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ABSTRACT

Several authors suggest that trust is an important determinant of cooperation between strangers in a society, and therefore of performance of social institutions. We argue that trust should be particularly important for the performance of large organizations. In a cross-section of countries, evidence on government performance, participation in civic and professional societies, importance of large firms, and the performance of social institutions more generally supports this hypothesis. Moreover, trust is lower in countries with dominant hierarchical religions, which may have deterred "horizontal networks of cooperation" between people. In sum, theories of trust hold up remarkably well on a cross-section of countries.

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Several recent studies, including Diego Gambetta (ed., 1988), James Coleman (1990), Robert Putnam (1993), and Francis Fukuyama (1995) argue that trust or social capital determines the performance of a society's institutions. These studies view trust or social capital as a propensity of people in a society to cooperate to produce socially efficient outcomes and to avoid inefficient non-cooperative traps such as that in the prisoners' dilemma. Putnam (1993), for example, examines social capital as a determinant of the performance of local governments across Italian regions. He demonstrates that the Italian regions in which the public actively participates in civic activities (viewed as manifestations of a high tendency to cooperate) are also the regions in which local governments exhibit higher objective measures of performance, such as the delivery of public goods. Fukuyama (1995) argues further that high trust among citizens accounts for the superior performance of all institutions in a society, including firms.

In this paper, we overview the existing theory of trust, develop some of its implications, and test them on a cross-section of countries. We find a striking confirmation of the theory in the data. We also ask: what are the forces that encourage the formation of trust? According to Putnam (1993), hierarchical religion discourages "horizontal" ties between people and hence the formation of trust. Indeed, we find a strong negative association between trust and the dominance of a strong hierarchical religion in a country, most notably Catholicism.

1. Argument.

Economists have developed two views of trust as a tendency to cooperate. One view, rooted in repeated game theory, holds that trust is a prior that an opponent is cooperative rather than fully rational, e.g., plays only tit-for-tat in a repeated prisoners' dilemma. A higher prior in

a repeated prisoners' dilemma leads to a greater likelihood and duration of cooperation (David Kreps, Paul Milgrom, John Roberts, and Robert Wilson 1982). Another view, rooted in economic experiments, holds that people cooperate even in one shot encounters, such as the dictator game or the ultimatum game (Colin Camerer and Richard Thaler 1995). These experiments suggest that people expect certain fair or cooperative behavior of their opponents even when they do not expect to see them again. Both of these views suggest that higher trust between people in a population should be associated with greater cooperation.

These views of trust share an important implication, namely that trust should be more essential for ensuring cooperation between strangers, or people who encounter each other infrequently, than for supporting cooperation of people who interact frequently and repeatedly. In the latter situations, such as families or partnerships, reputations and ample opportunities for future punishment would support cooperation even with low levels of trust. This implies that trust is most needed to support cooperation in *large organizations,* where members interact with each other only infrequently because they are only rarely involved in joint production. Take, for example, administrative interactions between members of different departments in a university, or interagency task forces in the government. Here cooperation is less sustainable without trust because interactions are too few to allow reputations to develop.

One such large organization is the government, where bureaucrats must cooperate with a large number of other bureaucrats they encounter only infrequently, as well as with private citizens they may never see again, to produce "public goods." Significant trust is then needed to ensure cooperation. Local governments in Italy might perform better in high trust regions because trust enables individual bureaucrats to cooperate better with each other and with private citizens, making government more effective.

Civil groups or associations, where participation is largely voluntary and success depends on many people cooperating, may also rely on trust to succeed. Putnam actually *measures* social capital by participation in civic groups and associations, even though participation must itself be a consequence of some underlying beliefs about the behavior of other people in the society.

Finally, corporations are also large organizations that would benefit from trust among their employees. Fukuyama (1995) stresses the need of cooperation between strangers for the success of large firms, and the dependence of such cooperation on trust. He contrasts large public firms in high trust countries to smaller family firms that prevail in low trust societies.

