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Building Trust: Public Policy, Interpersonal Trust, and Economic Development*

Stephen Knack* & Paul J. Zak**

We have previously shown that interpersonal trust substantially impacts economic growth, and that sufficient interpersonal trust is necessary for economic development. To investigate the ability of policy-makers to affect trust levels, this paper builds a formal model characterizing public policies that can raise trust. The model is used to derive optimal funding for trust-raising policies when policy-makers seek to stimulate economic growth. Policies examined include those that increase freedom of association, build civic cultures, enhance contract enforcement, reduce income inequality, and raise educational levels. Testing the model's predictions, we find that only freedom, redistributive transfers, and education efficiently and robustly stimulate prosperity. They do this by strengthening the rule of law, reducing inequality, and by facilitating interpersonal understanding, all of which raise trust.

*All this was trust. But could you manage it? Were you not always
distraught by expectation. . . ?*
Ranier Maria Rilke, *Duino Elegies*

*There are, to be sure, pervasive barriers to investment [in Russia].
The most serious is a lack of trust. . . . But trust can be built.*
U.S. Treasury Secretary Paul O'Neill, *The Wall Street Journal*,
August 9, 2001

I. INTRODUCTION

Zak & Knack demonstrate that interpersonal trust has a considerable
effect on economic growth as trust affects the transactions costs
associated with investment.[1] Their analysis shows that if trust is suf-
ficiently low, so little investment will be undertaken that economic
growth is unachievable, resulting in a low-trust poverty trap. Even
in a growing economy, interpersonal trust is a powerful economic
stimulant: a 15 percentage point increase in the proportion of people
who report that others in their country are trustworthy raises per cap-
ita output growth by 1% for every year thereafter. Further, economic
growth initiates a virtuous circle as income gains enhance interper-
sonal trust.

Because differences in trust directly cause differences in economic
performance, if trust is malleable by policy it would provide substan-
tial leverage to policy-makers seeking to influence living standards.
This question itself is unconventional as the literature has largely
considered trust to be determined by exogenous "local conditions."
For example in Italy, Putnam traces the cultural factors determin-
ing low trust in the south to the 12th century Norman regime cen-
tered in Sicily.[2] Across the American states, trust and other dimen-
sions of social capital are strongly predicted by ethnic and religious
composition.[3] Weingast argues that the adoption and implementa-
tion of constitutional rules to enforce property rights, a component
of environments that produce trustworthiness, is ultimately depen-
dent on the homogeneity of citizens' preferences.[4] Similarly, cross-
country studies show that trust is higher in ethnically homogeneous

[1] Paul J. Zak and Stephen Knack, *Trust and Growth*, 111 The Econ J 295 (2001).
[2] Robert Putnam, Robert Leonardi and Raffaella Y. Nanetti, *Making Democracy Work* (Princeton U Press, 1993).
[3] Tom W. Rice and Jan L. Feldman, *Civic Culture and Democracy From Europe to America*, 59(4) J of Pol 1143 (1997); Stephen Knack, *Social Capital and the Quality of Government: Evidence From the States*, 46 Am J Pol Science 772 (2002).
[4] Barry Weingast, *The Political Foundations of Democracy and the Rule of Law*, 91(2) Am Pol Science Review 245 (1997).

countries.[5] Putnam exhaustively surveys the factors associated with trust and social capital, but does not concretely identify policies that raise trust.[6]

We investigate how to build trust by constructing a dynamic general equilibrium growth model that identifies the ways that government policies impact the constituents of trust.[7] Importantly, the model is used to derive an efficiency criterion that permits the cost of each policy to be compared to the enhanced income growth it produces by raising trust. We then investigate the impact of a broad set of policies on growth empirically and determine if any of these satisfy the efficiency criterion. While our analysis indicates that a number of government policies robustly influence trust levels, few of these meet the efficiency criterion showing that they can be used as a development strategy. The only policies examined that meet this criterion are raising educational levels, redistributive transfers, and increasing civil liberties. Though this policy set is smaller than one would have hoped for, it does not mean that governments should not expend resources to raise trust. Trust is essential to myriad aspects of civil society that we have not included in our analyses; indeed, the economic effects of trust, though measurable, may be among the least important factors shaped by trust.

