	-0.0136	-2.2960	0.332	7.038
Brazil	0.0445	0.3773	0.0422	0.3568	-0.0116	-1.1192	-0.0115	-1.1035	0.067	8.198
Britain	0.1018	2.0307	0.1051	2.0947	0.0021	0.1635	0.0004	0.0319	0.436	8.165
Canada	0.1297	3.5106	0.1337	3.6082	-0.0126	-1.5591	-0.0114	-1.3961	0.524	8.178
Chile	0.1663	3.0502	0.1647	3.0055	0.0150	1.5362	0.0135	1.3558	0.227	8.652
Finland	0.0430	0.9212	0.0392	0.8372	0.0179	1.3506	0.0149	1.1570	0.627	8.128
India	-0.0059	-0.1853	-0.0023	-0.0722	-0.0150	-2.4410	-0.0163	-2.5946	0.343	8.762
Italy	0.1466	4.2170	0.1397	3.9651	0.0099	1.2870	0.0037	0.4778	0.371	8.327
Japan	0.1583	3.7541	0.1420	3.3091	0.0035	0.2974	0.0016	0.1322	0.417	8.747
Mexico	-0.0575	-0.7492	-0.0469	-0.6089	-0.0009	-0.0795	0.0025	0.1969	0.335	6.761
Netherlands	0.1056	2.1435	0.1032	2.0792	0.0147	1.3085	0.0111	0.9597	0.558	7.492
Portugal	0.0122	0.2456	0.0105	0.2107	-0.0040	-0.5215	-0.0039	-0.4998	0.214	7.469
South Africa	-0.0341	-0.8289	-0.0400	-0.9690	-0.0437	-6.3683	-0.0429	-5.9532	0.283	8.047
Spain	0.0748	3.3765	0.0800	3.5728	-0.0177	-3.6194	-0.0191	-3.7708	0.338	8.071
Turkey	-0.0720	-0.6373	-0.0756	-0.6660	-0.0146	-1.0304	-0.0151	-1.0582	0.100	8.724
USA	0.1106	2.9761	0.1144	3.0617	0.0003	0.0303	-0.0031	-0.3378	0.500	8.593
West Germany	0.0698	2.4208	0.0662	2.2289	-0.0030	-0.5128	-0.0046	-0.6996	0.378	7.459

Note 1: The regressions are calculated using unweighted observations.

Note 2: The first pair of columns in Panel A corresponds to specification (2) in Table 2. The first pair of columns in Panel B corresponds to specification (3) in Table 2. The second pairs of columns in both Panel A and Panel B correspond to specification (4) in Table 2.

TABLE 5: Second stage: The impact of average trustworthiness and trust on personal return to trust and trustworthiness

Dependent variable:	A: Trust coefficient		B: Trustworthiness coefficient	
First stage:	Trustworth. not included	Trustworth. included	Trust not included	Trust included
Average Trustworthiness	0.0362 (0.0321)	0.0312 (0.0310)		
Average Trust			0.0437 (0.0181)**	0.0383 (0.0169)**
Constant	Yes	Yes	Yes	Yes
Observations	18	18	18	18
R-squared	0.09	0.07	0.19	0.17

Note 1: Ordering of columns corresponds to Table 4.

Note 2: Heteroscedasticity consistent robust standard errors in parentheses. Significance level notation: * at 10%, ** at 5%, *** at 1%.

estimated country-specific effect of an individual’s trustworthiness on real income is positively related to the average trust in the country, and the coefficient is significantly different from zero at a 5% confidence level. Thus, this two-step procedure does not corroborate the results of specification (5) in Tables 2 and 3, but it does corroborate the findings in specification (6).

The third robustness check returns to the issue of having *household* real income as a dependent variable and *respondent* attitudes and demographic characteristics as independent variables. As we mentioned already, this issue is likely to be less important for the education and age variables (due to assortative matching of household members) than it is for the gender variable. In this check, we run our baseline specifications (as in Table 2), but we include only those households where the respondent coincides with a major or equal wage earner within the household. The results are shown in Table 6. Compared to Table 2, the coefficient estimates are similar and the country dummies are also jointly significant at 1 percent level. A major difference is that the simple and interaction coefficients on trust now lose statistical significance in specifications (5) and (7), although they retain the now-familiar sign pattern. Note that the conclusions from this robustness check mirror the ones from the previous check: the personal return to trust is *not* statistically significantly related to the average level of trustworthiness in society, but the personal return to trustworthiness *is* positively and statistically significantly related to the average level of trust in society. Also note that, as expected, the estimated impact on income of being a male is now much higher, by a factor of four, compared to Table 2.

