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Cross-country evidence

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W-446

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February
2008

HELSINGIN KAUPPAKORKEAKOULU
HELSINKI SCHOOL OF ECONOMICS
WORKING PAPERS
W-446

HELSINGIN KAUPPAKORKEAKOULU
HELSINKI SCHOOL OF ECONOMICS
PL 1210
FI-00101 HELSINKI
FINLAND

ISSN 1235-5674
(Electronic working paper)
ISBN 978-952-488-221-7

Helsinki School of Economics -
HSE Print 2008

Trust, inequality and the size of co-operative sector: cross-country evidence

by

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January, 2008

Abstract

We provide the first, albeit preliminary, empirical evidence on the determinants of differences in the size of the cooperative sector around the world. Our key data have been recently released by the ICA and are integrated with other standard sources, such as data from the World Values surveys. In our empirical work we concentrate on the links between inequality and trust and cooperative incidence and undertake selectivity correction estimates as well as a series of robustness checks. Consistent with theory we find strong support for the proposition that trust plays a causal role in accounting for differences in co-operative incidence. Also consistent with theory, we find support (albeit much weaker) for the role of inequality. Further support for our findings flows from our estimates for conventional, listed firms, where we do not find that trust and inequality play similar roles in accounting for the variation in the incidence of large listed firms across countries.

JEL Classification Numbers: P51; P13; O57

Keywords: comparative organization; co-operatives; trust; inequality

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1 Introduction

In an influential paper, Ben-Ner, Montias and Neuberger (1993) argue that explaining the cross-national variance in organizational structures is one of the key questions in comparative economics. They also noted that empirical research on the subject was quite limited. Subsequently, however, in part because of the availability of new data sets, a growing body of work that examines the determinants of ownership has appeared. One approach is to use data for a single country where the focus is usually on the stability of different ownership forms in transition economies (e.g. Jones and Mygind, 2002; Jones, Kalmi and Mygind, 2005). But the bulk of the new empirical work uses cross national data (e.g. LaPorta et al. 1998; Claessens, Djankov and Long 2000; Mueller and Philippon 2006; Estrin et al., forthcoming). Yet from a comparative economics system perspective, this cross national work is limited since it has been concentrated only on publicly traded firms. As such, this definition excludes economic activities that take place in non-listed firms, a sector that is often sizable.[1] Recognizing that from a comparative economics perspective, it would be interesting to know more about the cross national distribution of a broader array of ownership types, in this paper we provide the first empirical findings on the forces affecting the cross national distribution of one important and largely neglected organizational form, namely co-operatives.

Our focus is on all forms of cooperatives, a purview that is considerably broader than the bulk of the published work in comparative economics that has tended to be restricted to worked-owned co-operatives (e.g. Estrin, Jones and Svejnar 1987; Bonin, Jones and Putterman 1993; Dow 2003). Our definition of co-operatives includes enterprises that share the following characteristics: 1) Ownership is not determined solely by investment in shares, but the owners have another transaction relationship with the enterprise (as employees, suppliers, or customers); 2) Voting rights are not divided in relation to capital but equally between members. Empirically, the most important forms of co-operatives, both in the US and elsewhere, appear to be co-operatives in

[1] For example see Financial Times (2006) where non-listed firms including cooperatives figure prominently in their list of the Global 100 unlisted firms

the agricultural sector (mainly in food production), in banking and finance (in the form of credit unions and co-operative banks), in insurance (either mutual or co-operative form), and in retailing, where co-operatives are either retailer- or consumer-owned (the latter is fairly uncommon in the US but is very popular in some European countries).[2] Co-operatives are economically significant actors all around the globe, and the combined membership in co-operatives, according to the International Co-operative Alliance, is more than 800 million people.[3] Moreover some co-operative forms, including coop banks, have been found to be of growing importance in their sectors (Fonteyne 2007; Hesse and Cihak, 2007). However, their importance does not derive solely from their economic significance, but also because of their democratic governance and their perceived ability to address market failures (see, e.g., Kalmi 2007).

Our empirical work is stimulated by two themes in the theoretical literature. First, we empirically address the questions of inequality and organizational forms that have been raised in theoretical work by Legros and Newman (1996) and Bowles and Gintis (1997) and empirical work by Banerjee et al. (2001). A second stimulus is the literature on trust and its economic consequences (e.g. LaPorta et al. 1997; Knack and Keefer 1997; Zak and Knack 2001), where we broaden that approach to consider the effects of variation in trust on ownership structures.

To empirically address the determinants of cooperative ownership, we draw on several data sets. Most important, we use new data recently released by the International Cooperative Alliance (ICA) and which includes information on the 300 largest co-operatives in the world. To date the lack of suitable comparative data has inhibited empirical investigations of the determinants of the distribution of *any* organizational form other than publicly traded firms; these new data enable us to examine for the first time the determinants of the distribution of ownership for one important organizational form. These new data are integrated with data drawn from several other standard data sources, such as the World Values Surveys data. In our empirical work we

[2] See e.g. Hansmann (1996) or Birchall (1997) for a description of co-operatives around the globe.
[3] See www.ica.coop

concentrate on the links between inequality and trust and cooperative incidence and we undertake selectivity correction estimates as well as a series of robustness checks. In accounting for differences in cooperative incidence we find strong support for the proposition that trust plays a causal role and weak support for inequality. When data for conventional, listed firms are used, we do not find that trust and inequality play similar roles in accounting for the variation in the incidence of large listed firms across countries.

II. Conceptual framework and Related Empirical Work

In this section our main focus is on the potential roles of inequality and trust in accounting for differences in the importance of the cooperative sector. We also examine, albeit more briefly, why these factors might be expected to play different roles in explaining variation in the incidence of other organizational forms, especially conventional, listed companies. Finally, and also briefly, we review selected empirical literature.

Inequality and organizational form

While disparate approaches are evident in the theoretical literature, the apparent consensus is the prediction that inequality inhibits the incidence of *cooperatives*, both by lowering the formation rate of cooperatives and also by hastening the demise of established cooperatives. Perhaps the most applicable theoretical model we are aware of is due to Bowles and Gintis (1997). They argue that if co-operatives are set up disproportionately by lower and middle income people (arguably those most likely to establish co-operatives), then at a given level of economic development, inequality of wealth may inhibit the formation of co-operatives. This is because risk-averse people do not want to risk their scarce capital. Greater equality in wealth would improve the wealth of lower and middle income people and therefore promote the establishment of co-operatives. Although their argument was made only for worker co-operatives, the potential roles of

wealth constraints and risk aversion would appear to naturally carry over to the formation of other types of co-operatives.