II. TRUST AND PUBLIC POLICY

The model in Zak & Knack[8] shows that trust emerges endogenously among economic actors in order to reduce transactions costs driven by asymmetric and costly information. Zak & Knack demonstrate that trust depends on five components: formal institutions that enforce contracts; social norms that restrain cheating; social and economic heterogeneity that exacerbate informational asymmetries; wealth; and income; with the latter two affecting agents' responses to cheating by determining the opportunity cost of seeking redress. These five factors robustly explain 70% of the variation in interpersonal trust across countries. The model in the present paper identifies policies that affect trust's constituent components and in this way determine trust's manipulability by policy-makers.

    [5] Zak and Knack 111 The Econ J at 295 (cited in note 1); Stephen Knack and Philip Keefer, *Does Social Capital Have an Economic Payoff? A Cross-Country Investigation*, 112(4) Quart. J of Econ 1252 (1997).
    [6] Robert D. Putnam, *Bowling Alone : The Collapse and Revival of American Community*, (Simon & Schuster, 2001).
    [7] Our choice of policies was strongly influenced by Putnam's findings, Putnam, *Bowling Alone* (cited in note 6).
    [8] Zak and Knack, 111 The Econ J at 295 (cited in note 1).

Of the five factors that produce trusting behaviors, two suffer such substantial measurement problems that we ignore them in the present analysis, those being social norms and wealth. Social norms are multidimensional and therefore not only difficult to measure, but necessarily difficult to control through policy. On the other hand, wealth, though reasonably well-measured, is too highly correlated with income to provide a measurably independent effect on trust. Lastly, note that while social and economic heterogeneity can be directly measured, absent importing or exporting particular groups of individuals, we will focus on economic heterogeneity (income inequality) which Zak & Knack demonstrate is a quantitatively important measure of heterogeneity and is clearly amenable to policy interventions as well as interpersonal communication.[9]

This narrows our focus to three areas for policy intervention: formal institutions, income distribution, and factors that directly trust, given a country's level of income. Let us introduce some notation. Denote contract enforceability by e, income inequality by Ψ, and per capita income by y, and define λ as policies that affect trust directly. Then, the transactions cost associated with investment is a mapping $\eta = \mathbf{R}^4 \to \mathbf{R}^+$, where the transactions cost at time t is

$$\eta_t = \eta(e_t, \Psi_t, \lambda_t, y_{t-1}) \tag{1}$$

where t denotes time. Note that income is lagged in (1) to capture the feedback between income levels and trust.

Trust at time t, $\aleph_t$, is measured by the proportion of income not expended to enforce contracts, following Zak & Knack;[10] that is, $\aleph_t \equiv (y_t-\eta_t)/y_t \in [0, 1]$. It is important to mention that this measure of trust is not the trust in one's heart, but observed trust in actual transactions and therefore dependent upon the institutional, social, and economic environments in which transactions are embedded. This idea is fully developed in our earlier paper; here we simply take it as given that trust is a *decision*, not an innate, unchangeable preference. This follows directly from defining trust as something that occurs within the context of intertemporal transactions.[11] To reiterate, trust is defined as the income not spent on specifying and verifying contract compliance when engaging in an investment in which the second

[9] Ibid.

[10] Ibid.

[11] In the extremes, some individuals appear always to trust or always to distrust others. See Vernon Smith, *The Two Faces of Adam Smith*, 65(1) S Econ J, 1-29 (1998); Paul J. Zak and Ahlam Fakhar, *The Bioeconomics of Trust* (Claremont Graduate U Working Paper, 2001).

transactor can renege on the first, causing him or her to lose some or all of moneys invested. Further, defining trust this way makes it an economically meaningful variable.

The model in our previous paper demonstrates that transactions costs $\eta(\cdot)$ decrease in contract enforceability, e, and income y, while it increases in income inequality Ψ. By construction, λ raises trust and therefore η falls as λ rises. The policy instruments available to influence the factors that affect transactions costs in (1) are: increased judicial funding p to better enforce contracts, $e = e(p)$; income transfers σ that reduce income inequality, $\Psi = \Psi(\sigma)$; as well as λ which can broadly be defined as investment in civic culture that builds interpersonal ties, following Putnam.[12] Because transactions costs are jointly endogenous in income, lagged per capita income y_{t-1} is included as a control variable in the empirical studies that follow rather than a policy variable per se.

