

Does Equality Lead to Fraternity?

Abstract

In understanding the relationship between inequality and trust across countries, it is also necessary to consider the effect of ethnic, religious and linguistic fractionalization. Using only high-quality inequality data, and a new dataset on fractionalization, I analyze a group of sixteen mostly OECD countries. Both inequality and fractionalization are negatively associated with trust, and when both are included in the model, inequality is the more significant factor. Using instrumental variables, I show that a one standard deviation increase in inequality (a 6 point rise in the gini) causes a 13 percentage point fall in trust. Both rich and poor people tend to be less trusting in unequal countries, and little of the effect seems to be related to crime.

JEL Classification: D3, D7

Keywords: Inequality, trust, ethnic fractionalization

A spate of recent research has shown that communities with higher rates of trust tend to have more effective governments, lower crime rates, better education systems, and more rapid economic growth. While most have argued that the causal arrow runs from trust to these positive outcomes (see Fukuyama 1995; Seeman 1996; La Porta et al 1997; Knack & Keefer 1997; Hjerpe 1998; Putnam 1993, 2000), it is difficult to parse out association from causation. Yet even if trust is partially endogenous, it appears to be a useful proxy variable for a range of outcomes that matter to economists.

This paper focuses on the determinants of trust across countries, emphasizing inequality and ethnic heterogeneity. In the United States, a comparison of trust across cities has shown that trust is higher in areas with more economic equality (Putnam 2000; Alesina & La Ferrara 2002). In cross-national data, a similar observation has been made, with Knack & Keefer (1997) finding that trust is negatively related to income inequality, across a 29-country sample from the 1995 World Values Survey, a result confirmed by Uslaner (2002).

But this association between economic equality and trust may not be as straightforward as it seems. In the United States, Alesina and La Ferrara (2002) have noted that the apparent association between trust and economic equality is largely driven by the fact that the most unequal parts of the country are also those with the highest levels of racial and ethnic diversity. They conclude that “people are more likely to trust others in an unequal city than in a racially fragmented one” (2002, 222). Leigh (2003) finds a similar pattern in Australia.

Do these findings apply in other developed nations? There are reasons to suppose that, particularly in the case of Europe, race and ethnicity may be less important. Indeed, it has been argued that certain key differences between Europe and America are driven by distinct patterns of racial conflict in the United States (Alesina, Glaeser and Sacerdote 2001; Alesina 2002). To test this hypothesis, I look to cross-national data, to see how different societies' income distribution, and their ethnic, linguistic and religious makeup, affect their levels of trust.

The remainder of this paper is structured as follows. Section 1 discusses the factors that influence the formation of trust on an individual and societal level, and reviews the findings from research across different communities in the United States and Australia. Section 2 outlines my data and methodology. Section 3 looks at the factors that are associated with trust at an individual level, and Section 4 looks at national-level factors. Section 5 focuses on the relationship between inequality and trust, and the final section concludes.

1. Theory and background

1.1. What makes people trust one another?

At an individual level, trust might be affected by a variety of elements.¹ First, if trust is affected by one's sense of economic security, then higher income, wealth or education (in the sense that it proxies for permanent income) would be expected to boost trust. Second, trust might also be a product of cultural integration, in which case one would expect that individuals with higher social standing, more education, or longer tenure in their community would be more trusting. Third, trust may be lower among those who have suffered discrimination on account of their gender, race, or some other attribute. A fourth hypothesis, which I will be unable to test in this paper, is that those who have experienced some sort of a random shock – such as being the victim of a crime, or being laid off from their job – are less trusting of others.

At a societal level, several factors may be important.² First, richer societies might have higher levels of trust, because the aggregate economic security of their members is higher, or because they have more resources to devote to public goods, such as high-quality public spaces. Second, the extent of economic inequality in a community could affect trust because it leads to a greater sense of difference; of fear among those who have

1. The individual and national level factors listed here are culled from a variety of sources, including Putnam (2000) and Alesina and La Ferrara (2002).

2. At this stage, I shall use the term “societal level” quite loosely. As I shall subsequently discuss, Alesina and La Ferrara (2002) use U.S. metropolitan areas as their societal unit, while I use the nation-state.

resources; or of jealousies among those who do not. Third, racial, linguistic, religious or ethnic fractionalization (which I will refer to collectively as “fractionalization”) may create another source of “difference”. As well as creating a perceptual difference, linguistic heterogeneity creates what game theorists have called “garbling”, in which the equilibrium payoffs fall as the quality of information declines (Blackwell & Girshik 1954; Kandori 1989; Cook and Cooper 2003).

Two other society-level hypotheses will not be tested here. One is that population mobility diminishes trust, a theory that has received support both in experiments (Cohen, Riolo and Axelrod 2000), and in a sample of the United States population (Alesina and La Ferrara 2002).³ Because of a lack of comparable mobility data, I do not test this theory across countries.⁴ Another theory is that cultural and historical factors create a higher or lower trust environment. While Axelrod (2000) finds that social structure is important in maintaining cooperation, developing common metrics for comparing social structures between nations is no easy task. One form of social structure that has received a substantial amount of attention is the effect of democracy and a stable legal system on trust. Yet after reviewing an array of possible indicators, Uslaner concludes that more

3. Cohen, Riolo, and Axelrod (2001) provide support for the population mobility hypothesis in an experimental context. Analyzing a collection of agents playing pairwise Prisoner’s Dilemma, they find that the chance of maintaining a high-trust equilibrium when 10% of one’s partners are changed each period is .844, but this falls to .402 when 30% are changed each period, and just .061 when 50% are changed each period.

Likewise, Alesina and La Ferrara find that the stability of a respondent’s community has a strong and statistically significant positive association with trust (2002, 223-25).

4. Although some immigration data is available, this is unlikely to be sufficient. To properly test the effect of population mobility on trust, one would want to take account of intra-country moves – for example, comparing the fraction of residents who have lived in the same house for the past five years.

democracy, stronger judicial systems, less corruption, and a better bureaucracies do not boost trust (2002, Ch 8).