2. Evidence.

We test the hypotheses developed above on a cross-section of countries. We are interested in the effect of trust on the performance of large organizations, measured here by government effectiveness, participation in civic organizations, size of the largest firms relative to GNP, and the performance of a society more generally. Our measure of trust comes from the World Values Survey, which in the early 1980s and again in the early 1990s surveyed 1000 randomly selected people in each of 40 countries. One of the questions was: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" The percentage of people answering yes is our measure of trust in a country (see also Stephen Knack and Philip Keefer 1996). The correlation across countries between trust in the 1980s and in the 1990s is .91, so we use the later, more complete, data. The highest trust countries are in Scandinavia, where almost two thirds of the respondents believe that strangers can be trusted; many of the lowest trust countries are in Latin America.

We only briefly summarize our variables, they are described in detail in Table 1. For

government effectiveness, we use (subjective, from investor surveys) estimates of the efficiency of the judicial system, corruption, bureaucratic quality, and tax compliance (a proxy for effectiveness of the tax authorities). For civic participation, we use the extent of participation in civic activities and in professional associations. To measure the relative success of large firms, we use total sales of the largest 20 (by sales) publicly-traded firms in a country relative to its GNP. Finally, some of our measures of social success proxy for the effectiveness of government only; others reflect the success of other institutions in the society as well. We look at education (high school graduates relative to the relevant population and educational adequacy estimated by a business group), health (logarithm of infant mortality rate), infrastructure (an estimate of its quality by one business group and an estimate of its adequacy by another), and finally two general measures of social success: per capita GDP growth between 1970 and 1993 and (the logarithm of) inflation over the same period. Our goal is to establish the robustness of the results through the use of multiple variables and data sources; we have looked at many other variables as well with similar results.

Table 2 presents the regressions of our measures of performance of large organizations on trust, controlling for the log of 1994 per capita GNP. In most regressions, we have fewer than 40 observations because we do not have dependent variables for socialist countries. Controlling for per capita GNP cuts the effect of trust, since trust is higher in richer countries. This may cause the effect of trust to be underestimated if trust is an input into producing higher wealth. In other (unreported) specifications, we also control for inequality without much effect. We interpret the coefficients using a one standard deviation change in trust, about 15 percentage points.

The effects of trust on performance are both statistically significant and quantitatively large. Holding per capita GNP constant, a standard deviation increase in trust raises judicial

efficiency by .7, the anticorruption score by .3, bureaucratic quality by .3, and tax compliance by .3 of a standard deviation. Putnam's results for Italy appear to be confirmed worldwide. Furthermore, a standard deviation increase in trust raises participation in civic activities by .7 and participation in professional associations by 1 standard deviation. The effect of trust on the large firms' share of the economy is also large: a one standard deviation increase in trust raises that share by 7 percentage points, or half of a standard deviation. These results support Fukuyama's argument that trust facilitates all large scale activities, not just the government.

Indeed, Fukuyama goes further and argues that, for firms in particular, trust replaces another mechanism of cooperation, which is the family. He believes that family strength is detrimental to growth of firms. We can actually test this hypothesis since the World Values Survey asks respondents if they trust their families. When we run the relative share of the top 20 firms on both a measure of trust in strangers and a measure of trust in family, the coefficient on trust in people is .654 (t = 4.1) and the coefficient on trust in family is -.563 (t= -3.1). Consistent with Fukuyama's argument, strong family ties are bad for the development of large firms.

The last panel of Table 2 presents the results for social outcomes. Trust has a relatively small but significant effect on infrastructure quality and adequacy, a significant effect on infant mortality, and a larger effect on the measures of educational achievement. A one standard deviation increase in trust raises the share of high school graduates by half of a standard deviation, and school adequacy by a third of a standard deviation. Trust is also associated with lower inflation and weakly with a higher per capita GNP growth (about .3 percent per annum per standard deviation increase in trust). The results for growth were also obtained by Knack and Keefer (1996). In sum, trust enhances economic performance across countries.