Given this formalization of the factors that produce and influence trust, we next characterize a policy-maker's choice calculus. Because trust is perfect if all economic agents are identical, interpersonal diversity is an essential aspect to a model of trust. With heterogeneity, there is no "standard" social welfare function for policy-makers to maximize when making policy-funding choices.[13] As a result—and because policy-makers everywhere are concerned with citizens' living standards—we consider economic growth to be the policy-maker's objective. Clearly this is a naïve view of how policy is set, though such an approach explains a substantial proportion of government expenditures.[14] Yet we view this approach as a useful benchmark to which actual policy choices can be compared.

Formally, policy-makers take into account how individuals react to policy changes in their decision process. That is, a unitary-actor government and citizens play a Stackelberg game, with the government moving first. Given the discussion above of the policy-maker's objective, policies are chosen to maximize the growth of productive capacity (called *capital deepening*)[15]

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[12] Putnam, *Bowling Alone* (cited in note 6).

[13] Costas Azariadis, *Intertemporal Macroeconomics* (Blackwell, 1993).

[14] Bruce Bueno de Mesquita, James Morrow, Randall Siverson and Alastair Smith, *The Logic of Political Survival* (MIT Press, 2003); Chetan Ghate and Paul J. Zak, *Growth of Government and the Politics of Fiscal Policy*, 13 Structural Change and Economic Dynamics 435 (2002).

[15] We maximize capital growth rather than output growth because with a constant returns to scale production function they are proportional to each other. Since K is the state variable for this model, this reduces some of the derivations without affecting the results.

$$Max_{p,\sigma\lambda} \frac{K_{t+1}}{K_t} \tag{2}$$

s.t.

$$K_{t+1} = \beta[Y_t - \tau_t - \eta_t] + (1 - \delta)K_t$$

$$\eta_t = \eta(e(p_t), \Psi(\sigma_t), \lambda_t, Y_{t-1})$$

$$\tau_t = p_t + \sigma_t + \lambda_t$$

In this problem, policies are funded by a lump-sum tax τ_t, as shown in the government budget constraint which is the last equation in (2). The first constraint is the law of motion for the capital stock taking into account consumer optimization. Consumers in this model are Solovian and save proportion $\beta \in (0, 1]$ of their after-tax, after-transactions cost income which flows into the capital market to fund investment. Using standard stock accounting, investment is the change in the capital stock $I_t = K_{t+1} - (1 - \delta)K_t$, where $\delta \in [0, 1]$ is the rate of physical depreciation of capital. Lastly, note that for simplicity, there is no population growth in the model, and population size is normalized to unity.[16]

The optimal policies that solve (2) are

$$1 = -\eta_e(\cdot)e'(p_t) \tag{3}$$

$$1 = -\eta_\psi(\cdot)\Psi'(\sigma_t) \tag{4}$$

$$1 = -\eta_\lambda(\cdot). \tag{5}$$

The above equations implicitly define the optimal values for p_t (equation 3), σ_t (equation 4), and λ_t (equation 5). These conditions have a straightforward interpretation. They state that using the growth criterion in (2), the marginal cost of funding each policy (which is unity when policies are funded with a lump-sum tax) must equal, at an optimum, the marginal benefit with respect to growth from each policy due to a reduction in transactions costs η.

Equations (3)-(5) are useful for two reasons. First, they specify the way that government policy is expected to affect levels of trust in a society. This therefore circumscribes the causative chain that our empirics seek to quantify. Second, these conditions define a set of op-

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[16] This form of the policy-maker's decision problem follows Yi Feng, Jacek Kugler, and Paul J. Zak, *The Politics of Fertility and Economic Development*, 44(2) Int Stud Q, 667 (2000), and Ghate and Zak, 13 Structural Change and Economic Dynamics at 435 (cited in note 14).
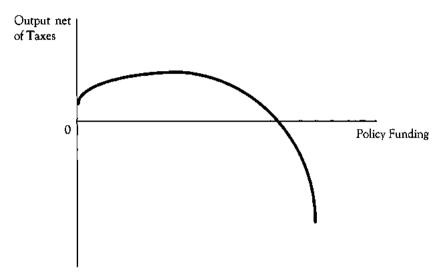
Figure 1.   Policy funding and output growth.

timality criteria vis-à-vis funding levels for various policies. As Figure 1 illustrates, policies can be over or under-funded with respect to the growth optimum (taking into account the economic drag from taxes). Thus, equations (3)-(5) not only tell us how policy impacts trust, but whether observed policies are being funded optimally.