There may be other reasons why low inequality might be linked to co-operative incidence. If low inequality reflects underlying preferences for equality and redistribution in the society, co-operatives (that usually pay lower salaries and cannot resort to stock options or stock issues) may be able to attract and retain higher quality managers than one might initially expect. More generally, the model of entrepreneurial choice by Conte (1986) implies that redistribution increases the attractiveness of co-operatives where, compared to entrepreneurial firms, expected returns are smaller but risk is also lower.

The implications of inequality for the size distribution of *conventional* firms has been examined by Legros and Newman (1996) who argue that greater wealth inequality combined with credit market imperfections may lead to larger firms sizes than would be optimal. In turn this suggests that countries with greater inequality may have more large listed firms.

Turning to empirical work, there do not appear to be any studies of the impact of inequality on cooperative formation across countries. There are, however, some recent empirical studies on the impact of inequality on the success of co-operatives at the micro-level. Banerjee et al. (2001) show that rent-seeking is a significant phenomenon in sugar co-operatives, where there is a significant inequality in terms of member's landholdings. Smallholders are less willing to join co-operatives when there is a significant inequality in landholding in the area. If there are only smallholders, then rent seeking activities are not observed. Basing his arguments on ethnographic data from Ecuador, Jones (2004) argues that wealth inequalities may promote the formation of co-operatives, because wealthier members act as sponsors to co-operatives, but if wealth disparities remain high, they also constrain the future growth of co-operatives. Thus the empirical research at the micro-level tends to support the hypothesis that wealth inequalities may constrain the growth of the co-operative sector.

Trust and organizational form

The role of interpersonal trust in increasing organizational efficiency by alleviating moral hazard and adverse selection problems has been recognized in the organizational economics literature (e.g. Casadesus-Masanell, 2004). An argument can be made that any voluntary organization that pools resources from a large number of individuals requires trust in the presence of uncertainty and incomplete contracting. Indeed, some literature has indicated that trust is a necessary precondition for *any type of large, widely owned organization* (Fukuyama 1995; LaPorta et al. 1997). On the other hand, trust is a characteristic that is often associated with co-operatives. For instance, Putnam (1993) and Miguel, Gertler and Levine (2005) use the density of co-operatives within an area as a proxy for social capital and trust. In this section, our aim is to explore the linkages surrounding the relationship between co-operatives and trust, and how these may differ from the relationship between trust and conventional firms.

Co-operatives sometimes have an advantage over profit-maximizing firms in market niches that require high trust. The existence of low-powered incentives in co-operatives implies that, typically, customers of co-operatives have less concern about opportunism (Hansmann 1996). Examples of this point include co-operative financial institutions that appear to have advantages in information gathering, monitoring and enforcement of contracts, and reducing moral hazard (Fischer 1998; Guinnane 2002; Fonteyne 2007). For these reasons, in many countries co-operative financial institutions seem to have an advantage in serving low-income populations and thus promoting financial inclusion (Gunn 2003). Another reason why trust may be important in co-operatives is that co-operatives rely more on relational contracts among their members rather than formal regulation and, consequently, they are also less willing than are investor-owned firms to impose sanctions (James and Sykuta, 2006). Fulton (1999) points out that trust towards the co-operative may allow agricultural co-operatives to survive predatory pricing by investor-owned firms. Although these authors refer to trust towards co-operatives, this type of trust may well reflect

more general, interpersonal trust. Co-operatives often have flatter hierarchies than do other types of firms and ownership is unusually dispersed (Borgen, 2001). These arrangements require stronger trust towards management and fellow members.

In certain situations the members of co-operatives share a strong common bond, e.g. due to religious or class background or a common employer.[4] Such tight networks may facilitate contract enforcement and thus reduce transaction costs, especially in situations where interpersonal trust is lacking (Bowles and Gintis, 2000). However, the growth of co-operatives is constrained by the requirement of personalized relationships. Fischer (1998) argues that the importance of the quality of the common bond decreases when interpersonal trust in society increases. Many large co-operatives are often actually networks of smaller, often regional, co-operatives. Therefore we hypothesize that what matters for co-operative development is not so much the narrow trust towards your peers, but rather the more general, interpersonal trust and trust towards strangers.

The conceptual literature that has examined the relationships between trust and co-operatives has often focused on co-operatives producing trust (e.g. Borgen, 2001; Casadesus-Masanell and Khanna, 2003). Similarly, the focus of existing empirical literature is on trust towards the co-operative at the micro-level. Borgen (2001) finds that trust towards the co-operative is related to identification with the co-operative. James and Sykuta (2006) use questionnaire data and compare producer-owned and investor-owned agribusiness firms. They find that higher trust in the firm exists in producer-owned co-operatives than in investor-owned agribusiness firms.

To our knowledge only Fischer (1998) discusses the relationship between interpersonal trust and co-operatives at the macro-level. He also stresses the causal relation flowing from interpersonal trust to the viability of the co-operative sector. However, he does not test this

[4] For a discussion on how a common bond, especially working class background, influenced the formation of consumer co-operatives, see various essays in Furlough and Strikwerda (1999). For case studies on the influence of a common bond on worker co-operatives, see Russell (1985) and Benham and Keefer (1991). Credit unions members are often required to share a common bond; see Emmons and Schmid (1999).

hypothesis empirically. The relationship from interpersonal trust to co-operative development is the core hypothesis we test in our empirical work.

There is also a related literature relating the incidence of *non-profits* to trust.[5] Salamon and Anheier (1998) do not find evidence supporting the hypothesis that the non-profit sector is expected to be larger in economies where overall trust in business is low. In addition, they do not find support for the alternative hypothesis that trust in business would promote non-profits. Saxton and Benson (2005) study non-profits established in US counties and regress it against various measures of social capital. While they find that their measures of political engagement and "bridging" social ties are related, no relationship with interpersonal trust is found. Ostergaard, Schindele and Vale (2008) use broader measures of social capital in their study of Norwegian savings banks. They find that savings banks have higher survival probabilities when they operate in areas with higher social capital..

III. Data and Descriptive Statistics

The study uses a novel data set on the global incidence of co-operatives. On October 25, 2006, the International Co-operative Association (ICA), which is an international organization devoted to promote co-operatives, released a list of 300 largest co-operatives. This list was an outcome of an extensive research effort to compile information on the largest co-operatives in the world. It is exhaustive in terms of countries. Co-operatives have been ranked in terms of turnover in 2004. Previously there has been no other comprehensive data set that had allowed comparisons of the significance of co-operatives in different countries.

