

# Is trust a historical residue? Information flows and trust levels

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Received 8 August 1997; received in revised form 13 July 1998; accepted 22 July 1998

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## Abstract

In making cross-country social comparisons, ‘trust’ has usually been treated as a culturally determined primitive. However, understanding the determinants of trust would enhance our understanding of its effects on the nature of contracting and on organizational structure. Theories of economists and sociologists generally predict a positive relationship between trust and information flows. We examine some institutional determinants of trust, using data from the World Values Survey 1990–1993 and the International Telecommunications Union Yearbook. Our finding that trust is increasing in the ease of two-way communication, particularly in urbanized economies, calls into question the extreme viewpoint that trust is purely a historical residue. © 1999 Elsevier Science B.V. All rights reserved.

*Keywords:* Trust; Information infrastructure; Institutions

*JEL classification:* D23; L14

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## 1. Introduction

The definition of trust has been much debated by social scientists over the past decade. No single definition is entirely satisfactory; still, there has been some convergence in opinion about what constitutes trust. Summarizing the views expressed at a Cambridge conference on the subject, Gambetta (1988) gave the following definition: “When we say we trust someone or that someone is trustworthy, we implicitly mean that the probability that he will perform an action that is beneficial. . . is high enough for us to consider in

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engaging in some form of cooperation with him. Correspondingly, when we say that someone is untrustworthy, we imply that that probability is low enough for us to refrain from doing so.”

Even more controversial is the issue of what causes trust. In the popular press, trust is most often taken as a primitive. This perspective is nicely summarized by Fukuyama (1995) who analyzes social organizations as a function of whether societies are ‘high-trust’ or ‘low-trust.’ The determinants of trust are reduced to a murkily defined notion of culture, which is taken as exogenous, as he states that “community depends on trust, and trust in turn is culturally determined.” This view has also been expressed in the academic literature. For example, sociologist Ronald Dore has written about Japan’s Confucian heritage as engendering trust in that society (Dore, 1987). Such heritage builds up over time, through a series of historical experiences. In this paper, we use the term ‘historical residue’ to refer to the part of trust that is a consequence of such historical experiences.

At the other extreme, rational-thinking economists, building on the well-known ‘Folk Theorem,’ (see, for example, Fudenberg and Tirole, 1992) assume trust to be a direct result of the traditional economic assumptions of rational utility-maximization. Trust here is essentially enforced cooperation based on repeated interaction and the possibility of punishing cheaters in the future.

Recently, attempts have been made in the social sciences to look more broadly at the sources of trust. It is commonly accepted that there must be some degree of ‘generalized morality’ operating that discourages opportunistic behavior (Granovetter, 1985). In terms of personal relations, the types of trust given by Shapiro et al. (1992) are consistent with much of the recent literature. They include: *deterrence-based trust*, which is based on the threat of punishment if consistent behavior is not maintained (rational trust); *knowledge-based trust*, which occurs when each party has enough information about the other to accurately predict the other’s behavior; and *identification-based trust*, which results when each party has fully internalized the other’s preferences, so that one party may serve as the other’s agent, with the other being confident that her interests will be fully protected.

These sources of trust will each be affected by the institutional environment in which they operate. In her study of trust production and destruction in the United States, Zucker (1986) discusses a number of institutions that facilitate trust production. She examines the effects of professional associations (professionalization) and of various insurance mechanisms that increase the predictability of outcomes (intermediation). Shapiro (1987) takes this work one step further by looking at the ways in which these ‘trustees of trust’ are themselves policed.

Theorists have pointed out that such (formal and informal) institutions help resolve ubiquitous information and agency problems (North, 1990). Given this received wisdom, the dearth of systematic empirical work that gets at the manner in which such institutions operate is somewhat puzzling. This scarcity extends to the limited work on the institutional determinants of trust. One factor that has been repeatedly emphasized in the theoretical literature on the sources of trust is that of information. In this short paper, we examine the trust-information relationship using cross-country data.