III. EMPIRICAL TESTS OF THE MODEL

A. Formal Institutions

We first investigate whether trust can be enhanced by strengthening formal institutions that enforce contracts. Direct, objective measures of the effectiveness of formal institutions are unavailable. In our empirical tests, we therefore follow others in using subjective measures provided by private firms assessing political risks to foreign investors, and by surveys of investors.[17]

Three alternative dependent variables are used in tests reported in Table 1. The first is a Quality of Governance index constructed from indicators of bureaucratic quality, corruption in government, and the rule of law, provided by the International Country Risk Guide (ICRG).

[17] Stephan Knack and Philip Keefer, *Institutions and Economic Performance*, 7 Economics and Politics 207 (1995); Paolo Mauro, *Corruption and Growth*, 110 Q J of Econ 681 (1995).

Table 1.

Equation	1	2	3	4	5	6
Dependent var.	ICRG 1997	ICRG 1997	KKZ Graft 1998	KKZ Graft 1998	KKZ Rule of Law 1998	KKZ Rule of Law 1998
Constant	-2.158 (7.360)	-1.135 (3.229)	-4.455 (1.728)	-2.526 (0.853)	-3.597 (1.962)	-3.332 (0.914)
Log per capita income, 1995	1.144 (0.967)	1.199** (0.439)	0.453* (0.228)	0.230 (0.122)	0.369 (0.243)	0.341** (0.123)
Log of population, 1995	-0.023 (0.293)	-0.002 (0.191)	-0.071 (0.068)	-0.082 (0.047)	0.015 (0.057)	-0.011 (0.045)
Log of land area	-0.184 (0.187)	-0.210 (0.138)	-0.017 (0.048)	-0.039 (0.039)	-0.089* (0.036)	-0.063 (0.036)
Ex-British colony	0.934 (0.595)	0.732 (0.437)	0.227 (0.154)	0.204 (0.106)	0.277 (0.153)	0.200 (0.128)
Ethnic homogeneity	0.024 (0.019)	0.001 (0.011)	-0.002 (0.004)	.0005 (.0026)	0.005 (0.004)	0.002 (0.003)
Schooling, 1995	0.467* (0.235)	0.526** (0.128)	0.155** (0.055)	0.174** (0.035)	0.110* (0.053)	0.124** (0.035)
Public order & safety exp./GDP, 1990-95 mean	17.400 (35.857)		14.462 (12.480)		3.913 (10.567)	
N	51	85	53	90	53	90
R^2	.73	.76	.80	.76	.76	.72

Heteroskedastic-consistent standard errors in parentheses. A * (**) indicates significance at .05 (.01) level for 2-tailed tests.

Each of the three sub-indexes is scored from 0-6, so the overall index can range from 0-18, with higher values reflecting better governance.

Other governance indicators used in Table 1 are from Kaufmann et al.[18] These indexes of "Graft" and of the "Rule of Law" are constructed using principal components analyses of data from numerous sources, including the ICRG and other expert assessments and surveys of businesspersons. The indexes are standardized to have a mean of 0 and standard deviation of 1.

Policy-relevant determinants of the quality of governance in Table 1 include government spending on public order and safety, as a share of GDP, and educational attainment. Other independent variables are used as controls, including per capita income, population, land area, a dummy for former British colonies, and a measure of ethnic homogeneity.[19]

Equations 1, 3 and 5 in Table 1 investigate if spending on public order and safety is associated with improvements in the quality of governance. Of course, spending decisions are not likely to be entirely exogenous, and it is possible that higher spending is sometimes a response to violence, crime and disorder. For this reason, we add a term which measures the level of sociopolitical instability times spending on public order and safety.[20] With or without controlling for socio-political instability, the public order and safety variable is statistically insignificant (the former is not reported to save space). Though we cannot rule out the possibility that spending improves the enforcement of contracts, an examination of expenditure data does not support this.