The primary focus of this paper is on the effect of fractionalization and inequality on trust. The notion that homogeneity may be associated with higher levels of trust is not new. As Coleman (1990) and Barr (1999) point out, familiarity can help boost levels of trust. Although familiarity can fall due to factors unrelated to heterogeneity (such as culture or mobility), there are theoretical reasons to think that larger racial, ethnic, linguistic, religious or economic differences would reduce trust.⁵ Hamilton (1964) proposed the theory of “kin-selection”, which posits that individuals seek to increase the rate of replication of their genes. This suggests that individuals will assist those who share their genes, and that such behavior will be governed by the benefit to be delivered (B), the coefficient of relatedness (r), and the cost incurred (C). Assistance will be provided when $C < rB$, so the probability of assistance rises with r.

One theoretical explanation for the effect of inequality on trust is proposed by Brockner and Siegel (1996), who find that perceptions of inequities in outcome can destroy trust. The authors also find a negative association between procedural injustice and trust, and argue that a history of inequality in a given context has a cumulative impact on individuals’ willingness to trust others. (Factors that might mediate the inequality-trust relationship are discussed in more detail in section 5.)

5. Indeed, Diamond (2002) suggests that one of the key elements of religion is that it defines rules of behavior towards in-groups and out-groups.

Another mechanism is suggested by Alesina and La Ferrara (1999) – that individuals prefer to interact with those who have similar preferences. To the extent that preferences are correlated with income and race, this will lead to a greater desire to interact with those of similar income and race.⁶ It should also be borne in mind that trust (or distrust) may be self-reinforcing, so that individuals whose personal characteristics make them low-trust in a low-trust community turn out to be high-trust when placed in a high-trust community. As Alesina and La Ferrara (2002) point out, this is likely to lead to a “two equilibria” phenomenon, in which homogeneous communities are more likely to tip towards the high-trust equilibrium, and heterogeneous communities are more likely to tip towards the low-trust equilibrium.

1.2. Trust and heterogeneity – evidence from America and Australia

In the United States, Alesina and La Ferrara (2002) attempt to understand the factors associated with trust by using responses from the 1974-94 General Social Survey (GSS). As a measure of trust, they use responses to the question “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people”. Their measures for inequality are calculated at the metropolitan statistical area level from the 1970, 1980 and 1990 censuses (interpolated for intervening years), and their measures of racial and ethnic fragmentation are calculated from the 1990 census. On an individual level, they find that low trust is associated with three factors – a recent history of traumatic experiences; belonging to a group that has been historically

6. This theory remains untested, since Alesina and La Ferrara (1999) do not present any evidence that preferences are correlated with income and race.

discriminated against; and having low levels of income and education. At the metropolitan area level, Alesina and La Ferrara (2002) introduce measures of ethnic fragmentation, racial fragmentation, and inequality.⁷ They find that ethnic fragmentation is not significant, but that living in a racially fragmented and/or unequal community is associated with lower levels of trust. When they introduce both racial fragmentation and inequality into their regressions, inequality ceases to be statistically significant. The effect of racial fragmentation is quite substantial. A one standard deviation increase in racial fragmentation is associated with a 3 percentage point fall in trust (controlling for individual attributes).⁸

Alesina and La Ferrara also attempt to distinguish between what they see as the two competing explanations for their findings on heterogeneity and trust. The first is the “aversion to heterogeneity” explanation – that people distrust those who are racially or economically dissimilar from themselves, and hence trust is lower in diverse communities because cross-racial or cross-economic contacts are more frequent. The second is the “local interaction” hypothesis – that because minorities and the poor tend to be less trusting of others, average trust in their communities is lower, and this drives the society towards a low-trust equilibrium. Using a variety of tests, including proxies for community-level trust, answers to other GSS questions, and the responses of blacks alone, they conclude that there is substantial evidence in favor of the aversion to

7. Under U.S. Census Board definitions, Metropolitan Statistical Areas must have a population of at least 50,000. In the 1990 census, which was the latest used by Alesina and La Ferrara, the largest MSA (New York city) comprised nearly 20 million people.

8. This accords with Costa and Kahn (2003), who attribute the fall in social capital outside the home (as measured by rates of volunteering and group membership) to rising inequality and ethnic heterogeneity over the period 1952-98.

heterogeneity explanation, and little support for the local interaction thesis. This conclusion accords with research on what sociologists have referred to as the “threat hypothesis”. For example, Taylor (1998) uses GSS data to find that white prejudice in the United States increases as black population share expands.

In the Australian context, Leigh (2003), looks at levels of trust across Australian neighborhoods, as classified by zip codes (areas containing approximately 6000 people). People are classed as trusting if they *disagree* with the statement that “Generally speaking, you can’t be too careful in dealing with most people in my local area”. For Australians, trust is positively correlated with education, age, and the mean income in the respondent’s community; but is negatively correlated with the ethno-linguistic fractionalization of the respondent’s neighborhood. Controlling for individual characteristics, a one standard deviation increase in linguistic fractionalization lowers trust by 5 percentage points. Leigh finds no significant relationship between inequality and trust in Australia.

2. Data and methodology

2.1. Individual-level data

The two largest cross-national datasets which ask about trust are the International Social Survey Program and the World Values Survey. I use the 1998 ISSP survey (ISSP 2001) and the 1995-97 wave of the WVS (Inglehart 2000). Both included questions on income

(which was only asked in deciles for the WVS, so is also converted into deciles in the ISSP) and educational attainment (converted into years of schooling). Questions on rural status and ethnicity were only asked for a subset of respondents, so are not included as controls in the cross-country regressions.⁹

The trust question in the WVS survey is identical to that asked in the GSS, while the trust question in the ISSP differs only slightly. Responses are recoded in a manner now standard in the trust literature. In the WVS, I categorize people as trusting if they respond that “People can almost always be trusted”, or “People can usually be trusted” to the question “Generally speaking, would you say that people can be trusted or that you can’t be too careful in dealing with people?”.¹⁰ In the ISSP, I categorize them as trusting if they answer “Most people can be trusted” in response to the question: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?”. Note that the ISSP asks whether *people* can be trusted, while the WVS asks whether *most people* can be trusted. One would expect that the latter is a slightly more stringent test, and this is reflected in the fact that for those countries that appear in both surveys, the mean level of trust in the ISSP is 8.2 percentage points higher than in

9. Individuals are categorized as living in a rural area if their town has a population under 10,000 (WVS dataset), or if they are classed as rural by the ISSP (for definitions of “rural” in different countries, see ISSP 2001, 210-11). Ethnicity was only included in the ISSP (variable number 315). Due to substantial variations in the way in which this question was asked in different countries, it was only possible to code ethnic minorities in Australia and West Germany.