There are 300 co-operatives in the list. The largest industry represented is agriculture (114), followed by retailing (91) and thereafter bank, finance, and insurance (68). Alongside with firms incorporated as co-operatives, the definition of co-operatives also includes mutual firms,

[5] Non-profits are different from co-operatives because their surplus cannot be distributed to firm patrons. Also, they are prevalent in different industries than co-operatives. See Hansmann (1996) for further comparisons.

credit unions, or firms that are controlled by co-operatives. These forms are traditionally regarded as co-operatives. Because the data are collected from a large number of countries, it means that there is no universally consistent definition for co-operatives.[6]

The list includes co-operatives from 28 countries. These are mainly OECD countries, although some of the largest developing countries (China, India, Brazil, Mexico) also have co-operatives on the list. The absence of developing countries from the list does not indicate that co-operatives would be insignificant in developing countries. In most developing countries, the purchasing power of the population is not large enough to result in their co-operatives producing enough revenue to warrant being included in the list.[7] The implication for our empirical work is that we need to model the selection process.

In our empirical analysis, we use the ICA data to construct two variables to capture co-operative incidence. Our first measure normalizes with respect to population: Number of large co-operatives relative to 10 million of inhabitants of the country (COOP_POP). The second proxy is: Turnover of large co-operatives within a country relative to the GDP of that country (in percent) (SACOOP_GDP). In both cases "Large" is defined by inclusion in the Global300 dataset. It is clear that both variables are imperfect measures of co-operative importance. Ideally, one would like to have measures such as the contribution of co-operatives in general to the GDP of the country. Clearly the second measure falls short of that standard, in part because one would prefer to have information on value added rather than sales, when normalizing with respect to the contribution to GDP[8]. In addition, for all countries, only a part of the co-operative sector is included.[9] The degree of underestimation may depend on country size. Even if co-operatives were equally distributed between large and small countries, those small countries that have a few large co-operatives relative

[6] The data collection methodology is described in detail in ICA (2006).
[7] For instance, the celebrated Grameen Bank of Bangladesh is not large enough to be included in the list.
[8] The sales of financial co-operatives in the sample are based on their non-interest income.
[9] For each country, only a very small percentage of the total number of co-operatives is included. However, since they are the largest co-operatives, their share of all economic activity within co-operative sector is in many cases likely to be substantial.

to a small population are likely to have the highest figures using our co-operative measure. On the other hand, small countries with relatively low co-operative activity are likely to be absent from the list altogether, while large countries with similar degrees of co-operative activity are likely to be included. As we explain below, these predictions are also borne out in data and we attempt to control these biases in the empirical analysis. However, it is also possible that co-operatives are genuinely more important in small countries. This may be the case if relevant industries (such as retail trade and banking) are less competitive in smaller countries, for instance if big multinationals have lower interest in entering smaller markets. Co-operatives are often argued to thrive in less competitive markets (Hansmann 1996; Hart and Moore 1996), which implies that smaller countries are expected to have a higher presence of co-operatives.

INSERT TABLE 1

Column (1) of Table 1 presents statistics on co-operative presence by country where observations are divided into three groups: large developing countries, small developed countries, and large developed countries (there are no entries for small developing countries). These statistics confirm that our measures of co-operative incidence are highest in small developed countries and lowest in developing countries. Looking first at the measure of number of co-operatives relative to population (COOP_POP), we find that these values are clearly highest in small developed countries such as Finland (17.2 large co-operatives per ten million inhabitants), Norway (15.3) and New Zealand (15.2).[10] In most countries within this category the measure is relatively high, though there are exceptions (e.g Portugal 1.0). In the category of large developed countries, the notable exceptions are France (7.9) and Italy (4.8), with Taiwan and South Korea having the smallest values

[10] Reviews of literature that either examines coops in individual countries (e.g. for Finland see Kuisma et al., 2000, and for New Zealand Evans and Meade 2005) or cross national surveys of co-operatives (e.g. Birchall 1997), suggests a picture that broadly corresponds to this statistical portrait of the varying importance of co-operatives presented in Table 1.

(0.4 both). Developing countries clearly have the lowest values, with a mean of only 0.02 large co-operatives per ten million inhabitants.

The second co-operative measure, the total turnover of large co-operatives to GDP (SACOOP_GDP), leads to very similar conclusions. Finland (24.1%), Switzerland (18.9%) and New Zealand (17.1%) take the largest values. The smallest values are again for developing economies and also in some large developed economies (Australia and Taiwan).

Our control group for the largest listed companies comes from the Business Week 1000 list for the year 2003 (henceforth, BW1000) that includes the largest listed companies in the world when market value is used as the main index of size. We use these data to construct two measures of the incidence of large conventional listed firms. One of these, LISTED_POP, is the number of large listed firms relative to population and thus is analogous to the measure used for co-operatives, namely (COOP_POP). The other measure is SALISTED_GDP. It describes the total turnover of these firms in the list relative to GDP. When these variables are calculated we find that there are 37 countries in this data set, including all 28 countries that overlap with the countries in the co-op data set. However, the BW1000 data does not include sales data for banks and SALISTED_GDP is observed only for 36 countries.[11]

It is interesting to compare values for the incidence variables in the two data sets. It is no longer clearly the case that small developed countries dominate the list. While the two countries with the biggest number of large listed firms relative to population are small countries, Switzerland (22.1) and Sweden (16.7), they are closely followed by the US (14.4), Canada (11.7) and the UK (11.1). The mean value of LISTED_POP is only marginally higher for small developed countries, and SALISTED_GDP is actually somewhat higher in the group of large developed countries. Again, these figures are clearly lower for developing and transition countries.

[11] The only Hungarian firm in the list is a bank, and therefore SALISTED_GDP is missing for Hungary.

The summary statistics reported in Table 2 are the variables used either in the outcome or selection regressions as independent variables. To control for differences in environment we use two standard measures[12], *Size of population and GDP* or *GDP per capita.* Measures of *Size of population* are taken from the Penn World Tables and values are for 2003; in our regression analysis we use the logarithmic form of this variable (LNPOP). Our measures of Gross Domestic Product, namely *GDP or GDP per capita*, are also derived from the Penn World Tables and are purchasing power parity-adjusted GDP values for 2003 in thousands of US$. This variable is available for 182 countries and we use it to construct GDP per capita, which enters the regressions in logarithmic form (LNGDP_CAP).