3. Where does trust come from?

Trust may not be truly exogenous, and may increase with good past performance of a society's institutions. According to Putnam (1993), trust is a habit formed during a centuries-long history of "horizontal networks of association" between people, covering both commercial and civic activities. Putnam argues that the independent city states of Northern Italy have encouraged the formation of such horizontal networks, in contrast to the more authoritarian political regimes of the South. Can we measure something even more basic than trust?

Putnam (1993) argues that the Catholic Church, by imposing a hierarchical structure of the society, often in symbiosis with the state, has discouraged the formation of trust: "Vertical bonds of authority are more characteristic of the Italian Church than horizontal bonds of fellowship" (p. 107). His argument would more generally apply to any dominant organized hierarchical religion in a country, and hence can be tested empirically across countries.

Specifically, for every country, we consider the percentage of the population belonging to a hierarchical religion, defined as Catholic, Moslem, or Orthodox. The mean of this variable in the sample is 55 percent and its correlation with trust is a remarkable -.61 (see Figure 1). This correlation, and all of the following results, is driven mostly by the correlation of -.47 between percent Catholic and trust, although predominantly Moslem and Orthodox countries have very low trust as well. In Table 3, we use this hierarchical religion variable as an explanator of organizational performance. Holding per capita income constant, countries with more dominant hierarchical religions have less efficient judiciary, greater corruption, lower quality of the bureaucracy, higher tax evasion, lower participation in civic activities and professional associations, less important large firms, inferior infrastructure, and higher inflation. The results for infant mortality, educational achievement and growth are less clear-cut. Still, the evidence

that hierarchical religions are bad for the performance of large organizations is strong. We have also run two-stage specifications, in which hierarchical religion is used as an instrument for trust. The results are similar to those in Table 2 in both magnitude and statistical significance.

This evidence suggests that hierarchical religion and distrust may both reflect some underlying basic "factor" in a society that is detrimental to the performance of large organizations. This factor may reflect dysfunctional institutions in a society, but if so, this to a large extent is a long-term disfunctionality associated in part with a hierarchical religion, and not just with recent events. Interestingly, this factor does not reflect the ethnic heterogeneity in a society which might be viewed as a source of distrust: the correlation between trust and a standard measure of ethnolinguistic heterogeneity is only -.12, and the inclusion of that measure in the regressions in Table 2 does not change the importance of trust.

4. Conclusion.

Trust promotes cooperation, which is most important for large organizations. Data on government performance, participation in civic and professional societies, importance of large firms, and overall performance of different societies support this hypothesis. Lastly, trust is lower in countries with dominant hierarchical religions, which may have deterred the formation of "horizontal networks of cooperation" between people. Despite economists' skepticism (Robert Solow 1995), theories of trust hold up remarkably well when tested on a cross-section of countries.

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Figure 1: Trust in People and Hierarchical Religion