Equations 2, 4 and 6 omit the spending variable, to test the impact of education using the largest possible sample size. Equation 2 shows that each 2-year increase in the mean number of years of schooling (for the 25-and-over population) is associated with an increase of about 1 point in the 18-point ICRG index. Equation 4 shows that an increase of just under 6 years in mean educational attainment is associated with a 1-standard deviation improvement in the Graft index. Equation 6 indicates that an increase of about 8 years is associated with a 1-standard deviation improvement in the Rule of Law index. These results show that one can build trust through policies that encourage educational attainment.

Among the controls in Table 1, higher incomes and a history of

[18] Dani Kaufmann, Aart Kraay, and Pablo Zoido-Lobaton, *Aggregating Governance Indicators*, (World Bank Policy Research Working Paper #2195, 2000).

[19] Michael J. Sullivan, *Measuring Global Values* (Greenwood Press, 1991).

[20] The socio-political instability variable is from Quan Vu Le, *Socio-Political Instability: Issues, Measures, and Explanations* (Working Paper, Claremont Graduate U, 1998).

British influence are conducive to more effective government, although these variables generally are not significant at conventional levels. There is weak evidence for diseconomies of scale in governance: population and land area generally have negative coefficients, but they are rarely significant. Ethnic homogeneity is unrelated to the quality of governance, a finding inconsistent with other research[21] Even when constitutions, laws and rules are similar across countries, levels of corruption and effectiveness of mechanisms for enforcing agreements are often dissimilar. One plausible explanation for these disparate results is differences in the ability of civil society to exercise accountability on governments. Civil liberties, including a free and independent media, can inhibit self-seeking or incompetent behavior by government officials.

Table 2 adds indicators of press freedoms and civil liberties to the quality-of-governance regressions. The press freedoms index ranges from a possible low value of 1 (indicating least freedoms) to a high of 100. The civil liberties index ranges from 1 (least liberty) to 7. Both variables are from Freedom House, and scales have been reversed from the original, so that higher values indicate greater freedom rather than less.

Press freedoms is a significant determinant of each of the three quality of governance indexes, as shown in equations 1, 4 and 6 of Table 2. A 40-point increase in the press freedoms index is associated with a 1-point rise in the ICRG index (equation 1). An 80-point increase in the press freedoms index is associated with a rise in the graft index of one-half of a standard deviation (equation 4), while a 50-point increase is associated with a one-half standard deviation rise in the rule of law index (equation 7).

Greater civil liberties are also associated with higher ratings on the governance indexes (equations 2, 5, and 7). However, for the ICRG index, a quadratic specification provides a better fit between civil liberties and governance (equation 3). From a value of about 4 on the civil liberties index, changes in either a positive or negative direction are associated with improvements in the ICRG index.

The relationship between civil liberties and the KKZ indexes is more closely linear. An increase of about 4 on the civil liberties scale is associated with an improvement in either the graft or rule of law index of about one-half of a standard deviation.

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[21] Mauro, 110 Q J of Econ at 681 (cited in note 17).

Table 2.

Dependent variable	ICRG quality of governance index 1997			KKZ graft index 1998		KKZ rule of law index 1998	
Equation	1	2	3	4	5	6	7
Constant	1.146 (3.423)	-1.735 (3.229)	3.579 (3.549)	-1.963 (0.894)	-1.981 (0.831)	-2.412 (0.974)	-2.755 (0.892)
Log per capita income 1995	1.109** (0.435)	1.214** (0.436)	0.998* (0.405)	0.206 (0.123)	0.240* (0.116)	0.293* (0.124)	0.344** (0.116)
Log of population 1995	0.079 (0.194)	0.074 (0.213)	0.247 (0.205)	-0.066 (0.468)	-0.041 (0.047)	0.021 (0.043)	0.040 (0.048)
Log of land area	-0.231 (0.140)	-0.228 (0.142)	-0.296* (0.135)	-0.042 (0.041)	-0.046 (0.041)	-0.055 (0.038)	-0.057 (0.037)
Ex-British colony	0.831 (0.447)	0.801 (0.448)	0.634 (0.429)	0.239* (0.107)	0.256* (0.102)	0.229 (0.124)	0.229 (0.124)
Ethnic homogeneity	-0.001 (0.011)	-0.001 (0.011)	-0.002 (0.011)	0.001 (0.003)	-0.001 (0.003)	0.001 (0.003)	0.001 (0.003)
Schooling 1995	0.443** (0.127)	0.451** (0.151)	0.354* (0.142)	0.155** (0.036)	0.131** (0.036)	0.091** (0.034)	0.075* (0.036)
Press freedoms 1999	-0.025* (0.012)			-0.006** (0.003)		-0.010** (0.004)	
Civil liberties 1995		0.201 (0.211)	-1.676* (0.763)		-0.116** (0.044)		-0.130** (0.051)
Civil liberties squared			0.240** (0.089)				
N		85		90			93
R^2	.77	.76	.79	.77	.78	.74	.73

Heteroskedastic-consistent standard errors in parentheses. A * (**) indicates significance at .05 (.01) level for 2-tailed tests.