Our measures of our key variables for inequality and trust are obtained from standard sources. Measures of *inequality* are derived from the WIDER' WIID2 database (see WIDER 2005). Arguably this database contains the most reliable and comprehensive measures of inequality. The database has several measures of inequality and the preferred measures are based on disposable income, when the estimates are for the entire population, household is the basic income-sharing unit and the figures have been adjusted for household size (see WIDER 2005; Leigh 2006). Our first measure of inequality GINI_NARROW is constructed according to these guidelines, and we choose the 2003 value or the previous available value.[13] However, this variable was available only for 63 countries, including almost all the developed industrialized economies but only for some developing economies. A consumption based measure (or a measure that otherwise did not meet the stricter criteria) was available for an additional 64 countries.[14] Including these values gives a

[12] We include these environmental variables to reflect the longstanding tradition in comparative economics that highlights the importance of diverse environmental factors, such as the level of economic development and population size, in accounting for differences in economic outcomes across countries (e.g. Koopmans and Montias, 1971; Pryor, 1985.)

[13] Additionally, it was required that the reliability rating of the value by the WIDER research team fell into two highest categories (A or B) and that the value was observed no earlier than 1995.

[14] Consumption-based measures of inequality were typically not available for countries which have income-based measures of inequality.

measure GINI_BROAD that is available for 127 countries. However, it should be recognized that the income-based and consumption-based measure of inequality may not be strictly comparable.[15]

For our measure of *trust* we follow the macro-literature in economics (LaPorta et al. 1997; Knack and Keefer 1997; Zak and Knack 2001) and use a measure derived from the World Values Survey (WVS). The specific variable is the percentage of positive responses to the question "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" We draw data from the last three rounds of the World Values Survey that have taken place between 1990 and 2004. There are 81 countries for which there exists at least one observation of trust during this period. For those countries for which there are multiple observations, we take an unweighted average of those observations. Covariance analysis reveals that between-country variation in trust is much larger than within-country variation; this increases our confidence in the validity of the measure. To the extent that there are within-country changes over time, it is difficult to differentiate genuine changes in trust from sampling error. However, the previous literature indicates that trust changes very slowly over time (Putnam, 1993; La Porta et al. 1997), so we believe most of the changes may come from the fact that different individuals are sampled in different times. Taking an average over multiple observations of trust is an effective way to deal with sampling error.[16]

The use of the WVS question as a measure of trust has provoked some debate in the literature. Glaeser et al. (2000) argue on the basis of experimental evidence that the WVS question is more likely to measure trustworthiness (i.e. reciprocating trust) rather than (unconditional) trust. Sapienza, Toldra and Zingales (2007), also drawing from experimental analysis, find that the WVS question captures beliefs about other people's trustworthiness. However, both of these studies (and the related literature) are conducted at the individual level. At the macro-level that we are studying,

[15] A comparison of these two measures for the few countries for which both measures are available indicates that consumption-based Gini coefficients tend to be lower than the income-based coefficients.
[16] However, all the results reported below would remain essentially similar if we would use the latest figure available, instead of averaging over consecutive waves.

the distinctions between trust and trustworthiness seem to be somewhat tenuous. At least one would expect them to be highly correlated. Against the background of our conceptual discussion, it also may be of little consequence whether the measure we use is really capturing trust or trustworthiness.

In our empirical work we will also perform a variety of robustness checks. Some of these include comparing the findings based on the approach discussed above to those obtained when a set of measures of institutional quality is used to replace trust (see on for a discussion on this point.) In addition, to respond to concerns about causality, we also use instrumental variables for trust in analyzing issues of endogeneity (see more below).

We use three measures of institutional quality. All have been collected by using survey techniques and the measures we use are widely used in applied research. One of the variables used in these robustness analyses is *Corruption.* This measure has been derived from the Transparency International's Corruption Perception Index for the year 2003.[17] The original measure ranges from 1 to 10 and it measures the absence of corruption. For the analysis presented below, the measure has been inverted and the new measure CORRUPT describes the extent of corruption in the country. Another measure used is *Economic Freedom* and it is derived from the Heritage Foundation's Index of Economic Freedom for 2003.[18] This measures issues such as security of property rights, absence of trade barriers, and the level of taxation. The measure ECON_FREEDOM varies from 0 to 100. The final measure of institutional quality we use is *Rule of Law.* This variable has been taken from the World Bank Governance Indices for the year 2003, reported in Kaufmann et al. (2006). It relates to "the extent to which agents have confidence to and abide by the rules of society" (Kaufmann et al., 2006, p. 4). The original variable has been transformed into a standardized variable with mean zero and unit standard deviation. We use it simply as such and call it RULE_LAW.

[17] The data have been downloaded from www.transparency.org (30.8.2007).
[18] The data have been downloaded from www.heritage.org (30.8.2007).

To address the issues of causality we use an instrument for trust that has been widely used in the literature. *Hierarchical religion,* as defined in LaPorta et al. (1997), is measured as the proportion of population that are Roman Catholic, Orthodox or Muslims. The variable is derived from the CIA World Factbook. Hierarchical religion is used as an instrument of trust. Summary statistics of all variables are presented in Table 2.

INSERT TABLE 2

IV Empirical Strategy and Findings

Our baseline approach is to estimate two stage sample selection models. These are estimated first for co-operatives and then, as one of our robustness checks, for listed firms. Thus we recognize that selection is a key issue that we have to address in the empirical analysis. While our GDP and population data consist of observations for 180 countries, the data on co-operatives include only 28 countries. Even a casual glance at the data reveals that the countries that have co-operatives tend to be the most developed countries. In other words, this suggests that we should run a two-stage sample selection model.

Since we believe that selection to the sample is likely to be mainly influenced by two environmental factors, namely the level of economic development and population size, we therefore include both of these variables in the selection equation. One of these variables has to be excluded from the second stage, outcome regressions. While simple t statistics lead us to choose to exclude GDP per capita, all the main results are unaltered if we would choose to exclude population size. The main variables of interest in the outcome equation are measures for inequality and trust. According to Wooldridge (2004), it is generally a good idea to include all the variables from the outcome equation in the selection equation. We follow this advice, although it means that we use a

smaller sample in the selection equation than would otherwise have been the case.[19]

Thus we end up estimating two sets of four outcome regressions, with each set corresponding to the two measures of co-operative incidence, COOP_POP and SACOOP_GDP. For each set we begin by estimating models in which either our measure of trust or one of our two measures of inequality is included, because trust and inequality are heavily correlated (Leigh, 2006) and therefore multicollinearity is likely to affect the estimates.[20] Finally, we include both trust and inequality in the same regression.