10. Glaeser, Laibson, Scheinkman and Soutter (2000) argue that this question may be measuring the respondent’s trustworthiness, rather than the extent to which they actually trust others. Since I am primarily interested in the aggregate level of trust in a society, my findings will be essentially unaffected by whether respondents are reporting their own trust level (the Glaeser et al interpretation) or that of those around them (the conventional interpretation).

the WVS. I therefore combine the two datasets, including a dummy variable indicating which dataset the respondent belongs to. (Analyzing the two datasets separately does not appreciably change the results.)

As a check on the accuracy of the cross-national datasets, Table 2.1 compares regression results for the United States from the ISSP and the WVS to those from the GSS (used by Alesina and La Ferrara).¹¹ For purposes of comparability, I use only the 1996 and 1998 waves of the GSS, and include only variables that appear in both datasets. As one might expect (given that the WVS survey asked a slightly different question), the mean value for trust differs by approximately 6 percentage points. Nonetheless, the coefficients on income, education, age and age squared are reassuringly similar. The main difference is for gender – in the 1996-98 GSS sample, gender does not have a statistically significant effect on trust (in contrast with Alesina and La Ferrara’s finding for the 1972-94 GSS). However, the WVS/ISSP regression shows that American women are likely to be 7 percentage points more trusting, a finding that is significant at the 1 percent level. One possible explanation is that gender discrimination in the US has diminished over time, so US women are today no less trusting than their male counterparts. In any case, since gender differences are not central to this paper, I do not explore this issue further here.

11. The ISSP is a half-sample of the 1998 GSS.

Table 2.1: Comparison of results for the United States

Dependent variable: Whether respondent trusts others		
	(1) WVS (1995) & ISSP (1998)	(2) GSS (1996 & 1998)
Income	.0212*** (.00472)	.0191*** (.00338)
Education	.0287*** (.004)	.0360*** (.00335)
Female	.0712*** (.0223)	-.0104 (.0163)
Age	.0103*** (.00397)	.0165*** (.00299)
Age²	-.000071* (.000039)	-.000106*** (.000030)
ISSP	.134*** (.0236)	
1998 GSS		.0419*** (.0161)
Pseudo R²	.0661	.0808
Observed Prob	.430	.368
Predicted Prob	.426	.356
Respondents	2434	3747

Sources: 1995 World Values Survey; 1998 International Social Survey Program module, Religion II; General Social Survey 1996 & 1998

Notes:

1. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Coefficients are marginal probabilities from a probit model, with robust standard errors, clustered at the country level, in parentheses.
2. The dependent variable for ISSP respondents is the proportion who answer “People can almost always be trusted”, or “People can usually be trusted” to the question “Generally speaking, would you say that people can be trusted or that you can’t be too careful in dealing with people?”. The dependent variable for WVS and GSS respondents is the proportion who answer “Most people can be trusted” in response to the question: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?”.
3. Income is the income decile of the respondent’s family or household. These were calculated from income data for ISSP and GSS. WVS income data was already in deciles.
4. Education is years of schooling. This was asked directly in the ISSP and GSS surveys, and calculated for the WVS data, based on figures for educational attainment.
5. Female is a dummy variable equal to 1 if the respondent is female, and 0 if the respondent is male.
6. ISSP is a dummy variable equal to 1 for respondents in the ISSP survey, and 0 for respondents in the WVS survey
7. 1998 GSS is a dummy variable equal to 1 for the 1998 GSS survey, and 0 for the 1996 GSS survey.

2.2. *National-level data*

For the purposes of measuring inequality, I use the gini coefficient.¹² This measure is well suited to analyses in which one is focusing on interactions between individuals, since the gini equals the income gap between any two randomly selected people divided by twice the sample mean. For example, if a country's gini is 0.3, the expected difference between any two people is 60 percent of the mean income. This provides a useful parallel to the measure of fractionalization described below.

While large datasets of national gini coefficients have been created in recent years, a major concern in conducting cross-country analyses of inequality is to ensure that the measures of inequality are sufficiently comparable. As Atkinson and Brandolini (2001) have shown, many cross-country analyses (including those that consider trust) have used measures of inequality that are of questionable accuracy.¹³ Measures of income inequality vary according to whether income or expenditure is being measured, whether taxes are taken into account, and whether one is looking at inequality across households or individuals.

12. The gini coefficient can be defined as:

$$\text{Gini}_k = \frac{1}{2N_k^2 \mu_k} \sum_{i=1}^N \sum_{j=1}^N |y_{ik} - y_{jk}|$$

Where y_{ik} and y_{jk} are the incomes of all possible pairs of individuals in an N_k person society with mean income μ_k .

13. Knack and Keefer (1997) used inequality data as near to 1980 as possible, and drew their gini coefficients from the World Development Report and Milanovic (1994). Uslaner (2002) uses the "Accept" datapoints from the Deininger and Squire dataset, a practice that Atkinson and Brandolini (2001) specifically warn against.

Given these problems, I rely primarily on data from the Luxembourg Income Survey (LIS 2002), as these figures are designed to be more fully comparable.¹⁴ Although this does not remove all concerns (see Atkinson and Brandolini 2001, 782), it does substantially reduce the likelihood of error. LIS ginis are calculated using disposable income and person weights, with an equivalence scale based upon the square root of the number of persons in the household. Where a country was not included in the LIS, I supplemented the LIS dataset with gini coefficients from the World Income Inequality Database (UNU & UNDP 2000) that met certain conditions (see Data Appendix 2.2).¹⁵

For ethnic, linguistic and religious heterogeneity, I use the measure of “fractionalization” recently developed by Alberto Alesina, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat and Romain Wacziarg (2003). Their fractionalization measure indicates the chance that two randomly selected individuals of a country are in the same group (and is hence analogous to the gini coefficient). While this is relatively straightforward for different languages and religions, the ethnicity measure takes account of race in some countries (eg. Bolivia) and language in others (eg. Switzerland) – reflecting the fact that ethnologists consider language to be an important part of what constitutes ethnicity.