The rest of the paper is organized as follows. In Section 2, we review the theoretical literature on trust and information. We show that the theory, with a few exceptions, points to a positive trust-information relation; we also discuss some of the experimental

evidence in support of the theory. The issue of how important this effect is in the world outside the laboratory remains unresolved, however. We present the data that we use to address this question in Section 3. In Section 4, we examine the relationship between aggregate expressions of trust (as evidenced in survey responses) and various measures of telecommunications infrastructure. Our finding of a strong positive relationship between trust and two-way information flows casts doubt upon the extreme viewpoint that trust is purely a historical residue. We discuss implications of our result and future work in the concluding section.

## 2. Theories of trust and information

We provide here brief descriptions of some of the dominant models of information and cooperation in the social sciences as they pertain to the ideas of trust outlined above. Obviously, we are not reviewing *all* such theories; rather, we outline a few models to illustrate their general predictions regarding the trust-information relationship. The first two categories reviewed below explicitly model the trust-information relationship; the last category emphasizes trust as a consequence of historical processes.

### 2.1. Deterrence-based trust

A large body of literature considers the behavior of players in repeated prisoners' dilemmas under imperfect information (Kreps et al. (1982)). It is intuitive that, if players are less able to monitor the actions of others, there will be less cooperation (and hence increased opportunistic behavior), since this makes it more difficult to ascertain whether or not cheating has occurred. This intuition has been confirmed by Fudenberg et al. (1994). Thus, this theory predicts a positive correlation between trust and information.<sup>1</sup>

### 2.2. Knowledge-based trust and identification-based trust

In both of these cases, it is straightforward that better information flows imply greater trust, as both of these types of trust rely on learning about others' behaviors and preferences.<sup>2</sup> There is some experimental evidence that knowing others' preferences can help coordination. Experimental economists have also reported the robust finding that preplay communication leads to greater cooperation, even in situations where game theory suggests that such communication is no more than cheap talk (Ledyard, 1995).

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<sup>1</sup> A body of literature outside economics also captures this idea. For example, social psychologists refer to prisoners' dilemma situations as social dilemmas. The idea that deterrence helps resolve such dilemmas can be found in several papers. See, for example, Yamagishi and Cook (1993).

<sup>2</sup> At least some *ex ante* uncertainty is essential for this type of trust to develop, however, since it allows players to observe how others behave when the possibility of opportunistic behavior exists. If there is no uncertainty, individuals never get the chance to 'prove themselves.' Kollock (1994) reports evidence supporting this claim from a market game, where he finds that subjects rate their partners as significantly more trustworthy under conditions of greater uncertainty. Note, however, that this argument does not apply to *ex post* uncertainty, so the overall effect is unclear.

One reason for this may be that preplay communication facilitates the formation of a group identity.

The situation becomes more complicated when we move away from a simple model of dyadic relations. In their work on third-party gossip, Burt and Knez (1996) study trust between individuals embedded in a broader social network. Their survey results suggest that trust is increasing in the frequency of interaction between the two parties involved. However, interactions with third-parties (indirect connections) reinforce previously held beliefs about whether or not the other party will cooperate in future interactions, thus affecting trust intensity, not direction. Thus, some types of information flows reinforce distrust as well as trust.

### 2.3. *'Generalized morality'*

The simple intuition here is that the average level of trust should be independent of information flows. Fukuyama (1995) has argued that trust is the result of shared values that allow individuals to subordinate their interests to those of larger groups, and that these shared values are the result of historically determined cultural heritage. A similar view is also expressed by Dore (1987). Several authors have suggested that humans will often behave in ways which are not in their interest because they have evolved emotional predispositions to do so (see, for example, Schelling, 1978; Akerlof, 1983; Frank, 1987; Hirshleifer, 1987). These predispositions, including the propensity to behave non-opportunistically, have little to do with the availability of information.