Table 3 reports the results of estimating models of the determinants of the size of co-operative sector using the two stage sample selection approach. We begin first by considering the findings from the first, sample selection stage, which are reported in the lower half of the table. As hypothesized, both population size and GDP per capita (entered in their log forms) are statistically significantly associated with sample selection in all eight specifications. At the same time, we observe that the measures of inequality and trust are never significant in these first stage selection specifications when income levels and population size are controlled for.[21]

Turning to the results for the outcome equations, when inequality is first measured as GINI_NARROW (column one) although inequality has the expected negative coefficient, it is not statistically significant. However, when we instead use the broad measure of inequality (GINI_BROAD) (column two) the variable becomes statistically significant, even though the parameter coefficient is substantially smaller. The size of the coefficient indicates that a ten point increase in inequality would be associated with about two fewer large co-operatives per 10 million people. In column (3) we report estimates in which TRUST is the key independent variable. We find that Trust is statistically significantly related to the number of co-operatives at the 1% level of confidence. Thus an increase of 10 percentage points in trust is associated with 1.9 more large co-

[19] We have also experimented with regressions where we have used only LNPOP and LNGDPCAP in the selection equation and thus include 180 countries in the selection stage. This does not affect the results reported here.
[20] The correlation coefficient between trust and inequality in the sample is -0.65.
[21] Interestingly we find that Lambda is insignificant in all models which implies that, contrary to our expectations, selection issues do not significantly affect the coefficients.

operatives per 10 million people; since the sample mean for the number of cooperatives per 10 million people is 4.97 this is an economically significant as well as a statistically significant effect.

For Columns (4) - (6) we use TURNO_GDP as the dependent variable. The results are very similar to those presented in columns (1) - (3). GINI_NARROW is not statistically significant, while GINI_BROAD is. A 10 percentage point increase in GINI_BROAD would decrease TURNO_GDP by 3.4 percentage points. A 10 percentage point increase in TRUST would increase TURNO_GDP by 2.2 percentage points. Note also that, conditional on selection, the coefficient of population size is negative and significant in most specifications.

So far the results have been supportive of the hypothesis that higher trust promotes the existence of a larger co-operative sector. The results on inequality are more mixed, because the results using what is arguably the preferred measure are statistically insignificant, but the results using the broader measure are statistically significant, even though the parameter coefficient is smaller. In specifications (7) and (8) we examine the robustness of these results further by including both GINI_BROAD and TRUST in the same equation. The result in both cases is that the coefficient of TRUST remains as statistically significant as in the previous regressions and of about the same size, whereas the coefficients of inequality become statistically insignificant and very close to zero. Despite the fact that the t-values of TRUST fall somewhat, the coefficient is still strongly statistically significant at the 1% level. These results may suggest that the partial correlations between GINI_BROAD and variables of co-operative incidence were spurious and induced by the correlations between GINI_BROAD and TRUST. However, because of the high correlation between GINI_BROAD and TRUST it is also possible that the problems of multicollinearity render the regression coefficients unreliable. For this reason, the results concerning the impact of inequality on co-operative incidence remain somewhat inconclusive. We cannot accept the hypothesis that lower inequality is associated with higher co-operative incidence because it may result from spurious correlation, but it is difficult to reject the hypothesis because of

multicollinearity problems. In any case, there is strong support that trust is related to co-operative incidence—this finding is supported in all regressions even though the sample size varies much across regressions because of missing data.[22] Hence in the rest of our analytical work we focus on that relationship.

Comparison with conventional firms

Our first test of the robustness of our findings on trust is to use the Business Week 1000 data and estimate comparable specifications for listed firms. That is we test the proposition that high trust may be associated with the presence of large firms in general –thus we see to what degree the results discussed above are specific to co-operatives. For reasons of comparability we also include inequality (GINI_BROAD) in the specifications.

The results reported in the columns (1) - (4) of Table 4 replicate the analysis presented in Table 3 for the variables LISTED_POP and SALISTED_GDP, although omitting the results for GINI_NARROW. However, it turned out that we gained a better fit for listed firms when we use LNGDP_CAP rather than LNPOP in the outcome equation, and therefore we report these results in columns (5) – (8). Finally, in columns (9) – (12) we include both TRUST and GINI_BROAD to the same equations and perform these regressions for both dependent variables and also for alternative specifications in the outcome regression.

The first thing to notice is that the results for the selection equation are very similar to the selection equation for co-operatives. These firms are concentrated in the largest economies by population size and in the wealthiest economies. The measures of inequality and trust do not have an impact on selection.

As the results show, there is no indication that inequality has any association with the

[22] We have also estimated the outcome models using OLS techniques. The results we obtain using this OLS approach suggest that the key results are not sensitive to the choice of estimation strategy. The parameter coefficients of inequality and trust are very similar both in OLS and two-step analysis, but the standard errors are lower in the latter, leading to higher levels of statistical significance. These OLS results are available upon request.

presence of large listed firms. However, there is some indication that higher trust is associated with a higher presence of large listed firms. The coefficient of TRUST is statistically significant at the 5% level in specifications (5) and (10). These results only pertain to the regressions where LISTED_POP is the dependent variable and LNPOP is excluded from the outcome regression. When SALISTED_COOP is used as the dependent variable or when LNPOP is included to the outcome regression, no statistically significant results are found. Although trust does not seem to be as robust in explaining the incidence of large listed firms as it is in explaining co-operatives, these results provide some indication that greater trust promotes larger firms in general.

Further robustness checks

Studies investigating the relationship between trust and economic growth have been criticised on several accounts. While it is by no means clear that these criticisms will carry over to studies of the relationship between trust and co-operative incidence, at least the previous literature on growth provides a useful agenda for robustness checks. Here we provide three different types of robustness checks. First, we address the concerns of Beugelsdijk et al. (2004) who argue that the relationship between trust and growth is sensitive to sample composition issues. We test the relationship between trust and the incidence of co-operatives by excluding developing economies from the regressions. Second, we respond to the criticism of Beugelsdijk (2005) that the trust variable merely captures aspects of overall institutional quality. By replacing trust with well established measures of institutional quality in our specifications, we check whether the results reported earlier for trust and co-operative incidence will still hold. Finally, we address issues of endogeneity by using an instrumental variable approach.

As argued by Beugelsdijk et al. (2004), the relationship between trust and economic growth as reported in Zak and Knack (2001) depends on the inclusion of less developed countries in the regression analysis. We test how sensitive our results are to this feature by replicating the

analysis of co-operative incidence when we restrict the sample to the OECD countries only Since this is quite a restricted sample and only a handful of rich countries do not have any co-operatives in the sample, we report findings using OLS regressions rather than the two-stage sample selection approach.[23] As presented in Table 5, Columns 1-2, the results concerning TRUST remain very similar in size and significance to those reported in Table 3. Therefore we can conclude that our results are not dependent on sample composition issues.