14. These figures are available at <http://www.lisproject.org/keyfigures/ineqtable.htm> (checked on 12 September 2002).

15. WIID gini coefficient were included if they were: (a) based on the entire national population; (b) based on net income; (c) enumerated at a person level; (d) classified as “1 OKIN” by the WIID; and (e) available for a year during the 1990s.

This fractionalization measure is calculated as follows:

$$(1) \quad \text{FRACT}_k = 1 - \sum_{j=1}^N s_{jk}^2$$

Where s_{jk} is the share of group j in country k .

This fractionalization data has a number of advantages over previous measures, such as those developed by Sullivan (1991), Easterly and Levine (1997), and Vanhanen (1999). First, it is more contemporary. Alesina et al measure fractionalization in countries during the 1990s, while most earlier studies used data compiled in the Soviet Union in the early 1960s (and published in the 1964 *Atlas Narodov Mira*). Second, Alesina et al's data is based on a wider set of sources than the other measures, with sources cross-checked against one another, and groups disaggregated as finely as possible. And third, the Alesina et al dataset provides separate measures for ethnic, religious, and linguistic fractionalization, while Sullivan (1991) and Vanhanen (1999) provide indices based only on the fraction of the population who are not in the majority group.

GDP figures are for 1998, taken from the World Development Indicators database (World Bank 2001). These figures are converted into U.S. dollars at purchasing power parity and then logged.¹⁶

16. The World Bank's figure for German GDP in 1998 is used to derive separate figures for East and West Germany. These are based on an estimate by Dornbusch (2000) that East German GDP in 1998 was 56 percent of West German GDP. Since the population of West Germany is around three times that of East Germany, I estimate that East German

Finally, I exclude from the sample countries that are currently Communist (China), or were Communist until recently (Eastern Europe). These countries are omitted on the basis that Communism might be thought to have systematically different effects on inequality and trust, as compared with countries that have a longer history of free markets. In particular, it seems reasonable to think that Communism depressed both trust and inequality, such that for these countries, regressing trust against inequality would produce a spurious correlation. Sixteen countries remain, of which 14 are members of the Organization for Economic Cooperation and Development (OECD). For Communist/formerly Communist countries in the ISSP or WVS, the regressions are replicated in Appendix 2.1. Summary statistics appear in Data Appendices 2.1 and 2.2.

3. Individual-level findings

At an individual level, I consider the association between trust and income, education, gender and age. For a smaller group of countries, I also show specifications that include rural/urban status, and whether the individual is from a minority ethnic group.

GDP per capita is 63 percent of German GDP per capita, while West German GDP is 112 percent of German GDP per capita.

Table 2.2: Individual-level determinants of trust

Dependent variable: Whether respondent trusts others			
	(1)	(2)	(3)
Income	.0164*** (.00206)	.0162*** (.00239)	.00986*** (.00128)
Education	.0224*** (.00303)	.0229*** (.00311)	.0314*** (.00383)
Female	.0208* (.0119)	.0299** (.0126)	.0130* (.00720)
Age	.00366 (.00236)	.00515** (.00232)	.00268 (.00830)
Age²	-.000028 (.000021)	-.000045** (.000021)	.000007 (.000088)
Rural		.00549 (.0186)	
Minority			-.0855*** (.0175)
ISSP	.0909*** (.0183)	.116*** (.0183)	
Country fixed effects?	Yes	Yes	Yes
Pseudo R²	.094	.099	.045
Observed Prob	.494	.511	.535
Predicted Prob	.495	.514	.538
Countries	16	14	2
Respondents	22070	18046	1487

Sources: 1995 World Values Survey, and 1998 International Social Survey Program module, Religion II.

Notes:

1. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Coefficients are marginal probabilities from a probit model, with robust standard errors, clustered at the country level, in parentheses.
2. The dependent variable for ISSP respondents is the proportion who answer “People can almost always be trusted”, or “People can usually be trusted” to the question “Generally speaking, would you say that people can be trusted or that you can’t be too careful in dealing with people?”. The dependent variable for WVS respondents is the proportion who answer “Most people can be trusted” in response to the question: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?”.
3. Income is the income decile of the respondent’s family or household (in both datasets, the question varied between countries). These were calculated from income data for ISSP data. WVS income data was already in deciles.
4. Education is years of schooling. This was asked directly in the ISSP survey, and calculated for the WVS data, based on figures for educational attainment.

5. Female is a dummy variable equal to 1 if the respondent is female, and 0 if the respondent is male.
6. Rural is a dummy variable equal to 1 if the respondent lived in a town with a population under 10,000 (WVS respondents), or if they were classified as rural (ISSP respondents); and 0 otherwise.
7. Minority is a dummy variable equal to 1 if the respondent is not in the same ethnic group as the majority of respondents from that country, and 0 otherwise.
8. ISSP is a dummy variable equal to 1 for respondents in the ISSP survey, and 0 for respondents in the WVS survey. It is dropped from specification (3), as both countries in that model were in the ISSP.

The figures in Table 2.2 suggest that moving up an income decile is associated with a 1½ percentage point rise in trust, while gaining an additional year of education is associated with a 2 percentage point increase in trust (both significant at the 1 percent level).

Women also appear to be 2 percentage points more trusting – though this effect is only significant at the 10 percent level. In contrast to Alesina and La Ferrara’s findings on the U.S., there is no statistically significant relationship between trust and age in the cross-national sample. Fourteen of the sixteen nations have data on rural/urban status, but in these countries, there is no significant difference between city and country. Lastly, two nations (Australia and West Germany) have data on minority status, and in these countries, minorities are 8½ percentage points less trusting.