However, there exist evolutionary models where an individual's level of trust is exogenous, as suggested by these authors, but the proportion of trusting individuals in the population depends on information flows. In Frank's (1987) model, players are either honest or dishonest, and pair up to play a prisoner's dilemma. If information is readily available, honest players are less likely to be fooled into being taken advantage of by dishonest players. Thus, the average payoff to honest players will be higher if there are reliable information flows, which increases the 'reproductive fitness' of honest types.<sup>3</sup>

A few important observations regarding these theories are in order. Most of the above explanations suggest a causal relationship in which information flows lead to greater trust. However, it is important to note the possibility of reverse causality. As an illustrative example, suppose that trust is, in fact, a historical residue. Suppose further that less trusting types invest in obtaining information, feeling the need for monitoring to reduce opportunism on the part of their exchange partners, while more trusting types do not do so. Then this would lead to a negative correlation between information and trust in which the direction of causality is the reverse of that implied by the above theories. This example, by drawing on both the generalized morality and the deterrence based

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<sup>3</sup> There are some caveats to this kind of model, however. For example, Bendor et al. (1991) show that, under increased uncertainty, more forgiving strategies tend to perform better in prisoners' dilemma tournaments (see Axelrod, 1984, for a description of such tournaments). Therefore, more cooperative strategies will 'survive' more often under conditions of increased uncertainty. The intuition is that 'suspicious' strategies will be too quick to punish apparent defections, and will end up in a state of non-cooperation simply due to mistakes in observing other players' behavior. Note that this will not necessarily imply more overall cooperation in equilibrium, since both suspicious and forgiving strategies will end up cooperating less when there is more uncertainty.

explanations, also illustrates the additional general point that not all theories predicting correlations between trust and information fit neatly into the above three categories.

The theories positing a positive correlation between trust and information flows are not always specific about the mechanism by which the information flows occur. For example, they do not always distinguish between two-way private communication, as opposed to one-way, or generalized, communication (such as through television or radio). Some theoretical reasoning (Bolton, 1991; Roth, 1995) suggests that face to face communication allows parties to understand and empathize with one another, which affects the utility each places on the other's outcome and contributes to the building of trust. Valley et al. (1998) interpret their recent experimental results as providing evidence for the idea that face-to-face communication appears to contribute to trust-building by increasing the incentive for truth-telling. In their experiments, verbal exchanges emphasized the interpersonal aspect of communication in ways that other communication mechanisms did not. We have only approximate proxies for the prevalence of various means of communicating information. Nonetheless, given the findings of (Valley et al., 1998) that the medium of communication affects trust formation, we feel it important to be sensitive to the distinction between one-way and two-way information flows in our estimations below. The theoretical reasoning and experimental evidence suggest that the act of information exchange through two-way communication media is more likely to be the source of an information-trust correlation than is information exchange through one-way communication media.

### 3. Data

Our basic design is to measure the relationship between information flows and trust across countries. We take as our sample the forty countries covered in the World Values Survey 1990–1993 (WVS), from which we obtain our measure of trust. Following La Porta et al. (1997), TRUST is defined as the percentage of respondents in each country who answered that most people can be trusted when asked, “Generally speaking, would you say that most people can be trusted or that you can't be too careful when dealing with people?”. Summary statistics for TRUST, as well as our other variables, are listed in Table 1, and Appendix A provides information on the World Values Survey.<sup>4</sup>

There are obvious limitations involved with any attempt to directly measure an intangible attribute such as trust. In addition to the usual difficulties with using survey data, there is the problem that the idea of trust may have different meanings across cultures and across individuals. Moreover, for our purposes, the survey data is too coarse in that it cannot differentiate between the types of trust outlined above.

We use phones per capita (PHONES), obtained from the International Telecommunication Union (ITU) Yearbook 1994, as a proxy for the level or importance of two-way communication. The ITU Yearbook contains many other measures of communications infrastructure, including phones per household, total calls per capita, faults per line, and

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<sup>4</sup> While the WVS provides survey data at the individual level, our study is limited to analyses at the country level, since this is the level of aggregation of our communications infrastructure data.

