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Does Equality Lead to Fraternity?

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ABSTRACT

Several cross-country studies have observed a negative correlation between inequality and interpersonal trust. Using data from 59 countries, I instrument for inequality using the relative size of the mature-aged cohort, and find that a rise in inequality reduces trust.

JEL Classification: D3, D7

Keywords: Trust, inequality, ethnic fractionalization, instrumental variables

1. <u>Trust, Inequality, and Ethnic Heterogeneity</u>

Economic theory has shown that the payoff in repeated games can be higher under conditions in which the players trust one another. In a society with high levels of generalized trust, individuals may be more willing to contract with others. In the presence of imperfect information, costly enforcement or coordination failures, high levels of trust can raise economic efficiency (Durlauf and Fafchamps 2004).

But what determines why some communities are more trusting than others? Two potentially important factors are ethnic heterogeneity and income inequality – both of which have been shown to be negatively correlated with trust. Across US cities (Alesina and La Ferrara 2002) and across Australian neighborhoods (Leigh 2006), ethnic heterogeneity appears to be more important than inequality. But cross-national studies have typically found that the negative relationship between trust and income inequality dominates (Knack and Keefer 1997; Uslaner 2002). Most of these studies do not deal with the possibility of reverse causation – that inequality might itself be affected by trust.

Supposing inequality or ethnic heterogeneity affect trust, what are the causal channels through which this effect could operate? Summarizing the literature on heterogeneity and cooperation, Bandiera, Barankay and Rasul (2005) suggest that (a) homogeneous communities might be better at solving collective action problems because members have similar tastes; (b) individuals might dislike working with others outside their group; (c) heterogeneity may lead to disagreement over how to share public goods; and (d) heterogeneity might undermine the ability to devise mechanisms that sustain trust and cooperation. In the case of inequality, they also suggest that an unequal distribution of resources might favor rent-seeking in the case of common pool resources.

Alternatively, causation might run the opposite direction. One way in which trust might affect inequality is if low levels of trust lead to less provision of public goods, and higher levels of post-tax inequality. Alternatively, trust might affect ethnic heterogeneity, for example if countries with high levels of trust are less inclined to admit immigrants.

2. Empirical Strategy and Results

One way to identify whether inequality has a causal effect on trust is to find an instrument that is correlated with inequality, and is only likely to be correlated with trust through its effect on inequality. A useful candidate is cohort size. Higgins and Williamson (2002) point out 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 and within countries. The distribution of the population along the age-earnings curve should affect inequality, but ought not have any direct impact on trust, except through the channel of inequality.

To test this, I use data from the European and World Values Surveys Integrated Data File. After merging in some additional variables from other datasets, my sample covers 82,778 respondents in 59 countries. Forty-eight of the countries were surveyed in 1999-2000, and 11 countries were surveyed in 1995-97 (these are all countries that were not surveyed in 1999-2000). As a measure of trust, respondents were asked "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?". Respondents who said "most people can be trusted" were coded as 1, while those who said that "you need to be very careful dealing with people" were coded as 0.[1] The data were then collapsed to the country level.

As a measure of inequality, I use the gini coefficient, which is a measure of the income gap between any two randomly selected individuals in the population, and is therefore the most appropriate measure of inequality for this purpose. Gini coefficients are drawn from the World Income Inequality Database, taking care to use only measures of income inequality that cover the entire population (on the comparability of inequality measures, see Atkinson and Brandolini 2001). Two other national-level controls are also included: the log of GDP per capita in international dollars at purchasing power parity (from the World Bank's World Development Indicators data base), and a Herfindahl-type index of ethnic fractionalization,

1. Glaeser, Laibson, Scheinkman and Soutter (2000) argue that this question may be measuring the respondent's *trustworthiness*, rather than how *trusting* they are. 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).

measuring the chance that two randomly selected people in a country are from the same group (from Alesina et al 2003). Table 1 presents summary statistics.