Table 3.   Education and Inequality

Equation	1	2
Constant	56.699	60.456
	(3.589)	(3.309)
Log per capita income	−4.644*	−4.344*
	(1.863)	(1.970)
Labor force in agriculture (percent)	−0.137*	−0.184**
	(0.054)	(0.045)
Schooling attainment	−0.991	−0.766
	(0.602)	(0.699)
Social security and welfare spending		−0.653**
		(0.209)
N	84	57
R²	.32	.55

Dependent variable is Gini, income inequality (1985-95 mean). Heteroskedastic-consistent standard errors in parentheses. A * (**) indicates significance at .05 (.01) level for 2-tailed tests.

B. Inequality

Policies to reduce income inequality are a second possible way to increase trust. Two ways to reduce income inequality are to provide universal primary and secondary education, and to transfer resources from the rich to the poor. Table 3 presents some evidence on these implications of the model.

The dependent variable in Table 3 is the Gini coefficient for income inequality, averaging all available observations on Gini over the 1985-95 period to smooth out short-term fluctuations. Control variables include per capita income and the share of the labor force in agriculture. The "Kuznets curve" literature suggests that these relationships may be nonlinear; however, linear specifications turn out to provide a much better fit.

Higher average schooling attainment is associated with lower income inequality (equation 1), but the relationship is significant at only the 10% level (2-tailed test). The coefficient on schooling indicates that each additional year of school reduces the Gini value by 1 point. Higher average attainment could be produced in part, however, by high levels of tertiary schooling for elites. We therefore added a measure of inequality in educational attainment, which turned out to be insignificant (and is not reported to save space).

Equation 2 adds a measure of transfers, namely spending on social

security and welfare as a share of GDP. The data are averaged over 1985-1995, measured as a percentage of GDP.[22] This variable is highly significant: higher spending on transfers is associated with lower income inequality. The estimated coefficient on transfers indicates that Gini drops by 1 point for each increase of about 1.5 percentage points in the transfers-to-GDP ratio. Though this exercise ignores potential endogeneity, and the history of inequality that could affect the incentives of governments and voters to favor income transfers, the results do suggest that income redistribution is a viable instrument to reduce inequality and raise trust.

C. Social Distance

In the Zak & Knack model, trust increases as "effective social distance" declines, i.e. as types become more similar, or cooperative norms extend to a wider radius of contacts, encompassing members of other ethnic groups or social classes. Effective social distance may decline with improvements in communications and transportation infrastructure that permit more frequent contact across groups producing a homogenizing effect. In the absence of any quantifiable measure of effective social distance, we directly analyze the impact of communications and transportation infrastructure on trust.

In Table 4, the dependent variable is the percentage of a country's respondents in the World Value Surveys who agree that "most people can be trusted." Control variables include per capita income, schooling attainment, and population density. Equation 1 adds two telecommunications variables: telephone mainlines per 1000 population, and number of mobile phones per 1000 population.[23] Both variables are statistically significant. An increase of about 200 mainlines per 1000 people, or about 100 mobile phones per 1000 people, is associated with a 1 percentage-point increase in trust.

Equation 2 adds a measure of transportation infrastructure: the percentage of a country's roads that are paved.[24] This variable is significant, with each 4 percentage-point increase in paved roads associated with a rise in trust of more than 1 percentage point.

Equation 3 includes both the transportation and communications variables. Results for the telephone variables differ from those in equation 1 not only because of the effects of paved roads, but also because the sample is three countries smaller than in equation 1, due to missing data on paved roads for those countries. The coefficients

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[22] The transfer data are from International Monetary Fund, *Government Finance Statistics*, various years.

[23] World Bank, *World Development Indicators* (1999).

[24] Ibid.