Table 1  
Summary statistics

	No. of countries	Mean	S.D.	Minimum	Maximum
TRUST	40	0.353	0.149	0.065	0.661
var(TRUST)	27	0.101	0.052	0.052	0.291
PHONES	40	0.316	0.198	0.003	0.678
GDP per capita	40	12066	11078	256	35606
HIER	40	0.685	0.269	0.3	1
URBAN	40	69.55	16.35	26.8	97

TRUST values are obtained from the World Values Survey, 1990–1993, and represent the fraction of respondents in each of 40 countries that answered in the affirmative to the question “Generally speaking, would you say that most people can be trusted or that you can’t be too careful when dealing with people?” PHONES is the number of telephones per capita, and is obtained from the International Telecommunications Union, 1993. GDP per capita is in 1992 U.S. dollars. HIER is the fraction of individuals who are followers of a hierarchical religion (Catholicism, Eastern Orthodox, and Islam), and is obtained from the Worldmark Encyclopedia of the Nations, 1995. URBAN is the percentage of individuals living in urban areas, and is obtained from the World Bank Yearbook.

waiting time for telephone installation. They are all strongly correlated, and our results are qualitatively unaffected by the measure of communications infrastructure used.<sup>5</sup> The results reported below use PHONES as the communications measure.

The one-way communications measures (as measured by newspaper circulation/capita, radio availability/capita, or television availability/capita) are all highly correlated, and are also highly correlated with PHONES (Pearson correlation coefficients of 0.71, 0.73, and 0.76 for the correlation of PHONES with newspapers per capita, radios per capita, and televisions per capita respectively, all significant at conventional levels). Even after controlling for log (income), the correlation coefficients for the various one-way communications measures with PHONES vary from 0.52 to 0.63, significant at conventional levels. To some extent, the generalized morality source of trust could be thought to be related to the one-way communication measures, but it is difficult to read too much into this conclusion. In any event, we control for one-way communication measures in the analysis below.

Both the theoretical and empirical literature suggest the presence of a cultural component to trust. Huntington (1996) provides a coarse metric for differentiating societies; he lists six basic cultures (CULTURE) – Western, Orthodox, Sinic, Hindu, African, and Latin American, as a means of grouping similar countries. TRUST statistics broken down by CULTURE are listed in Table 2. The summary statistics suggest that the mean trust level in Western countries is higher than that in any of the other culture categories. The difference in means is statistically significant at conventional levels for

<sup>5</sup> Admittedly, our *t*-values are higher for PHONES, though not the magnitude of the effect. This is probably because other proxies are less easily measured, and are therefore noisier. For example, the reported number of calls per capita varies by as much as an order of magnitude between years, for a given country. We attempted to construct an aggregate index of communications infrastructure; however, it is not at all clear how to construct such a measure. We also examined how other forms of infrastructure were related to trust, on the grounds that these might facilitate economic activity and thus lead to greater interaction and thereby greater trust. Our measures of transportation (roads, railroads), and energy production were found to be more or less orthogonal to trust, once we controlled for income.

Table 2  
Level of Trust by CULTURE

CULTURE	No. of countries	Mean	S.D.	Minimum	Maximum
Western	22	0.41	0.15	0.10	0.66
Sinic	3	0.33	0.10	0.22	0.42
Latin	4	0.21	0.11	0.06	0.33
African	2	0.26	0.04	0.23	0.29
Orthodox	8	0.27	0.07	0.17	0.38
Hindu	1	0.35	–	0.35	0.35

TRUST values are obtained from the World Values Survey, 1990–1993, and represent the fraction of respondents in each of 40 countries that answered in the affirmative to the question “Generally speaking, would you say that most people can be trusted or that you can’t be too careful when dealing with people?” Countries are categorized into one of six cultures, as advocated by Huntington (1996). In this classification, Western countries for which we have data are Austria, Belgium, Britain, Canada, Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, and USA. The other categories of countries are: Sinic – China, Japan, South Korea; Latin – Argentina, Brazil, Chile, Mexico; African – Nigeria, South Africa; Orthodox – Belarus, Bulgaria, Estonia, Latvia, Lithuania, Romania, Russia, Turkey; and Hindu – India.

the comparison between Western countries on the one hand, and for any of the Latin, African or Orthodox countries on the other.