4. National-level factors

Taking into account national-level factors, I estimate the following model, for individual i in country k :

$$(2) \quad \text{Pr}(\text{Trust}_i) = \alpha + \beta_1(\text{Income})_i + \beta_2(\text{Education})_i + \beta_3(\text{Female})_i + \beta_4(\text{Age})_i + \beta_5(\text{Age})_i^2 + \beta_6(\ln \text{GDP})_k + \beta_7(\text{Inequality})_k + \beta_8(\text{Ethnic Fractionalization})_k + \beta_9(\text{Linguistic Fractionalization})_k + \beta_{10}(\text{Religious Fractionalization})_k + \varepsilon$$

Table 2.3 shows the relationship between trust, inequality and fractionalization, controlling for individual income, education, gender, age and age squared, and for log GDP per capita at a national level. To permit comparison of the national-level characteristics, all countries are weighted equally, and standard errors are clustered at the country level.

Table 2.3: National-level determinants of trust

Dependent variable: Whether respondent trusts others							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inequality	-					-	-1.275*
	1.750***					1.501***	
	(.334)					(.433)	(.663)
Ethnic fract.		-.401***			-.347**	-.122	-.104
		(.149)			(.160)	(.127)	(.175)
Linguistic fract.			-.325*		.125		-.0181
			(.174)		(.245)		(.232)
Religious fract.				-.316***	-.273**		-.0932
				(.155)	(.164)		(.161)
GDP	-.0373	.106	.1927***	.271***	.188***	-.0304	.0269
	(.0854)	(.0724)	(.0689)	(.0693)	(.0688)	(.0847)	(.111)
Pseudo R²	.0639	.0536	.0494	.0538	.0602	.0647	.0656
Observed Prob	.494	.494	.494	.494	.494	.494	.494
Predicted Prob	.494	.494	.494	.495	.495	.494	.494
Countries	16	16	16	16	16	16	16
Respondents	22070	22070	22070	22070	22070	22070	22070

Sources: 1995 World Values Survey, and 1998 International Social Survey Program module, Religion II.

Notes:

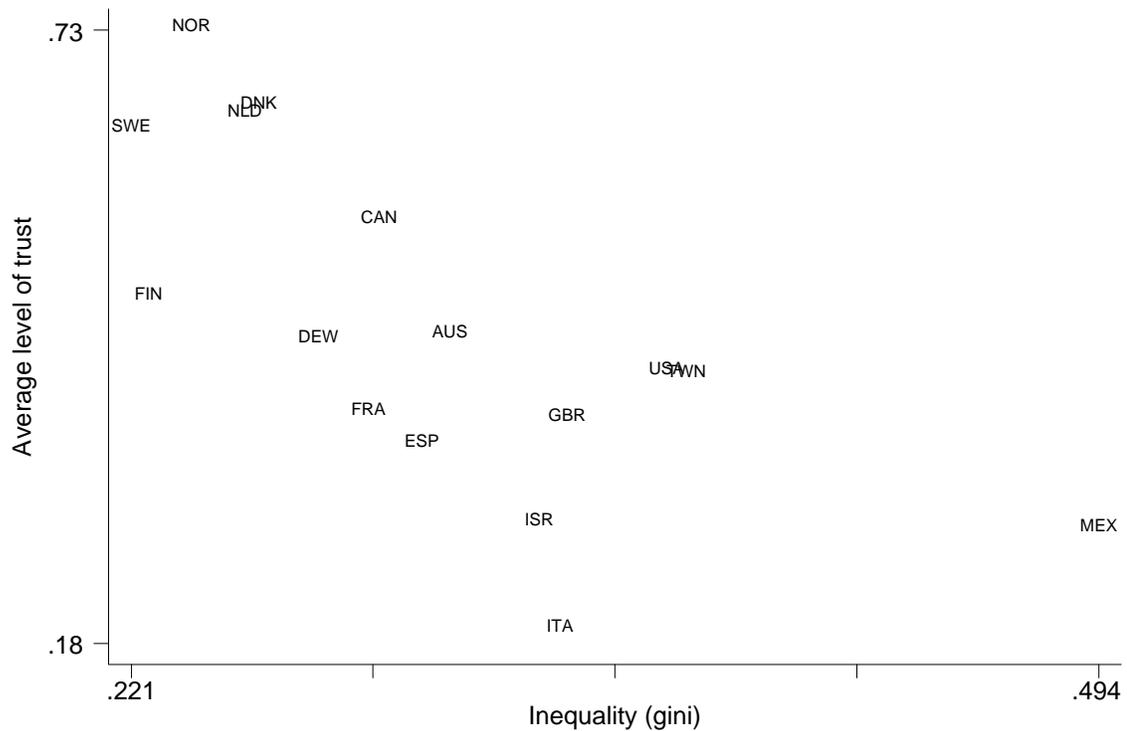
1. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Coefficients are marginal probabilities from a probit model, with robust standard errors, clustered at the country level, in parentheses.
2. All regressions control for the respondent's income, education, age, age² and whether the respondent is in the WVS or ISSP sample.
3. GDP is log 1998 GDP per capita in US\$ (PPP adjusted), from World Bank (2001).
4. Inequality is the Gini coefficient from LIS (2002) or UNU & UNDP (2000).
5. Ethnic, linguistic and religious fractionalization indices are from Alesina et al (2003).

Columns (1) to (4) of Table 2.3 separately include inequality and the three measures of fractionalization into the regression. Each is negatively related to trust, with the association being significant at the 1 percent level for all but linguistic fractionalization (where the relationship is significant at the 10 percent level). Including the three measures of fractionalization in the regression, ethnic and religious fractionalization

remain negative and significant, while linguistic fractionalization is insignificant. Among the fractionalization measures, the largest coefficient is on ethnic fractionalization (-.4), implying that a one standard deviation increase in ethnic fractionalization (about the difference between Norway and the United States) is associated with an 8 percentage point decline in trust.

However, when the fractionalization measures and inequality are both included in the model, fractionalization ceases to be statistically significant, while the relationship between inequality and trust remains negative and significant. Even with all three measures of fractionalization included in the regression, the relationship between inequality and trust is significant at the 10 percent level. The coefficient on inequality is between -1.27 and -1.75; indicating that a one standard deviation rise in inequality (a 6 point increase in the gini) is associated with an 8-12 percentage point drop in trust. Figure 2.1 graphs inequality against average rates of trust; there are no evident outliers.