We also replicate these regressions when we restrict the analysis to OECD sample countries, but observations are for large, listed companies (Columns 3-4). Importantly, the positive relationship between trust and co-operative incidence that was observed previously, now disappears. Thus the relationship between trust and incidence for capitalist firms does appear to be sensitive to sample composition issues and is more fragile than indicated by the earlier results.

Next we check the claim of Beugelsdijk (2005) that the commonly used measure of trust mainly reflects general institutional quality. To examine this claim we begin by noting that simple correlation analysis does not fully support the argument that TRUST would only reflect institutional quality. The correlation coefficient between TRUST and ECON_FREEDOM is 0.26, with TRUST and RULE_LAW 0.49, and TRUST and CORRUPT -0.52. While all these correlations are statistically significant at the 5% level, they pale in comparison with the correlations these variables have with each other: -0.80 between CORRUPT and ECON_FREEDOM, 0.84 between ECON_FREEDOM and RULE_LAW, and -0.94 between CORRUPT and RULE_LAW. Next we replicate the earlier specifications that included TRUST by replacing trust with the three measures of institutional quality; these results are reported in Table 6. From those results it appears that TRUST is much more robust in explaining the incidence of large co-operatives than the other variables. Interestingly, corruption and rule of law appear to have some explanatory power in the selection equation, but neither variable is significant in the outcome

[23] The two-stage results are available upon request.

equation. ECON_FREEDOM does not become significant in either specification.

Addressing Causality

We have shown that trust is correlated with the presence of large co-operatives. However, correlation does not imply a causal relationship. Some researchers (e.g. Casadesus-Masanell and Khanna 2003) have suggested that co-operatives may generate trust, suggesting a reverse causal relationship. At the macro-level, this link seems to us somewhat tenuous, because previous research has shown that trust at the national level is formed over a long period and changes only slowly (Putnam 1993; LaPorta et al. 1997). This is also supported by the observation that the values of trust in successive waves of WVS change only slowly.

However, to formally examine this matter, we use an instrumental variable estimation approach. As is well known, good instruments should satisfy two criteria: 1) They should be correlated with our key explanatory variable; 2) They should have no direct impact on the dependent variable apart from that which is mediated by the independent variable. Unsurprisingly, in view of these criteria, good instruments are often hard to find. However, we follow the earlier literature and use hierarchical religion, defined as the proportion of Catholics, Muslims and Orthodox in the population, as an instrument for trust. In the research of La Porta et al. (1997), this instrument has been shown to correlate strongly and negatively with trust. Drawing on Putnam (1993), they argue that vertical bonds established by hierarchical religions have an adverse effect on the formation on trust. We also find that the significant and negative correlation holds for our sample: the correlation coefficient between trust and hierarchical religion is -0.55. However, the instrument is valid only if it also does not have any direct impact on the size of the co-operative sector. This seems plausible since co-operatives are religiously neutral and open to anyone regardless of religious denomination.[24]

[24] This is formally codified in the first principle of the International Co-operative Alliance, open and voluntary membership (see www.ica.coop). However, there have been co-operatives formed along religious lines. For instance, in

In Table 7 we provide evidence from the instrumental variable regressions. In Table 7, panel A, we show the results from the first stage regressions where we regress trust on hierarchical religion. In Panel B, we present regressions where we use the new instrumental variable as the explanatory variables explaining COOP_POP and TURNO_GDP.

The first stage results show that hierarchical religion has strong explanatory power in accounting for variation in trust. However, when we turn to the second stage, outcome regressions, we find that the coefficients for trust are almost identical to the two-stage coefficients reported in Table 3. Standard errors have increased; however, this is a common feature of IV regressions (Murray, 2006). In both cases, the coefficient on trust is statistically significant at least at the 10 % level. These results give support to the hypothesis that the effect from trust to the size of the co-operative sector can be regarded as causal. This is also consistent with the intuitive notion that trust (or social capital) is relatively stable over time and has a causal priority.

V. Conclusions and Discussion

In this paper, we have reviewed theory of the effects of inequality and trust on the incidence of co-operatives, and investigated these relationships empirically. We have utilized an important new data set for students of comparative economic systems--on the 300 largest co-operatives in the world that was recently released by the International Co-operative Alliance. This has enabled us to empirically investigate these relationships for the first time at the macro level.

Our results indicate that co-operative incidence is very strongly and positively related to the level of interpersonal trust in a society. We subject our finding on the positive relationship between trust and co-operative incidence to a variety of robustness checks. It turns out that trust is a much more robust predictor of co-operatives than is the case in large listed firms, although there is

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Italy many co-operatives have traditionally been affiliated with the Catholic Church, whereas in Britain many of the early co-operatives were inspired by the protestant Christian Socialist movement. However, in balance, it seems to be fair to say that the formation of co-operatives is not specifically related to any religious denomination.

some evidence that the presence of large listed firms is also higher in the presence of higher trust. We also find that the results between trust and co-operative incidence holds when developing economies are dropped from the sample and that trust is a much more powerful predictor of co-operatives than measures of institutional quality. Finally, our instrumental variable regressions suggest that the relationship from trust to co-operatives is causal.

We also find some evidence in support of the hypothesis that the incidence of co-operatives is negatively related to inequality in society, but this result is not very robust empirically.

Our key result on the significance of trust highlights the role of interpersonal trust as a prerequisite, rather than a consequence, of co-operative incidence. This finding may not be too encouraging for social reformers who might wish to use co-operatives as a tool in addressing market failures. Since lack of trust and market failures often may occur in the same countries, it may be that co-operatives do not grow where the potential benefits from them would be highest, such as in developing or transition countries. However, these results hold at the macro-level where trust is likely to be relatively immutable, whereas we would not exclude the possibility that at the micro-level the presence of co-operatives may also generate trust.[25] This appears as a fruitful topic for further research.

However it is important to realize that our results, because of the limited nature of the data, are necessarily preliminary. One limitation of our study is that, by necessity, we omitted data from most but the largest developing countries, simply because the co-operatives in those countries were not large enough to be included in the survey. Analyzing the role and potential of co-operatives in economic development would require more targeted data collection efforts. Also a deficiency of the existing data is that it concentrates on only the largest co-operatives and ignores numerous small co-operatives. While the new ICA data is a big step in the right direction, more

[25] One could also imagine that there might be virtuous circles where the establishment of co-operatives generates trust that feeds into more formation of co-operatives. Some of the regional clusters of co-operatives (e.g. Mondragon in the Basque Country, the Emilia-Romagna co-operatives, the Antigonish movement in Nova Scotia, and the Maharashtra co-operatives in Gujarati) may be interpreted as such.

data collection on the relative incidence on co-operatives is surely needed.