Table 1: Summary Statistics		
Variable	**Mean**	**SD**
Trust	0.289	0.155
Gini	0.400	0.113
Log GDP per capita	9.068	1.014
Ethnic fractionalization	0.331	0.228
Mature cohort	0.299	0.052

The relationship between inequality and trust is depicted in Figure 1, which indicates a strong negative association between the two variables. The more unequal a country is, the fewer of its residents believe that most people can be trusted.

Figure 1: Trust and Inequality

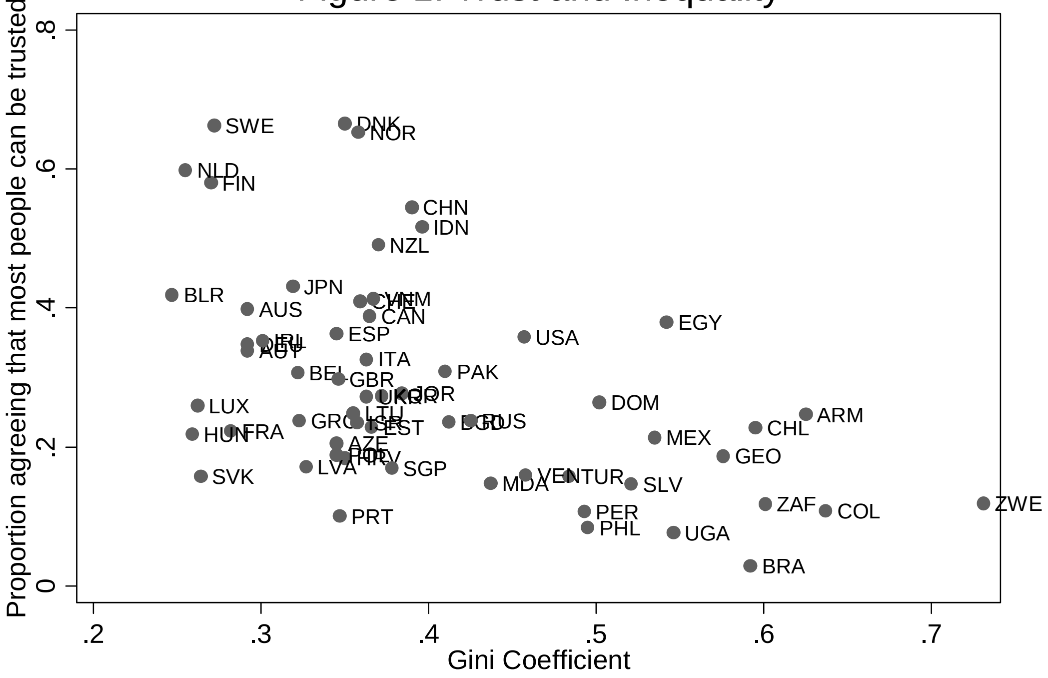

Table 2 estimates the relationship between inequality and trust in a simple OLS specification, controlling for average per-capita income and ethnic heterogeneity. A 10 point increase in the gini coefficient is associated with a 5 percentage point fall in the fraction of the population who agree that most people can be trusted. Trust is positively associated with average per-capita income, and negatively associated with ethnic fractionalization, though these relationships are not statistically significant at conventional levels.

Table 2: Country-Level Specification (OLS)
Dependent variable: Whether respondent believes that most people can be trusted

Gini	-0.466***
	[0.156]
Log GDP per capita	0.024
	[0.019]
Ethnic fractionalization	-0.119
	[0.084]
Countries	59
R^2	0.29

Note: ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Robust standard errors in brackets.

In Table 3, I use the size of the mature-aged cohort (the ratio of the size of the cohort aged between 40 and 59 to the population aged 15 to 69) as an instrument for inequality. The first stage regression is strong and significant, with approximately a one-to-one relationship between the relative size of the mature-aged cohort and the gini coefficient. Using this instrumental variables approach, the second stage of the regression is negative and statistically significant at the 10 percent level. The magnitude of the effect is slightly larger in the IV specification than in the OLS specification. The coefficient suggests that a 10 point rise in the gini coefficient would lead to a 6 percent fall in the fraction of people agreeing that most people can be trusted.