Figure 2.1: Inequality and trust across countries



Like Alesina and La Ferrara, I find that ethnic fractionalization and inequality tend to be associated with lower levels of trust. But when both are included in the model, inequality matters more than ethnicity, indicating that people are more likely to trust one another in an ethnically fractious nation than in an unequal one. One interpretation of this finding is that the United States and Australia are anomalous among the mostly OECD countries that make up this dataset. Alternatively, fractionalization may matter most at the city or neighborhood level, while inequality matters most at the national level.

5. Understanding the inequality-trust relationship

In this section of the paper, I look more closely at the relationship between inequality and trust. I first use an instrumental variable to test whether inequality is affecting trust. Then I consider a number of mechanisms through which the relationship could operate.

5.1. Instrumental variable analysis

Although the foregoing results have shown a strong association between inequality and trust, this need not imply causation. Indeed, it could be that the association is entirely spurious. One way of showing causation is to find an instrument that affects inequality, and is only likely to affect trust through its effect on inequality. A useful candidate is cohort size. Higgins and Williamson (1999) posit the theory that because “fat cohorts” tend to get low rewards, earnings inequality will be reduced when there is a labor market glut at the top of the age-earnings curve, and increased when there is a glut of old or young adults. They show that the ratio of the size of the cohort aged between 40 and 59 to the population aged 15 to 69 is a powerful predictor of inequality, both across countries and within countries.

Since I use demographic data for most countries in 1996, my “mature” cohort is born in 1937-56.¹⁷ As has been pointed out, the ISSP and WVS surveys show older people to be more trusting (whether because of age or cohort effects is impossible to determine in a

17. Note that this cohort is subsequent to Putnam’s “long civic generation” – those born between 1910 and 1940 (Putnam 2000).

single cross-section). But because I control for the age of the respondent, this ought not affect the validity of the instrument, particularly given that at an individual level, there was no statistically significant relationship between age and trust.

Table 2.4: Instrumental Variable analysis

<u>A. Relationship between inequality and size of mature cohort</u>	
	Dependent variable: Inequality
Size of mature cohort	-1.492*** (.208)
R²	.647
Countries	16
Respondents	22070
<u>B. Instrumenting for inequality with size of mature cohort</u>	
	Dependent variable: Trust
Inequality	-1.965*** (.371)
R²	.08
Countries	16
Respondents	22070

Sources: 1995 World Values Survey, and 1998 International Social Survey Program module, Religion II.

Notes:

1. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Coefficients are from an OLS model, with robust standard errors, clustered at the country level, in parentheses.
2. Size of the mature cohort is the fraction of the total population aged 15-69 who are aged 40-59.
3. Panel B is the second stage of a 2SLS regression, using the size of the mature cohort to instrument for inequality, controls for the respondent's income, education, age, age², whether the respondent is in the WVS or ISSP sample, and their country's log GDP per capita.
4. Although the dependent variable in the second stage is binary, OLS appears to be a good approximation of the second stage regression, since only 0.24% of the predicted values fall outside the 0-1 range.

The first panel of Table 2.4 shows the relationship between the size of the mature population (as drawn from United Nations (2000)) and inequality.¹⁸ The association between the two is strong and statistically significant at the 1 percent level. The second panel shows the results from an instrumental variable analysis, controlling for the same set of demographic variables (which included age and age squared) at an individual level. The estimate of the effect of inequality on trust is -1.96 , which is significant at the 1 percent level (and larger in absolute value than the non-IV estimate of -1.75). According to the instrumental variables estimate, a one-standard deviation increase in inequality results in a 13 percent fall in trust.

5.2. Mediating factors

Next, I turn to three possible explanations for why inequality might be associated with lower levels of trust. First, higher levels of inequality might cause those with low incomes to feel a sense of relative deprivation, and hence be less trusting of the rest of society. For example, experimental work on ultimatum games demonstrates the willingness of individuals to punish unfair bargains, even at a cost to themselves (Larrick and Blount 1997). In the real world, antagonism over income gaps that are perceived to be “unfair” could drive down a society’s equilibrium level of trust. This is analogous to the contention that a strategy of “moderate envy” performs well in iterated Prisoner’s Dilemma simulations (Lahno 2000). In addition, inequality might make the poor less

18. Demographic data from the closest year to 1998 is used. Taiwanese data was taken directly from the government’s National Statistics website (<http://www.stat.gov.tw>). Separate figures for East and West Germany were provided to the author by Statistisches Bundesamt.

trusting if welfare become less generous in more unequal countries; though of course the causal arrow could also run from low trust to smaller welfare states (Alesina, Glaeser and Sacerdote (2001)).¹⁹

A second channel through which inequality might affect trust is that it might cause the rich to be less trusting of the poor – perhaps because the more unequal the society, the more the rich stand to lose. Third, inequality might heighten the sense of difference in a society – affecting rich and poor alike. Fourth, inequality might increase the crime rate, which in turn reduces trust.

19. Some partial evidence to support the welfare state theory is that there seems to be some parallel between the patterns of trust and equality, and Esping-Andersen's (1990) characterization of "three worlds of welfare capitalism". The countries with the highest levels of trust and equality are those Esping-Andersen terms "Social Democratic" (Denmark, Norway and Sweden). However, the theory does not fit perfectly, as there is no clear trust gap between his remaining two categories – the "Corporatist" states (France, Italy and Germany), and the "Liberal" states (Australia, Britain, Canada, the United States).

Table 2.5: Do rich and poor people respond differently to inequality?

	<u>Probit</u>		<u>IV</u>	
	Poor	Rich	Poor	Rich
GDP	-.0875 (.109)	.119 (.0835)	-.233 (.141)	.104 (.0899)
Inequality	-1.370*** (.425)	-1.882*** (.395)	-2.171*** (.535)	-1.846*** (.429)
R² or Pseudo R²	.0348	.0823	.0390	.0885
Observed Prob	.397	.619		
Predicted Prob	.394	.628		
Countries	16	16	16	16
Respondents	5037	3332	5037	3332

Sources: 1995 World Values Survey, and 1998 International Social Survey Program module, Religion II.