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Table 1: Dependent variables, Summary statistics

Country	COOP_POP	SACOOP_GDP	LISTED_POP	SALISTED_CAP
Developing and transition countries				
Brazil	0,11	0,22	0,27	3,05
Chile	N/A	N/A	0,64	2,21
China	0,02	0,06	0,16	2,62
Hungary	N/A	N/A	0,99	N/A
India	0,03	0,09	0,08	1,58
Indonesia	N/A	N/A	0,04	0,24
Malaysia	N/A	N/A	2,17	3,60
Mexico	0,10	0,11	0,58	5,43
Poland	N/A	N/A	0,52	1,35
Russia	N/A	N/A	0,62	4,00
South Africa	N/A	N/A	2,57	16,25
Thailand	N/A	N/A	0,47	3,86
Large Developing Countries, mean	0,06	0,12	0,76	4,02
Small Developed Countries				
Austria	2,45	2,28	3,68	2,16
Belgium	2,89	3,09	9,63	29,91
Denmark	9,26	14,44	7,41	25,44
Finland	17,24	24,09	9,58	62,44
Greece	N/A	N/A	7,22	11,55
Ireland	7,49	5,41	9,98	12,63
Israel	4,90	2,17	3,27	2,93
Netherlands	11,77	14,04	7,43	130,06
New Zealand	15,21	17,06	2,53	3,72
Norway	15,30	9,41	10,93	49,65
Portugal	0,96	0,51	2,89	8,65
Singapore	4,34	1,60	10,85	10,28
Sweden	8,92	9,82	16,72	46,50
Switzerland	9,69	18,89	22,14	125,71
Small Developed Countries, mean	8,49	9,45	8,88	37,26
Large Developed Countries				
Australia	1,01	0,37	9,12	25,63
Canada	2,84	2,23	11,70	25,84
France	7,50	11,30	7,33	72,30
Germany	4,00	6,06	4,24	55,58
Italy	4,83	3,34	3,97	25,56
Japan	1,41	4,57	10,73	79,71
Korea, Republic of	0,42	3,11	2,11	17,78
Spain	1,19	2,10	4,03	22,07
Taiwan	0,44	0,33	7,96	12,19
United Kingdom	2,87	2,57	11,13	89,07
United States	2,12	1,30	14,42	56,43
Large Developed Countries, mean	2,60	3,39	7,88	43,83
Overall mean	4,97	5,73	5,95	29,11
Overall standard deviation	5,10	6,59	5,36	34,58

Notes: 1) Variable definitions: COOP_POP: Number of large co-operatives per 10 million inhabitants; SACOOP_GDP: turnover of large co-operatives relative to GDP in percentage; LISTED_POP: number of large listed firms per 10 million inhabitants; SALISTED_GDP: turnover of large listed firms relative to GDP in percentage. 2) Sources: For Co-operative data: GLOBAL 300 Database (ICA 2006); for large listed firms: Business Week 1000 data (URL: http://bwnt.businessweek.com/global_1000/2003/index.asp); for population and GDP; Penn World Table at http://pwt.econ.upenn.edu/.

Table 2: Summary statistics of independent variables

Variable	Variable short name	N	MEAN	STD	MIN	MAX
Population, in log	LNPOP	188	8.65	2.02	2.98	14.07
GDP per capita, in log	LNGDP_CAP	180	8.57	1.19	5.84	10.80
Inequality, narrow definition	GINI_NARROW	63	39.93	12.06	21.9	63.3
Inequality, broad definition	GINI_BROAD	127	44.00	13.58	21.9	76.7
Trust	TRUST	81	28.84	14.55	4.8	65.3
Corruption	CORRUPT	129	6.82	2.23	1.3	9.7
Economic Freedom	ECON_FREEDOM	155	58.32	12.31	4.44	89.30
Rule of Law	RULE_LAW	186	-0.07	1.00	-2.11	2.02
Hierarchical religion	HIERARCH	27	40.04	35.92	0	94

Table 3: The Impact of Inequality and Trust on the Size of the Co-operative Sector

	(1) COOP_POP	(2) COOP_POP	(3) COOP_POP	(4) SACOOP_GDP	(5) SACOOP_GDP	(6) SACOOP_GDP	(7) COOP_POP	(8) SACOOP_GDP
GINI_NARROW	-0.35 (-1.34)			-0.56 (-1.43)				
GINI_BROAD		-0.22*** (-2.16)			-0.34** (-2.32)		0.00 (0.04)	-0.09 (-0.53)
TRUST			0.19*** (4.28)			0.22*** (3.26)	0.19*** (3.73)	0.20** (2.53)
LNPOP	-0.86 (-0.67)	-1.40*** (-2.76)	-1.64*** (-4.47)	-0.25 (-0.13)	-1.17* (-1.64)	-1.65*** (-2.92)	-1.69*** (-4.09)	-1.50** (-2.36)
Lambda	5.85 (1.10)	2.90 (1.33)	2.09 (1.28)	8.56 (1.10)	3.31 (1.06)	1.40 (0.54)	1.95 (1.02)	1.72 (0.56)
Selection equation								
LNGDP_CAP	4.24*** (3.06)	4.06*** (4.03)	3.59*** (3.85)	4.24*** (3.06)	4.06*** (4.03)	3.59*** (3.85)	3.85*** (3.73)	3.85*** (3.73)
LNPOP	1.31*** (3.29)	1.42*** (3.77)	1.23*** (3.48)	1.31*** (3.29)	1.42*** (3.77)	1.23*** (3.48)	1.28*** (3.23)	1.28*** (3.23)
GINI_NARROW	-0.01 (-0.15)			-0.01 (-0.15)				
GINI_BROAD		-0.02 (-0.68)			-0.02 (-0.68)		0.01 (0.29)	0.01 (0.29)
TRUST			0.01 (0.79)			0.01 (0.79)	0.02 (1.12)	0.02 (1.12)
Wald Chi	22.65***	38.86***	60.56***	18.41***	30.46***	37.77***	57.74***	35.04***
N	63	125	81	63	125	81	76	76
N, uncensored	26	28	28	26	28	28	28	28

Notes: 1) t statistics in parenthesis. 2) Significance levels: * 10%; ** 5%; ***1%.