A different proxy for the cultural component of trust comes from Putnam (1993), who argues that trust is a habit formed during generations of ‘horizontal networks of association.’ He further claims that the Catholic Church, by imposing a hierarchical structure on society, has discouraged the formation of this ‘habit of trust.’ La Porta et al. (1997) argue that this assertion applies to any hierarchical religion. Based on this premise, they take the percentage of the population belonging to a hierarchical religion (HIER) as an ‘exogenous’ measure of generalized trust.<sup>6</sup> The correlation between TRUST and HIER is  $-0.61$ , providing some confirmation to the claim of (La Porta et al. (1997)).

Ability to communicate is only a part of the communally enforced cooperation that may be considered ‘trust.’ In larger, urban communities, social ties may be too diffuse to effectively blacken a cheater’s reputation through word-of-mouth communication (see, for example, Kandori, 1992). In other words, an individual may act dishonestly for a long time before his reputation catches up with him. By contrast, in a rural village, ostracism is easily facilitated. To account for this effect, we use the percent of a country’s population living in urban areas. The WVS data also include the size of the community where each interview took place. Univariate comparisons of mean TRUST levels across different community sizes (Table 3) do not, however, suggest any striking relationship between mean trust levels and community size. We note that caution is in order in interpreting these statistics, because of the strong positive urbanization-income and income-trust relationships.

Research on telecommunications infrastructure in Japan by Imagawa (1997) suggests that phone usage is complementary to urbanization, i.e., telephones are a more dominant means of communication in urban areas. If this were the case, we would expect the

<sup>6</sup> Hierarchical religion is defined here as Catholic, Moslem, or Orthodox. They note, however, that most of the correlation between HIER and TRUST is driven by the correlation between Catholicism and trust.

Table 3  
Level of Trust by Community Size

Population	No. of individuals	Mean	S.D.
<2000	13214	0.35	0.48
2–5000	4086	0.35	0.48
5–10 000	3288	0.34	0.47
10–50 000	4515	0.37	0.48
50–100 000	13891	0.38	0.48
100–200 000	4123	0.38	0.49
200–500 000	16113	0.36	0.48
>500 000	11343	0.34	0.48

TRUST values are obtained from the World Values Survey, 1990–1993, and represent the fraction of respondents in each of 40 countries that answered in the affirmative to the question “Generally speaking, would you say that most people can be trusted or that you can’t be too careful when dealing with people?” Data on community size is also obtained from the World Values Survey, 1990–1993.

*marginal* effect of phones on trust to be affected by the *level* of urbanization (URBAN). To account for this effect, we include a PHONES  $\times$  URBAN interaction terms in some of the regressions below.

The nature of the data affects the kinds of empirical analyses that are possible. With the exception of the idea of generalized morality, the theories in Section 2 are at a micro level, whereas our empirical results are based on coarser data aggregates. As an example of where this disjunction between the extant theories and available data might be relevant, consider the distinction drawn in social psychology between generalized exchange and restricted exchange (Ekeh, 1974), and between different kinds of generalized exchange.<sup>7</sup> In experimental settings, some authors have shown that the effect of information flows on the levels of cooperation depend upon the kind of exchange (Yamagishi and Cook, 1993), and the nature of the communication medium (Valley et al., 1998). However, our data precludes us from conditioning our estimations on the particulars of the micro situation. Consequently, we are unable to address the possibility that the trust-information correlations (and the underlying reasons for these correlations) may differ across circumstances within a particular country.

#### 4. Results and interpretation

We use as our model the following linear relationship between TRUST and our covariates:

$$\text{TRUST}_i = \alpha + \beta_1 \times \text{PHONES}_i + (\beta_2 \times \log(\text{GDP}_i) + \beta_3 \times \text{URBAN}_i + \beta_4 \times \text{PHONES}_i \times \text{URBAN}_i + \beta_5 \times \text{CULTURE}_i + \beta_6 \times \text{HIER}_i) + \varepsilon_i$$

<sup>7</sup> Here restricted exchange between two agents refers to a situation where each agent’s contribution is directly related to that of the other, whereas generalized exchange situations are characterized by no such direct relationship.