Notes:

1. “Poor” denotes respondents in income deciles 1 and 2. “Rich” denotes respondents in income deciles 9 and 10.
2. IV regression uses the size of the mature cohort to instrument for inequality, controlling for the respondent’s income, education, age, age², whether the respondent is in the WVS or ISSP sample, and their country’s log GDP per capita.

In Table 2.5, I look at the effect of income inequality on the richest and poorest groups.

In the probit and IV specifications, there is a significant negative relationship between inequality and trust for both rich and poor. With probit, the adverse affect of inequality on trust is greater for the rich; while using IV, the effect is greater for the poor. It is therefore possible to conclude only that inequality has a strong effect on rates of trust among both rich and poor.

Finally, I consider the relationship between trust and crime. As Fajnzylber, Lederman and Loayza (2002) have shown, more inequality is associated with more violent and property crime, and the causal connection runs from inequality to crime. It therefore seems reasonable to think that this might be an operative mechanism in the present case.

Because most cross-national crime statistics are subject to variations in reporting and definition, I focus only on two crimes – homicide and robbery. Homicide is chosen because it is known to suffer from the least underreporting, and to be a good proxy for other crime rates (Fajnzylber, Lederman and Loayza 2000). Robbery is included on the basis that it is the form of property crime which suffers from the least amount of underreporting. There are two major sets of cross-national homicide statistics, from the World Health Organization's *World Health Statistics Annual* (WHO 2000) (based on national public health records), and from the United Nations' *Survey on Crime Trends* (UN 2001) (based on national police and justice statistics).²⁰ While Fajnzylber, Lederman and Loayza (2002) find the WHO data more suitable for their purposes, I present both. Robbery rates are taken from United Nations source. All figures are in rates per 100,000 (based on population data from the World Bank), and in each case the closest year to 1998 is used.

To determine whether crime mediates the relationship between inequality and trust, I first regress trust on inequality (controlling for GDP and the usual individual demographic variables), and then include the different measures of crime in the model. If crime is indeed a mediating factor, we should expect the coefficient on inequality to fall, and the coefficient on crime to be statistically significant.

20. I was unable to obtain separate figures for West Germany, and therefore use the overall German crime statistics. Excluding West Germany from the model does not affect the results.

Table 2.6: Does inequality affect trust through crime?

Dependent variable: Whether respondent trusts others				
	(1)	(2)	(3)	(4)
GDP	-.0373 (.0854)	.301** (.125)	-.0299 (.0811)	-.0836 (.0710)
Inequality	-1.751*** (.334)	-2.818*** (.359)	-2.341*** (.347)	-1.436*** (.378)
Homicide (WHO)		.00939 (.0346)		
Homicide (UN)			.0645 (.0445)	
Robbery				-.0358 (.0255)
Pseudo R²	.0639	.0815	.0682	.0677
Observed Prob	.494	.509	.498	.491
Predicted Prob	.493	.511	.498	.490
Countries	16	14	15	13
Respondents	22070	19908	21069	18383

Sources: 1995 World Values Survey, and 1998 International Social Survey Program module, Religion II.

Notes:

1. GDP is log GDP per capita.
2. Crime figures are log rates per 100,000 people.

Table 2.6 provides little evidence to support the thesis that inequality affects trust through crime. When either of the two measures of homicide are included, the coefficient on inequality rises, and the coefficient on homicide is positive (though statistically insignificant). The only evidence of crime mediating the inequality-trust relationship is from robbery. When robbery is included, the coefficient on inequality falls by about one-fifth. In this case, the coefficient on robbery is negative, though still not statistically significant.

6. Conclusion

At an individual level, some of the factors that are related to trust among American respondents also appear in the cross-national data. Income and education are positively associated with higher levels of trust, suggesting that economic stability and cultural integration are both important determinants. However, in the cross-national sample, women appear to be *more* trusting than men, casting some doubt on the discrimination hypothesis.²¹

At a societal level, inequality, ethnic fractionalization, religious fractionalization, and (to a lesser extent) linguistic fractionalization are all negatively associated with trust. When measures of fractionalization and inequality are both included in the model, the association between trust and inequality emerges as the strongest relationship, pushing out ethnic fractionalization. This is the opposite to what has been found across U.S. cities and Australian neighborhoods, suggesting either that these two nations are exceptional, or that fractionalization may matter more at the local level than at the national level.

Instrumenting for inequality with the relative size of a country's mature age cohort indicates that the causal relationship runs from inequality to trust. However, it is difficult to understand the precise mechanism through which this occurs, since inequality lowers

21. Alternatively, it may be that U.S. women have reasons for being less trusting than women in other countries. One factor affecting this could be earnings differentials. Blau and Kahn (2003) find that among 22 developed countries, the United States has the third highest gender pay gap (after Japan and Switzerland).

trust for both the rich and the poor. I find no evidence that inequality affects trust through violent crime, and only weak support for property crime as a mediating factor.

There remains substantial work to be done in understanding the factors that affect trust at a societal level. While this paper has focused on income, inequality and fractionalization, a limited number of countries, and a lack of comparable national statistics, prevents proper analysis of population mobility, or of less quantifiable factors such as culture and history. Further country-specific research, beyond what we already know about the United States and Australia, would be helpful in shedding light on the various factors that determine why some people trust, and others do not.