Table 3: Country-Level Specification (IV)	
<u>First Stage</u>	
	Dependent variable: Gini coefficient
Size of mature cohort	-1.022***
	[0.340]
Log GDP per capita	-0.021
	[0.017]
Ethnic fractionalization	0.073
	[0.052]
Countries	59
R^2	0.47
Partial R^2 on excluded instrument	0.18
<u>Second Stage</u>	
	Dependent variable: Trust
Gini	-0.573*
	[0.310]
Log GDP per capita	0.018
	[0.021]
Ethnic fractionalization	-0.107
	[0.087]
Countries	59
R^2	0.29

Note: ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Robust standard errors in brackets.

An alternative approach is to run the regressions at an individual level, controlling for the respondent's years of schooling, gender, marital status, age and age^2, but clustering standard errors at a country level. Note that by carrying out the regression at an individual level, rather than collapsing all data to the country level, it is possible to instrument with the size of the mature-aged cohort, controlling for the age of the individual respondent (helping to satisfy the exclusion restriction for the instrument). The tables below show results using this strategy.

Table 4 presents results using a probit model and a linear probability model (to allow comparison with the IV results in Table 5). In both cases, there is a significant negative relationship between inequality and trust, with a 10 point rise in the gini associated with a 4 percentage point fall in trust. Average per-capita income is positively associated with trust, and ethnic heterogeneity is negatively associated with trust, though both are less statistically significant than the inequality/trust relationship. Those with more education, men, and older respondents tend to be more trusting, though the age effect diminishes over time.

Table 4: Individual-Level Specifications (Probit and Linear Probability Models)
Dependent variable: Whether respondent believes that most people can be trusted

	(1) **Probit**	**(2)** **OLS**
Gini	-0.393**	-0.354**
	[0.177]	[0.162]
Log GDP per capita	0.026	0.028*
	[0.017]	[0.017]
Ethnic fractionalization	-0.138*	-0.131*
	[0.082]	[0.078]
Years of school	0.011***	0.011***
	[0.003]	[0.003]
Female	-0.012***	-0.012***
	[0.004]	[0.004]
Married	0.004	0.003
	[0.011]	[0.010]
Age	0.004***	0.004***
	[0.001]	[0.001]
Age^2 /1000	-0.040***	-0.040***
	[0.015]	[0.014]
Countries	59	59
Individuals	82,778	82,778
R^2 or Pseudo-R^2	0.03	0.04

Notes: ***, ** and * denote significance at the 1%, 5% and 10% level respectively, with robust standard errors, clustered at the country level, in brackets. Column 1 shows marginal probabilities from a probit model.

Table 5 shows results that are qualitatively and quantitatively similar to those in Table 3. When the size of the mature aged cohort is used to instrument for inequality in an individual-level specification, clustering standard errors at the country level, the effect of inequality on trust is negative and significant, with a coefficient around -0.6.

Table 5: Individual-Level Specification (IV)

First Stage

	Dependent variable: Gini coefficient
Size of mature cohort	-1.010***
	[0.364]
Log GDP per capita	-0.019
	[0.018]
Ethnic fractionalization	0.09
	[0.055]
Individuals	82,778
Countries	59
R^2	0.49
Partial R^2 on excluded instrument	0.16

Second Stage

	Dependent variable: Trust
Gini	-0.613**
	[0.296]
Log GDP per capita	0.016
	[0.020]
Ethnic fractionalization	-0.096
	[0.084]
Individuals	82,778
Countries	59
R^2	0.04

Notes: ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Coefficients are from a linear probability model, with robust standard errors, clustered at the country level, in brackets. Both regressions also control for years of schooling, gender, marital status, age and age^2. A linear probability model is used in preference to a probit, since Stata's probit IV module does not facilitate the use of analytic weights and clustering of standard errors.

3. Conclusion

Instrumenting for inequality with the relative size of a country's mature age cohort indicates that across countries, inequality has a causal effect of lowering trust. The finding that inequality matters more than ethnic heterogeneity is the opposite of what has been found across US cities and Australian neighborhoods. Three possible ways in which these results could be reconciled are that these two nations are exceptional; that inequality measures are more comparable across countries than measures of ethnic heterogeneity; or that trust is affected by ethnic diversity at the local level, and inequality at the national level.