Table 4. Communications, Freedoms, and Trust

Equation	1	2	3	4	5
Constant	69.346	33.069	108.418	−1.438	−0.001
	(39.346)	(44.137)	(35.770)	(37.615)	(45.667)
Log per capita income	−7.837	−3.394	−12.173	−2.339	−1.557
	(4.916)	(5.699)	(4.457)	(5.026)	(6.599)
Schooling	0.766	2.653*	0.614	2.077	2.329
	(1.043)	(1.294)	(0.911)	(1.342)	(1.361)
Population density	1.225	−1.797	−0.845	1.086	0.732
	(0.984)	(1.924)	(1.203)	(1.124)	(1.158)
Telephone mainlines	0.054*		0.064**		
	(0.025)		(0.022)		
Mobile phones	0.102*		0.065		
	(0.044)		(0.041)		
Paved roads		0.269*	0.182*		
		(0.112)	(0.079)		
Civil liberties				5.710*	
				(2.807)	
Press freedoms					0.320
					(0.213)
N	39	36	36	39	39
R²	.72	.60	.81	.52	.50

Dependent variable is trust. Heteroskedastic-consistent standard errors in parentheses. A * (**) indicates significance at .05 (.01) level for 2-tailed tests. Civil liberties ranges from 1 (most free) to 7 (least free).

for mobile phones falls somewhat relative to equation 1, while that for mainlines rises slightly. The coefficients for the effect of fixed and mobile phones on trust for this specification are nearly identical, consistent with the intuition that telephone service, whatever the manner of delivery, has a similar impact on one's ability to communicate. The coefficient for paved roads is somewhat smaller in equation 3 than in equation 2, although it remains statistically significant.

In addition to its effects on trust via strengthening formal institutions, civil liberties may increase trust by facilitating communication across ethnic groups and social classes. Accordingly, equation 4 of Table 4 adds the civil liberties index to the trust regression. This coefficient should capture both the indirect impact on trust through formal institutions (which are not included in the regression), and

any effects via reductions in effective social distance. Each 1-point improvement in the 1-7 civil liberties index is associated with an increase in trust of nearly 6 percentage points. Similarly, press freedoms is added to the trust regression in equation 5. This variable is not significant at conventional levels, though the point estimate suggests that a 3-point increase in the 100-point press freedom index is associated with a 1 percentage-point rise in trust.

D. Policy Optimality

The empirical results show that there is a set of policies that influence trust levels. These include strengthening formal institutions by raising years in school, expanding civil liberties, and increasing press freedoms. Income inequality can be reduced by increased education and redistributive transfers, while trust can be directly raised through communication by increasing the number of land-based phones, mobile phones, paved roads, and through greater civil liberties. Our final task asks if any of these have a sufficiently powerful impact on trust relative to their cost to be considered a viable development policy.

Three policy variables that we show raise trust can be, or must be, left out of this analysis. First, building paved roads is ignored as a way to facilitate trust due to its prohibitive cost. Archondo-Callao reports that it costs $250,000 per kilometer to build a paved road in a developing country.[25] Given this cost, we can immediately dismiss paved roads as a cost-effective way to build trust. Second, freedoms cannot be included in the analysis as there is no straightforward way to evaluate the costs of raising civil liberties or press freedoms. Substantial evidence indicates that freedoms follow from income growth , and we know that higher incomes raise trust,[26] but there is no way to evaluate the economic efficiency of freedoms as a trust-based development policy without directly measuring costs.[27] Alternatively, because income growth raises trust, continual growth sustains a virtuous circle in which trust rises "for free."

This leaves us with four policy variables for which costs and benefits can be calculated: education, transfers, land phones and mobile

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[25] Rodrigo Archondo-Callao, *Road Works Costs Per Kilometer* (World Bank Working paper, 2000).

[26] Zak and Knack, 111 The Econ. J. at 295 (cited in note 1).

[27] Paul J. Zak and Feng, Yi, *A Dynamic Theory of the Transition to Democracy* J of Econ Beh and Org (publication forthcoming); Yi Feng, and Paul J. Zak, *The Determinants of Democratic Transitions*, 43(2) J of Conflict Res 162 (1999); Ross Burkhart, and Michael Lewis-Beck, *Comparative Democracy: The Economic Development Thesis* 88 Am Pol Sci Rev 903 (1994).