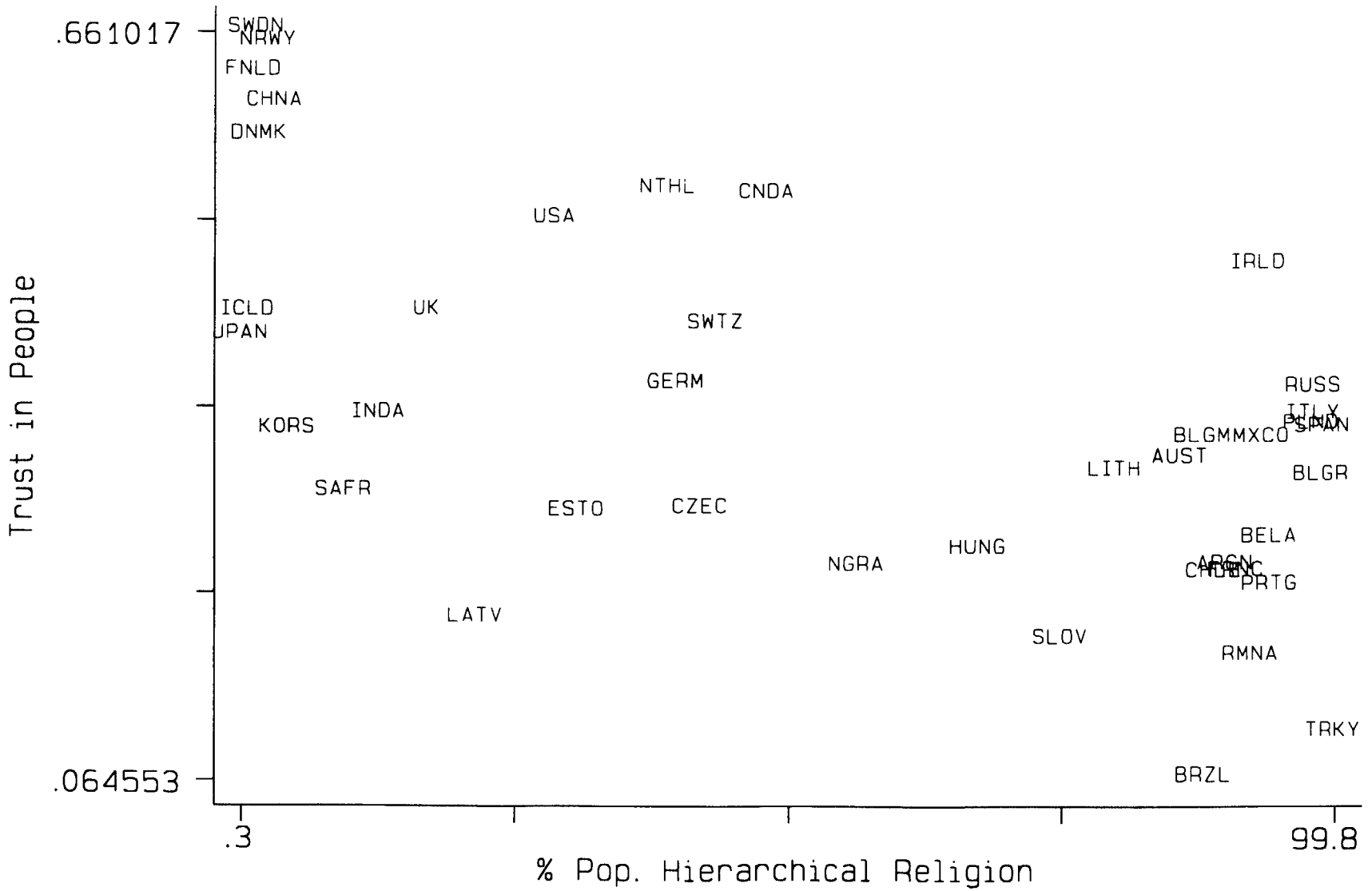

Table 1: Description of the Variables Used in Tables 2 and 3

Trust in People	Percentage of respondents 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 in dealing with people?" Source: *World Values Survey 1990-93 (WVS).*
Efficiency of the Judiciary	Assessment of the "efficiency and integrity of the legal environment as it affects business, particularly foreign firms". Average between 1980-1983. Scale from 0 to 10, with lower scores indicating lower efficiency levels. Source: *Business International Corporation.*
Corruption	Low ratings if "high government officials are likely to demand special payments and illegal payments are generally expected throughout lower levels of government in the form of bribes connected with import and export licenses, exchange controls, tax assessment, policy protection, or loans". Scale from 0 to 10. Average of the months of April and October of the monthly index between 1982 and 1995. Source: *International Country Risk Guide (ICRG).*
Bureaucratic Quality	High scores indicate "autonomy from political pressure" and "strength and expertise to govern without drastic changes in policy or interruptions in government services". Scale from 0 to 10, with higher scores for greater efficiency. Average of the months of April and October of the monthly index between 1982 and 1995. Source: *ICRG.*
Tax Compliance	Assessment of the level of tax compliance. Scale from 0 to 6, where higher scores indicate higher compliance. Source: *The Global Competitiveness Report 1996, (GCR).*
Civic Participation	Percentage of civic activities in which an average individual participates. The activities included are: (1) social welfare services for elderly and deprived, (2) education, art, and cultural activities, (3) local community affairs, (4) conservation, environment, ecology, (5) work with youth, (6) sports or recreation and (7) voluntary associations for health. Source: *WVS.*
Participation in Prof. Assoc.	Percentage of respondents who answered positively when asked if they belonged to professional associations. Source: *WVS.*
Sales' Top 20 / GNP	The ratio of sales generated by the top twenty publicly traded firms to GNP for 1994. Firms within a country are ranked by sales. Source: *WorldScope Database.*
Infrastructure Quality	Assessment of the "facilities for and ease of communication between headquarters and the operation, and within the country," as well as the quality of the transportation. Average data for the years 1972 through 1995. Scale from 0 to 10 with higher scores for superior quality. Source: *Business Environmental Risk Intelligence.*
Adequacy of Infrastructure	Average of five scores measuring the extent to which a country's infrastructure meets business needs in each of the following areas: (1) roads; (2) air transport; (3) ports; (4) telecommunications; and (5) power supply. Scale from 0 to 6, where higher scores are for a superior infrastructure. Source: *GCR.*
Log Infant Mortality	Logarithm of the number of deaths of infants under one year per one thousand live births for 1993 or the most recent available. Source: *Health-For-All Global Indicators Database 1994.*
Completed High School	Percentage of the 1985 male population aged twenty five and over that has completed higher school. Source: *Barro-Lee Database.*