Finally, we return to the issue of what the WVS trust (and, to a lesser degree, trustworthiness) responses really measure. Glaeser, in particular, has argued that higher-income people are more likely to say they trust others, in part because rich

TABLE 6: Regressions results: The impact of trust and trustworthiness on real household income when only households with major earner respondents are included

	Dependent variable: Log of Real Household Income						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Education	0.149 (0.0278)***	0.145 (0.0291)***	0.148 (0.0279)***	0.144 (0.0292)***	0.146 (0.0291)***	0.145 (0.0279)***	0.142 (0.0291)***
Education Squared $\times 10^{-2}$	-0.376 (0.122)***	-0.364 (0.128)***	-0.373 (0.122)***	-0.361 (0.128)***	-0.369 (0.127)***	-0.358 (0.122)***	-0.351 (0.128)***
Age $\times 10^{-1}$	0.623 (0.0346)***	0.620 (0.0362)***	0.626 (0.0348)***	0.623 (0.0365)***	0.619 (0.0363)***	0.627 (0.0348)***	0.623 (0.0365)***
Age Squared $\times 10^{-3}$	-0.691 (0.0341)***	-0.688 (0.0356)***	-0.692 (0.0343)***	-0.689 (0.0358)***	-0.688 (0.0356)***	-0.694 (0.0343)***	-0.690 (0.0359)***
Male	0.346 (0.0206)***	0.345 (0.0214)***	0.350 (0.0207)***	0.349 (0.0215)***	0.345 (0.0214)***	0.351 (0.0207)***	0.350 (0.0215)***
Trust		0.0652 (0.0185)***		0.0689 (0.0186)***	-0.395 (0.377)		-0.338 (0.378)
Trustworthiness $\times 10^{-1}$			-0.103 (0.0396)***	-0.114 (0.0413)***		-0.429 (0.104)***	-0.417 (0.107)***
Trust*Av.Trustworthiness					0.0571 (0.0459)		0.0503 (0.0459)
Trustworthiness*Av.Trust						0.0983 (0.0264)***	0.0916 (0.0270)***
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12579	11869	12399	11715	11869	12399	11715
R-squared	0.45	0.44	0.45	0.45	0.44	0.45	0.45

Note 1: The regressions are calculated using observations unweighted within countries and with the sums of weights equalized across countries.

Note 2: Heteroscedasticity consistent robust standard errors are in parentheses. Significance level notation: * at 10%, ** at 5%, *** at 1%.

people can effectively punish those who act in an untrustworthy way towards them. That is, they can “afford” to trust. To the extent this is true, there is causation running from income to the trust (and possibly trustworthiness) response, and the coefficients estimated here do not measure the structural effect of attitudes on income.

A natural approach to this concern is to identify a set of instrumental variables that are correlated with trust (or trustworthiness), but which are not influenced by income. With this objective, we investigated a wide variety of survey responses.¹⁴ In the case of trust, the instruments that we considered either lacked statistically significant explanatory power for trust and trust interacted with average trustworthiness in the first stage or, alternatively, led to very imprecise (as measured by the standard errors) and unstable (across various specifications) estimates of the coefficients on predicted trust and trust interacted with average trustworthiness in the second stage. In contrast, we could identify apparently appropriate instruments for trustworthiness, and two-stage least squares estimates yielded qualitatively similar results to those reported in the paper.¹⁵ Thus, with respect to the trust measure we regard the issue of potential reverse causation as unsettled, and an important topic for future research. We are less concerned that this is a problem for our estimates of the impact of individual trustworthiness and its interaction with average trust on income.

5 Conclusions

Previous empirical research suggested that countries with a high proportion of trusting citizens tend to have a higher per capita income and to grow faster. What had not been demonstrated is the incentive people have to act in a trusting and trustworthy manner. This paper addresses this issue by empirically investigating the monetary return to behaving in a trusting and a trustworthy manner, and whether each depends on the average amount of the complementary behavior in the society. We find evidence that the personal return to trustworthiness is negative in most countries, but increasing with the average level of trust and eventually positive in some countries. On the other hand, the personal return to trust is positive in almost all of the countries we consider, and it is increasing in the average level of trustwor-

¹⁴To be specific, we investigated answers to whether the respondent considers himself/herself to be a religious person, whether religion is important in his/her life, whether he/she was raised religiously, whether he/she thinks it is important to teach children responsibility, whether he/she would mind having (each category individually) people with criminal record, emotionally unstable people, heavy drinkers, and drug addicts as neighbors, whether he/she considers having friends and acquaintances to be an important aspect of life, whether he/she considers meeting people to be an important job attribute, and whether he/she has confidence in the civil service.

¹⁵In particular, using religious variables as instruments for trustworthiness and their interactions with aggregate trust as instruments for trustworthiness interacted with aggregate trust, the coefficient on trustworthiness in specifications (3) and (4) of Table 2 was reduced to about -0.1 , and the sign pattern and the relative magnitude of the coefficients on trustworthiness and trustworthiness interacted with aggregate trust was preserved in specifications (6) and (7), with all these estimates being statistically significant.

thiness in the society. The results about the personal return to trustworthiness are quite robust to alternative specifications, but the results concerning the personal return to trust are less so, perhaps corroborating the experiment-based scepticism expressed in Glaeser et al. (2000) about whether the survey question purportedly measuring trust in others does so. These results begin to provide a heretofore missing connection between the cross-country analyses that find a link between growth and measures of trust and trustworthiness and analyses of the impact of trust and trustworthiness on individual prosperity and hence the incentives to exhibit these behaviors.

Our empirical results confirm that personal attitudes do matter for personal prosperity. These empirical regularities should inform future theories of the role and interaction of trust and trustworthiness. To be sure, more research is necessary to further refine these findings. First, given the difficulty in linking the survey measure of trust to observed behavior in trust game experiments, it would be insightful to verify the validity of our current measure in other settings and to explore more reliable survey instruments. Second, more work is necessary to sort out the causal links between trust, trustworthiness and individual prosperity.

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