Table 4: The Impact of Inequality and Trust on the Presence of Large Listed Firms: Heckman Regressions

Spec #	1	2	3	4	5	6	7	8	9	10	11	12
Variable	LISTED_POP	LISTED_POP	SALISTED_GDP	SALISTED_GDP	LISTED_POP	LISTED_POP	SALISTED_GDP	SALISTED_GDP	LISTED_POP	LISTED_POP	SALISTED_GDP	SALISTED_GDP
GINI_BROAD	-0.11 (-0.83)		-10.30 (-1.47)		-0.03 (-0.40)		-4.97 (-0.90)		-0.01 (-0.99)	0.08 (0.98)	-5.04 (-0.50)	1.34 (0.18)
TRUST		0.10 (1.07)		6.49 (1.22)		0.09** (2.04)		5.68 (1.63)	0.09 (0.85)	0.11** (2.18)	4.80 (0.79)	6.08 (1.41)
LNPOP	-1.33 (-1.41)	-1.67* (-1.92)	-9.93 (-0.21)	-41.93 (-0.82)					-1.47 (-1.62)		-16.25 (-0.33)	
LNGDPCAP					5.38*** (4.45)	5.18*** (4.92)	202.86** (2.11)	207.19*** (2.43)		5.77*** (4.98)		225.71** (2.33)
Lambda	-8.08** (-2.03)	-8.04** (-2.17)	-405.26 (-1.50)	-465.48** (-2.05)	-3.80** (-2.02)	-2.58 (-1.35)	-278.62 (-1.37)	-280.01* (-1.81)	-7.66** (-1.98)	-2.83 (-1.41)	-414.89 (-1.43)	-264.28 (-1.25)
Selection equation												
LNGDPCAP	7.70*** (3.00)	4.35*** (3.52)	9.49*** (2.96)	4.80*** (3.44)	7.70*** (3.00)	4.35*** (3.52)	9.49*** (2.96)	4.80*** (3.44)	7.17*** (2.76)	7.17*** (2.76)	9.49** (2.46)	9.49** (2.46)
LNPOP	3.19*** (2.92)	1.80*** (3.30)	3.95*** (2.92)	2.01*** (3.29)	3.19*** (2.92)	1.80*** (3.30)	3.95*** (2.92)	2.01*** (3.29)	2.94*** (2.65)	2.94*** (2.65)	3.85** (2.45)	3.85** (2.45)
GINI_BROAD	-0.00 (-0.11)		0.01 (0.21)		-0.00 (-0.11)		0.01 (0.21)		-0.01 (-0.16)	-0.01 (-0.16)	0.01 (0.25)	0.01 (0.25)
TRUST		-0.01 (-0.29)		-0.00 (-0.20)		-0.01 (-0.29)		-0.00 (-0.20)	0.00 (0.20)	0.00 (0.20)	0.02 (0.67)	0.02 (0.67)
Wald Chi	13.27***	17.51***	12.26**	14.39***	39.23***	46.21***	18.95***	23.05***	12.43*	42.99***	9.20	16.78**
N	125	81	125	81	125	81	125	81	76	76	76	76
N, uncensored	37	35	36	34	37	35	36	34	35	35	34	34

Notes: 1) t statistics in parenthesis. 2) Significance levels: * 10%; ** 5%; ***1%.

Table 5: The Relationship of Trust and Cooperative Incidence in OECD Countries: OLS regressions

	(1) COOP_POP	(2) SACOOP_GDP	(3) LISTED_POP	(4) SALISTED_GDP
LNGDPCAP	2.14 (0.47)	-3.03 (-0.42)	12.83** (2.54)	424.18 (1.06)
LNPOP	-1.83*** (-3.06)	-1.50 (-1.60)	-0.02 (-0.03)	103.10* (1.82)
TRUST	0.19*** (3.10)	0.27*** (2.88)	0.04 (0.57)	8.16 (1.42)
F	10.05***	5.04***	3.75**	2.94*
R2	0.60	0.43	0.35	0.30
N	23	23	25	25

Notes: 1) t statistics in parenthesis. 2) Significance levels: * 10%; ** 5%; ***1%.

Table 6: Measures of Institutional Quality and Cooperative Incidence

	(1) COOP_POP	(2) COOP_POP	(3) COOP_POP	(4) SACOOP_GDP	(5) SACOOP_GDP	(6) SACOOP _GDP
CORRUPT	-0.73 (-1.04)			-0.94 (-0.94)		
ECON_FREEDOM		-0.05 (-0.37)			-0.10 (-0.47)	
RULE_LAW			1.82 (1.01)			2.44 (0.95)
LNPOP	-1.26 (-1.62)	-2.17** (-2.36)	-1.38* (-1.86)	-1.11 (-0.99)	-2.45** (-2.45)	-1.26 (-1.20)
Lambda	0.80 (0.27)	-1.46 (-0.67)	-0.54 (-0.23)	-4.41 (-1.00)	-3.77 (-1.26)	-1.75 (-0.54)
Selection equation						
LNGDPCAP	3.33* (1.85)	3.96*** (2.96)	3.93** (2.15)	3.33* (1.85)	3.96*** (2.96)	3.93** (2.15)
LNPOP	2.50** (2.53)	2.07*** (3.31)	2.65*** (2.84)	2.50** (2.53)	2.07*** (3.31)	2.65*** (2.84)
CORRUPT	-1.29** (-2.50)			-1.29** (-2.50)		
ECON_FREEDOM		0.16 (2.79)			0.16 (2.79)	
RULE_LAW			2.98*** (2.84)			2.98*** (2.84)
Wald Chi	28.50***	30.50***	30.48***	18.23***	22.13***	20.94***
N	127	150	178	127	150	178
N, uncensored	28	28	28	28	28	28

Notes: 1) t statistics in parenthesis. 2) Significance levels: * 10%; ** 5%; ***1%.

Table 7: Instrumental variable regressions

Panel A: First stage regressions (N=27)

	TRUST
GDP per capita (in log)	4.33 (0.76)
Population (in log)	-0.62 (-0.30)
Hierarchical religion	-0.24*** (-3.37)
R2	0.36
F	4.39**

Panel B: Second stage regression (N=27)

	COOP_POP	SACOOP_GDP
Trust (instrumented)	0.18** (2.41)	0.22* (1.83)
Population (in log)	-1.82*** (-3.52)	-1.79** (-2.20)
GDP per capita (in log)	-0.58 (-0.39)	-0.43 (-0.18)
R2	0.65	0.48
F	10.98***	5.01***

Notes: 1) t statistics in parenthesis. 2) Significance levels: * 10%; ** 5%; ***1%.