Adequacy of Educational System	Assessment of the extent to which the educational system meets the needs of a competitive economy. Score from 0 to 6, where higher scores are for a superior educational system. Source: *GCR.*
Log Inflation	Logarithm of the geometric average annual growth rate of the implicit price deflator for the time period 1970-1993. Source: *World Development Report 1995, (WDR95).*
GDP growth	Average annual growth in per capita GDP for the period 1970-1993. Source: *WDR95.*
Log GNP per capita	Logarithm of the Gross National Product per capita expressed in dollars of 1994 unless otherwise noted. Source: Source: *World Development Report 1996.*
Trust in Family	Rating based on respondents answers to how much they trust their families. Scale from 0 to 4. The highest (lowest) rating is awarded when respondents manifest that they trust (distrust) their families. Source: *WVS.*
Hierarchical Religion	Percentage of the population of each country that are either Roman Catholic, Orthodox or Muslim. Source: *Worldmark Encyclopedia of the Nations 1995, Statistical Abstract of the World 1994.*
Ethnolinguistic Fractionalization	Probability that two randomly selected persons from a given country will not belong to the same ethnolinguistic group in 1960. Source: *World Handbook of Political and Social Indicators (1972).*

Table 2: Trust in People and Performance

Ordinary least square regressions of the cross-section of 40 countries. There are fourteen dependent variables classified in four different groups including: (1) Government Efficiency; (2) Participation; (3) Large Organizations; (4) Social. Coefficients are shown and White (1980) corrected standard errors are given in parentheses underneath.

	Independent Variables			
Dependent Variables	Log GNP per Capita	Trust in People	Intercept	Adj R^2/ Observ.
1. Government Efficiency				
Efficiency of the Judiciary	0.2959 (0.2213)	8.2093 [a] (1.3652)	2.2769 (1.7766)	0.6343 27
Corruption	0.9214 [a] (0.1022)	4.8068 [a] (0.7509)	-2.3608 [a] (0.9050)	0.7316 33
Bureaucratic Quality	1.1596 [a] (0.1927)	3.9797 [a] (1.3544)	-4.0842 [b] (1.6763)	0.6806 33
Tax Compliance	0.3595 [a] (0.0913)	1.7330 [a] (0.5840)	-0.9124 (0.7873)	0.3540 32
2. Participation				
Civic Participation	0.0127 [a] (0.0038)	0.1224 [a] (0.0329)	-0.0921 [a] (0.0308)	0.4614 33
Participation in Prof. Assoc.	-0.0072 (0.0099)	0.3056 [a] (0.0669)	0.0330 (0.0730)	0.5492 33
3.Large Organizations				
Sales' Top 20 / GNP	0.0103 (0.0325)	0.4927 [a] (0.1657)	-0.0374 (0.2798)	0.2433 26
4.Social Efficiency				
Infrastructure Quality	1.0269 [a] (0.1413)	2.3261 [a] (0.7970)	-3.7162 [a] (1.2331)	0.6783 33
Adequacy of Infrastructure	0.5943 [a] (0.0604)	1.2511 [a] (0.4200)	-1.6559 [a] (0.5837)	0.7222 32
Log Infant Mortality Rate	-0.4598 [a] (0.0484)	-1.0283 [b] (0.5176)	6.9682 [a] (0.4495)	0.7141 40
Completed High School	1.2884 [a] (0.4416)	10.9714 [a] (3.4633)	-7.4405 [b] (3.5336)	0.3474 29
Adequacy of Educational System	0.2200 [a] (0.0858)	1.2334 [b] (0.6771)	0.8525 (0.7736)	0.2107 32
Log Inflation [d]	0.0371 (0.0787)	-3.4128 [a] (1.1502)	3.1306 [a] (0.6494)	0.2059 37
GDP Growth [d]	-0.2738 [c] (0.1548)	2.0266 [c] (1.2152)	3.5847 [a] (1.3625)	0.0072 39