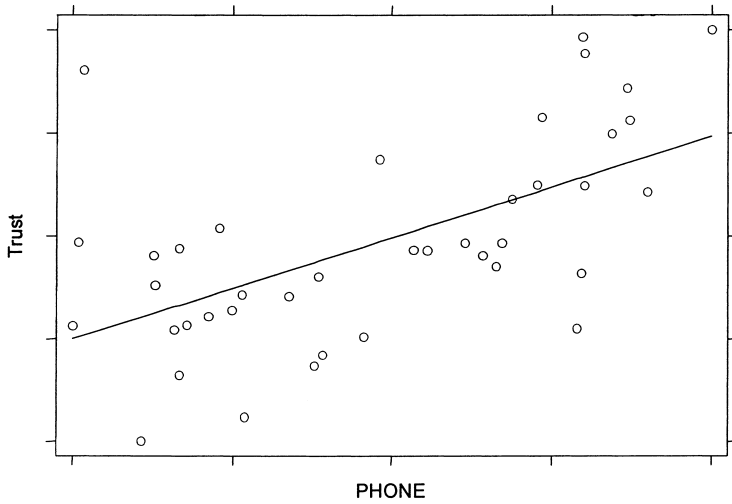


Fig. 1. This figure demonstrates the raw relationship between Trust and phones per capita. The straight line is the least squares regression line.

where CULTURE is a vector of dummy variables that allows for CULTURE fixed-effects, and the bracketed terms may or may not be included in a particular estimation. The raw relationship between trust and phones is shown in Fig. 1. Concerned that phones may simply be picking up an income effect, we graph in Fig. 2 the trust-phones

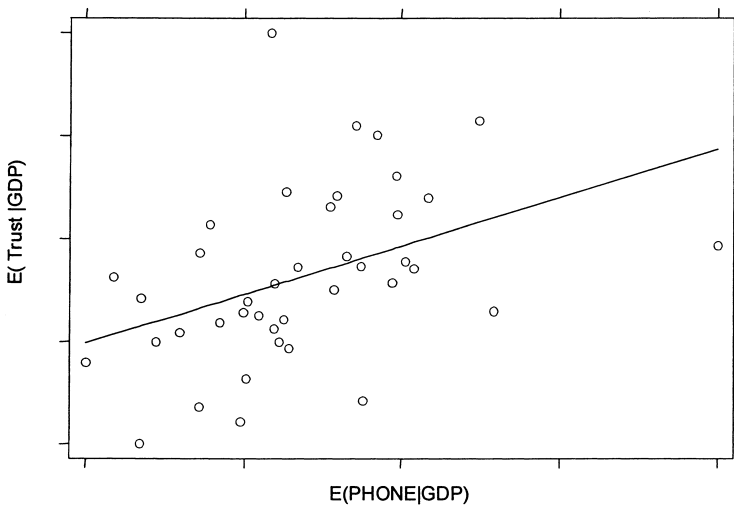


Fig. 2. This figure represents the relationship between Trust and phones per capita after controlling for GDP per capita.

Table 4  
Trust as dependent variable, with Culture fixed-effects

	Model 1	Model 2	Model 3
Log (GDP)	−0.061 <sup>a</sup> (−1.75)	−0.060 <sup>a</sup> (−1.73)	−0.026 (−0.77)
PHONES	0.75 <sup>c</sup> (3.44)	0.77 <sup>c</sup> (3.37)	0.67 <sup>c</sup> (3.02)
URBAN		−0.04 (−0.23)	−0.11 (−0.59)
PHONES × URBAN			0.02 <sup>b</sup> (2.17)
Constant	0.67 <sup>b</sup> (2.46)	0.68 <sup>b</sup> (2.37)	0.42 (1.67)
# of observations	40	40	40
Adj. $R^2$	0.42	0.40	0.46

<sup>a</sup>significant at 10%.