Table 5. Policy Efficiency

Policy	Cost Per Capita	Income Gain Per Capita	Efficient?
Education	$463	$2,711	YES
Mobile phones	$463,000*	$90,090	NO
Land Phones	$463,000*	$48,649	NO
Transfers	$286	$445	YES
Freedoms	????	$5,135	YES

*Phone costs and income gains are per 1,000 people.

phones. Recall that the optimality criterion compares marginal values, i.e. how much additional funding on a policy raises trust which then raises incomes. Table 5 shows these calculations.

Consider first the effect of an extra year of schooling. The table reports the cost of a year of education per capita by using the average number of years that students in remain in school ("school life expectancy") similar to Hanushek & Kimko.[28] The education data come from UNESCO and the World Bank.[29] The average for the countries in the sample is $463 per capita to add one year additional year of education for the school-aged population (the standard deviation is $375). Note that the average years of education when our sample begins in 1970 is 5.4 years (standard deviation 2.6). Our empirics show that education affects trust in three ways: by raising institutional quality (Table 1), by reducing inequality (Table 3), and directly raising interpersonal trust (Table 4). The increase in trust of an extra year of education from all three effects is 3 percentage points. Zak & Knack (Table 1) show that the effect on annual per capita income growth from a change in trust is 0.063. As a result, an extra year of education would increase annual per capita income growth rate by nearly 0.20. Such a policy change would result in the average citizen in our sample having higher income of over $2,700 per year for every year thereafter (based on an average per capita income in 1995 for countries in our sample of $14,300). Increased education clearly has a positive economic payoff, as it strengthens government institutions and reduces inequality, both of which raise trust, as well as by raising trust directly.

The next row in Table 5 applies a similar calculation for the effect of phones on trust and income. The data for telephone costs uses the

[28] Eric A. Hanushek, and Dennis D. Kimko, *Schooling, Labor-Force Quality, and the Growth of Nations* 90(5)Am Econ Rev 1184 (2000).

[29] School life expectancy data: UNESCO, *School Life Expectancy*, at www.unesco.org; per pupil educational spending. World Bank (cited in note 23).

average annual spending by residential users on phone service.[30] The average individual in the sample spends $463 per year on telephone usage (standard deviation $153), so the cost of an additional 1,000 people using phones is $463,000 annually (data on infrastructure costs for phone lines was unavailable). Using the estimated coefficients for the effect of phone usage on trust in Table 4, 1,000 additional land-based (mobile) phones would raise income per 1,000 people $49,000 ($90,000). Clearly, this fails the efficiency criterion.

Lastly, we calculate the effect of using transfers to reduce income inequality.[31] Zak & Knack show that a one point increase in Gini reduces trust by 0.76.[32] Using the estimated coefficient of transfers on inequality in Table 3, we show that an additional dollar of transfers raises trust by one-half percentage point. This increases annual per capita income by $445. Even though the cost to redistribute one dollar is high (Stuart reports that it costs roughly one dollar to transfer one dollar in the US), our analysis shows that this policy is an efficient way to raise trust even using the Stuart estimate of costs.[33] Indeed, this result obtains because inequality so strongly affects trust. One caveat, though, is that this analysis may not take into account all the economic disincentives induced by income transfers. The efficacy of raising trust with redistributive transfers suggests a further explanation for the extraordinarily high degree of trust in the Scandinavian countries.

IV.   CONCLUSION

We set out in this paper to ask how amenable trust levels are to policy intervention. Our analysis shows that trust can be raised directly by increasing communication and education, and indirectly by strengthening formal institutions that enforce contracts and by reducing income inequality. Among the policies that impact these factors, only education, redistributive transfers, and perhaps freedom satisfy the efficiency criterion which compares the cost of policies with the benefits citizens receive in terms of higher living standards. Further, our analysis suggests that good policy initiates a virtuous circle: policies that raise trust efficiently, improve living standards, raise civil liberties, enhance institutions, and reduce corruption, further raising trust. Trust, democracy, and the rule of law are thus the foundation of abiding prosperity.

[30] OECD, *OECD Telecommunications Database* (1996).
[31] World Bank (cited in note 23)
[32] Zak and Knack, 111 The Econ. J. at 295 (cited in note 1).
[33] Charles Stuart, *Welfare costs of per dollar of additional tax revenue in the United States*, 74(3) Am Econ Rev 352 (1984).