a=Significant at 1% level; b=Significant at 5% level; c=Significant at 10% level.
d=Log of GNP per capita is measured in 1970.

Table 3: Religion and Performance

There are fourteen dependent variables classified in four different groups including: (1) Government Efficiency; (2) Participation; (3) Large Organizations; (4) Social. We report coefficients for heteroskedasticity corrected OLS (White (1980)). Standard errors are shown underneath in parenthesis.

	Independent Variables			
Dependent Variables	Log GNP per Capita	Hierarchical Religion	Intercept	Adj R^2/ Observ.
1. Government Efficiency				
Efficiency of the Judiciary	0.7420 [a] (0.2357)	-0.0233 [a] (0.0067)	2.4936 (2.4613)	0.5245 27
Corruption	1.0740 [a] (0.1171)	-0.0148 [a] (0.0051)	-1.1331 (1.2028)	0.7025 33
Bureaucratic Quality	1.2376 [a] (0.1493)	-0.0214 [a] (0.0054)	-2.1445 (1.5465)	0.7583 33
Tax Compliance	0.3985 [a] (0.0767)	-0.0088 [a] (0.0029)	-0.1415 (0.6727)	0.4335 32
2. Participation				
Civic Participation	0.0164 [a] (0.0035)	-0.0003 [a] (0.0001)	-0.0589 [b] (0.0274)	0.4106 33
Participation in Prof. Assoc.	0.0002 (0.0105)	-0.0010 [a] (0.0002)	0.1393 (0.1104)	0.5256 33
3.Large Organizations				
Sales' Top 20 / GNP	0.0370 (0.0263)	-0.0020 [a] (0.0006)	0.0077 (0.2668)	0.3387 26
4.Social Efficiency				
Infrastructure Quality	1.0725 [a] (0.0955)	-0.0172 [a] (0.0039)	-2.3035 [b] (0.8967)	0.7835 33
Adequacy of Infrastructure	0.6252 [a] (0.0550)	-0.0057 [b] (0.0021)	-1.1572 [b] (0.5270)	0.7480 32
Log Infant Mortality Rate	-0.5044 [a] (0.0473)	0.0016 (0.0018)	6.9040 [a] (0.4794)	0.6919 40
Completed High School	1.7590 [a] (0.4573)	-0.0409 [a] (0.0142)	-5.4915 (4.3376)	0.3814 29
Adequacy of Educational System	0.2680 [a] (0.0820)	-0.0016 (0.0028)	0.9735 (0.7854)	0.1597 32
Log Inflation [d]	-0.0915 (0.0784)	0.0087 [b] (0.0035)	2.5343 [a] (0.7381)	0.0991 37
GDP Growth [d]	-0.1944 (0.1622)	-0.0030 (0.0069)	3.8230 [b] (1.6884)	-0.0206 39

a=Significant at 1% level; b=Significant at 5% level; c=Significant at 10% level.
d=Log of GNP per capita is measured in 1970.