<sup>b</sup>significant at 5%.

<sup>c</sup>significant at 1%.

All regressions use heteroskedasticity-corrected least squares estimation techniques. *t*-statistics are in parentheses.

relationship, controlling for log (GDP per capita). In both cases, a positive linear relation is apparent.

The regression results of the three baseline models are shown in Table 4; the coefficient on PHONES is positive in all regressions. This result is robust to specification, significant at the 1% level in all three models. The effect is also large, with the coefficient ranging from 0.67 to 0.77. In more concrete terms, this implies that a move from the mean to the 75th percentile (an increase in per capita telephones of 0.2) will increase the percent of ‘trusting individuals’ by 13 to 15 percent. The interaction term (URBAN × PHONES) is also positive and statistically significant ( $p = 0.038$ ), and large in magnitude. Its size implies that a 5% increase in urbanization will raise the marginal effect of communication on trust by 1%. To illustrate, for countries at the 25th percentile level of urbanization, an increase of per capita phones of 0.2 will raise the level of trust by 9%, whereas for countries at the 75th percentile, the same increase in phones will yield an increase in trust of 17%. Once other factors are accounted for, there is at best a weak link between income and trust. Thus, our results strongly suggest a positive relationship between ability to communicate and level of perceived trust. We note also that the CULTURE fixed effects are jointly significant at the 1% level in all these specifications.

Table 5 shows the results when HIER is used to proxy for a cultural effect. The coefficient on PHONE remains positive and significant in all the estimations. The magnitude on those estimations that include HIER is reduced relative to the estimations that used CULTURE fixed effects. For example, it is reduced from 0.67 in Table 4, Model 3, to 0.34 in Table 5, Model 4. Even at this attenuated level, however, note that the magnitude of the PHONE effect remains strong (evaluated at their respective means, the PHONE effect is of comparable magnitude to the HIER effect). Another difference in Table 5 is that the PHONES × URBAN effect is smaller in magnitude and significance.

Table 5  
Trust as dependent variable, with HIER as a proxy for cultural effects

	Model 1	Model 2	Model 3	Model 4
LGDP	−0.022 (−0.89)	0.003 (0.13)	0.0067 (0.27)	0.012 (0.51)
PHONES	0.60 <sup>c</sup> (3.50)	0.31 <sup>a</sup> (1.66)	0.35 <sup>a</sup> (1.90)	0.34 <sup>b</sup> (2.01)
HIER		−0.25 <sup>c</sup> (−3.04)	−0.24 <sup>c</sup> (−3.02)	−0.17 <sup>b</sup> (−2.01)
URBAN			−0.0013 (−1.03)	−0.009 (−0.50)
PHONES × URBAN				0.001 (1.49)
Constant	0.35 <sup>a</sup> (1.95)	0.40 <sup>b</sup> (2.24)	0.44 <sup>b</sup> (2.61)	0.29 (1.62)
No. of observations	40	40	40	40
Adj. $R^2$	0.35	0.50	0.50	0.52

<sup>a</sup>significant at 10%.

<sup>b</sup>significant at 5%.

<sup>c</sup>significant at 1%.

All regressions use heteroskedasticity-corrected least squares estimation techniques. *t*-statistics are in parentheses.

These results are qualitatively unchanged if we include CULTURE fixed effects and HIER in the same specifications.<sup>8</sup>

Finally, in all the specifications in Tables 4 and 5, we include measures of one-way communication in addition to PHONES. Our results are qualitatively unchanged, and the one-way communication measures are not significant at conventional levels.

The robust positive correlation between TRUST and a measure of two-way communication is consistent with the predictions of most of the theories discussed in Section 2. For example, it is consistent with the deterrence-based story that the existence of phones (or, more generally, of communications means for which PHONES is a proxy) discourages opportunistic behavior on the grounds that it is more likely to be discovered, and thereby contributes to a greater level of trust. But a degree of circumspection is in order here, as there are a variety of underlying mechanisms that are consistent with this result, and our data do not permit us to identify some subset of these as operative in our data to the exclusion of others.