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Appendix 2.1: Regressions replicated for Communist or formerly Communist countries

Dependent variable: Whether respondent trusts others						
	(1)	(2)	(3)	(4)	(5)	(6)
Income	.00864*** (.00181)	.00834** (.00346)	.00696** (.00343)	.00696** (.00345)	.00917*** (.00293)	.00616** (.00256)
Education	.0126*** (.00321)	.00603 (.00554)	.00734 (.00519)	.00747 (.00502)	.00485 (.00489)	.0102*** (.00346)
Female	-.00368 (.00690)	-.0103 (.00796)	-.00918 (.00783)	-.00919 (.00792)	-.0101 (.00723)	-.00692 (.00691)
Age	-.00147 (.00220)	-.000556 (.00228)	-.000362 (.00236)	-.000354 (.00235)	-.000492 (.00229)	-.000197 (.00228)
Age²	.000024 (.000024)	.000012 (.000027)	.000010 (.000028)	.000010 (.000028)	.000012 (.000026)	.000010 (.000026)
GDP		-.0254 (.0544)	-.0430 (.0613)	-.0439 (.0616)	-.0361 (.0421)	-.0209 (.0398)
Inequality		.166 (.305)				.294 (.197)
Ethnic fract.			-.1403 (.140)			1.0414* (.621)
Linguistic fract.				-.132 (.134)		-1.234** (.601)
Religious fract.					.402** (.175)	.595*** (.136)
ISSP	.0181 (.0288)	.000488 (.0303)	-.00415 (.0309)	-.00492 (.0311)	.00850 (.0347)	-.00175 (.0311)
Country fixed effects?	Yes	No	No	No	No	No
Pseudo R²	.05	.007	.008	.009	.02	.035
Observed Prob	.274	.275	.275	.275	.275	.275
Predicted Prob	.265	.273	.273	.273	.270	.268
Countries	12	12	12	12	12	12
Respondents	18266	18266	18266	18266	18266	18266

Notes: As for Tables 2.2 and 2.3.

Data Appendix 2.1

	<u>Non-Communist (16 countries)</u>			<u>Communist or formerly Communist (12 countries)</u>		
	Observations	Mean	S.D.	Observations	Mean	S.D.
Trust	22070	0.494	0.500	18266	0.279	0.448
Income	22070	5.084	2.778	18266	5.047	2.657
Education	22070	11.378	3.956	18266	10.923	3.206
Female	22070	0.508	0.500	18266	0.553	0.497
Age	22070	44.097	16.465	18266	45.093	16.306
Rural	18046	0.269	0.444	16389	0.365	0.482
Minority	1487	0.186	0.389	5250	0.239	0.427
ISSP	22070	0.562	0.496	18266	0.395	0.489
Log GDP	22070	9.984	0.294	18266	8.766	0.568
Inequality (Gini)	22070	0.304	0.066	18266	0.329	0.093
Ethnic fract.	22070	0.235	0.192	18266	0.285	0.163
Religious fract.	22070	0.513	0.247	18266	0.500	0.147
Linguistic fract.	22070	0.305	0.186	18266	0.269	0.177
Size of mature cohort	22070	0.344	0.036	18266	0.340	0.028
Homicide per 100,000 (WHO)	19908	2.012	2.153	16825	8.937	7.820
Homicide per 100,000 (UN)	21069	2.616	3.230	18266	7.403	5.918
Robbery per 100,000	18383	249.106	399.358	16825	63.841	61.600

Data Appendix 2.2

Country	Dataset	Communist or Former Communist	Trust Average (WVS)	Trust Average (ISSP)	Log GDP per capita (1998)	Gini (LIS)	Gini (WIID)	Ethnic fract.	Religious fract.	Linguistic fract.	Size of mature cohort	Homicide (WHO)	Homicide (UN)	Robbery (UN)
Australia	Both	No	.40	.54	1.052	.311		.186	.384	.187	.343	1.6	1.52	126.6
Canada	ISSP	No		.53	1.121	.291		.168	.657	.164	.352	1.4	1.68	95.9
China	WVS	Yes	.53		8.114		.452	.131	.253	.141	.307		2.12	
Czech Republic	ISSP	Yes		.50	9.459	.259		.103	.403	.122	.377	1.5	1.69	41.81
Denmark	ISSP	No		.66	1.135	.257		.152	.524	.030	.379	1.1	.92	49.19
East Germany	Both	Yes	.25	.37	9.577		.216	.418	.326	.807	.351	.9	1.19	78.54
Estonia	WVS	Yes	.22		9.012		.3697	.344	.347	.552	.355	16.4	13.94	282.92
Finland	WVS	No	.48		9.994	.226		.115	.303	.115	.394	3.3	2.19	4.6
France	ISSP	No		.35	9.995	.288		.587	.556	.580	.336	1	1.65	35.73
Hungary	ISSP	Yes		.37	9.282	.323		.322	.414	.322	.374	3	2.86	3.26
Israel	ISSP	No		.29	9.808	.336		.105	.722	.514	.303	1	2.67	
Italy	ISSP	No		.19	9.977	.342		.397	.811	.166	.348	1.4	1.52	65.59
Latvia	Both	Yes	.25	.22	8.699		.3217	.850	.742	.832	.355	11.9	1.21	24.87
Mexico	WVS	No	.28		8.988	.494		.710	.385	.719	.235		14.93	316.71
Netherlands	ISSP	No		.65	1.044	.253		.239	.306	.836	.362	1.3	1.24	92.02
Norway	Both	No	.65	.79	1.230	.238		.254	.565	.255	.360	1	.86	3.55
Poland	Both	Yes	.18	.24	8.983	.294		.416	.451	.413	.350	2.5	4.83	88.44
Russian Federation	ISSP	Yes		.23	8.841	.447		.060	.234	.197	.345	22.2	18.03	83.24
Slovak Republic	ISSP	Yes		.16	9.222	.189		.274	.684	.503	.311	2	2.37	22.84
Slovenia	Both	Yes	.16	.16	9.610		.2505	.320	.005	.222	.354	2	.71	19.12
Spain	Both	No	.30	.38	9.743	.303		.121	.694	.053	.318	.8	1.18	134.09
Sweden	Both	No	.60	.67	9.970	.221		.490	.824	.565	.386	1.2	1.77	
Taiwan	WVS	No	.42		9.687		.3778	.168	.657	.164	.291			
Ukraine	WVS	Yes	.24		8.118		.226	.4737	.6157	.4741	.355	11.3	8.34	44.72
United Kingdom	ISSP*	No	.30	.49	9.960	.344		.1211	.6944	.0532	.352	.3	1.43	127.84
United States	Both	No	.36	.50	1.323	.372		.4901	.8241	.5647	.360	7.6	5.19	162.61
West Germany	Both	No	.42	.48	1.156		.274	.1682	.6571	.1642	.351	.9	1.19	78.54

* Although the United Kingdom was included in the 1995-97 WVS, it is omitted here because income and education were missing from the dataset.