As discussed earlier, it is also appropriate to recognize that there may not be a direct causal link between information flows and trust (as implied by the theories in Section 2). For example, a behavioral explanation (not posited by the theories above) consistent with our results is that phones allow exchange with strangers, and such repeated exchange contributes to trust.<sup>9</sup> Here ‘exchange with strangers’ is the unobserved variable that accounts for the correlation between information and trust.

<sup>8</sup> Note that, because of the high correlation between HIER or CULTURE fixed effects on the one hand, and PHONES on the other (e.g. HIER and PHONES have a correlation coefficient of 0.47, significant at the 1% level), it is not possible to meaningfully examine how much of the variation each of these variables independently explain.

<sup>9</sup> We are grateful to an anonymous referee for this observation.

## 5. Conclusions

Several theories proposed by economists and sociologists predict a positive relationship between trust and information flows. We view this short paper as providing useful confirmation of this prediction. We also find that this effect is particularly strong in highly urbanized countries. It is surely true that trust is a complicated attribute, and that several factors other than the availability of information flows affect trust levels. However, we view the results as challenging the notion that trust is purely a historical residue.

Our results have important implications in a number of areas. In particular, the transactions costs theory of the firm has long claimed that the inability to write enforceable and complete contracts is a fundamental reason for the existence of firms. The easier it is to write such contracts, the more easily transactions may take place across organizational boundaries (and, more generally, between individuals). Trust, by substituting for formal contract enforcement, may affect the types of organizational forms that emerge across different societies.<sup>10</sup>

These results point to a few interesting future directions. Most of the results we have reported here involve only highly aggregated data from the World Values Survey. If we are able to develop a proxy for information flows for states or provinces within some subset of our countries, we would be able to estimate a model that allows for country fixed effects. We may also wish to look for data that provides a different measure of trust. For example, data on loans between friends may be a more meaningful measure of trust than one based on survey results. Finally, we are not able, given the nature of our data, to distinguish between the various theories that predict a positive relationship between trust and information flows. Further experimental studies designed to better identify these components of observed trust would be complementary to our own effort.

## Acknowledgements

We thank Ranjay Gulati, Rakesh Khurana, David Laibson, Dan Levinthal, Sendhil Mullainathan, Jan Rivkin, Nicolaj Sigglekow, E. Somanathan, Aks Zaheer, and participants at the Harvard Behavioral Economics Seminar for helpful comments and advice. We are also grateful to the editor, Richard Day, and to an anonymous referee for several insightful comments. The Harvard Business School Division of Research generously funded the research. All errors and opinions are, of course, our own.

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<sup>10</sup> As an example, consider the business groups that dominate the private sectors of most developing countries. Several authors have emphasized the role of trust in cementing relationships between firms belonging to a particular business group (see Leff, 1978; Granovetter, 1994; Khanna and Palepu, 1997; Ghemawat and Khanna, 1998 and the references therein). As another example, note the focus placed by organizational behavior scholars on the importance of trust in relational contracting. In forming lateral contracts, trust is essential (Sheppard and Tuchinsky, 1996), and without it, the network forms of organization that have received so much attention lately (see, for example, Powell and Smith-Doerr, 1994; Uzzi, 1996) cannot be sustained.

## Appendix

The World Values Survey (WVS) is a database compiled by the Institute for Social Research at the University of Michigan. According to the WVS codebook, the purpose of the database is, “to enable crossnational comparison of values and norms in a wide variety of areas and to monitor changes in values and attitudes of mass publics in 40 societies around the world. Broad topics covered are work, the meaning and purpose of life, family life, and contemporary social issues.”

The population in the WVS included adults 18 and over, selected through random sampling. As noted in the codebook, rural areas and the illiterate were undersampled (the latter is not a problem for us, as it increases the comparability of observations across countries).

Weights were provided to further scale observations to better reflect a country’s demographic distributions. Since the weighted and unweighted measures of TRUST were highly correlated ( $\rho = 0.9948$ ), we report the unweighted values for simplicity (of course, none of results change if the weighted values are used).

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