References

Alesina, A, Glaeser, E, and Sacerdote, B. 2001. "Why Doesn't the United States Have a European-Style Welfare State?" *Brookings Papers on Economic Activity*. 2001(2): 187-254

Alesina, A. and La Ferrara, E. 2002. "Who trusts others?" *Journal of Public Economics*. 85: 207-34

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S. and Wacziarg, R. 2003. "Fractionalization" *Journal of Economic Growth* 8(2): 155-194

Atkinson, A and Brandolini, A. 2001. "Promise and Pitfalls in the Use of 'Secondary' Data-Sets: Income Inequality in OECD Countries as a Case Study". *Journal of Economic Literature*. 39: 771-99

Bandiera, O., Barankay, I. and Rasul, I. 2005. "Cooperation in collective action" *Economics of Transition* 13(3): 473–498.

Durlauf, S.N. and Fafchamps, M. 2004. "Social Capital" in S.N. Durlauf and P. Aghion (eds) *Handbook of Economic Growth*, Amsterdam: North Holland

Glaeser, E, Laibson, D, Scheinkman, J, Soutter, C. 2000. "Measuring Trust". *Quarterly Journal of Economics*. 65: 811-846

Higgins, M. and Williamson, J.G. 2002. "Explaining inequality the world round: cohort size, Kuznets curves, and openness" *Journal of Southeast Asian Studies* 40(3): 268-302.

Knack, S and Keefer, P. 1997. "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation". *Quarterly Journal of Economics*. 112(4): 1251-88

Leigh, A. 2006. "Trust, Inequality, and Ethnic Heterogeneity" *Economic Record*, forthcoming

Uslaner, E.M. 2002. *The Moral Foundations of Trust*. Cambridge: Cambridge University Press

Data Appendix

Gini coefficients are from the World Income Inequality Database, version 2.0a (June 2005), available at http://www.wider.unu.edu/wiid/wiid.htm. Observations were used that met the following criteria: (a) the estimate was for income rather than consumption or expenditure; (b) the income-sharing unit was not the tax unit; (c) the estimate covered the full geographic area of the country; (d) the estimate covered the entire population; and (e) the gini was calculated in 1990 or later, but not later than the trust survey. Where there were multiple observations that met these five criteria, I used the most recent observation.

Mature cohort is the ratio of the size of the population aged between 40 and 59 to the population aged 15 to 69. Population data from the US Census Bureau's International Data Base, available at http://www.census.gov/ipc/www/idbsprd.html. In all cases, I use the most recent year of data available.

Log GDP per capita is measured in international dollars, converted at purchasing power parity, from the World Bank's World Development Indicators database, available at http://www.worldbank.org/data/wdi2005/index.html. Respondents in the 1995-97 wave were assigned the figure for 1995, while respondents in the 1999-2000 wave were assigned the figure for 1999.

Ethnic fractionalization indices are from Alesina et al (2003), available at http://www.stanford.edu/~wacziarg/.

Country-Level Data						
Country	**Trust**	**Gini**	**Log GDP per capita**	**Ethnic Fractionalization**	**Mature cohort**	**WVS Wave**
ARM	0.247	0.625	7.421	0.127	0.273	1995
AUS	0.399	0.292	9.972	0.093	0.350	1995
AUT	0.339	0.292	10.187	0.107	0.330	1999
AZE	0.205	0.345	7.423	0.205	0.252	1995
BEL	0.307	0.322	10.126	0.555	0.334	1999
BGD	0.235	0.412	7.286	0.045	0.236	1999
BLR	0.419	0.247	8.396	0.322	0.330	1999
BRA	0.028	0.592	8.761	0.541	0.269	1995
CAN	0.388	0.365	10.180	0.712	0.340	1999
CHE	0.410	0.359	10.143	0.531	0.349	1995
CHL	0.228	0.595	9.063	0.186	0.271	1999
CHN	0.545	0.390	8.158	0.154	0.256	1999
COL	0.108	0.637	8.672	0.601	0.243	1995
DEU	0.348	0.292	10.123	0.168	0.357	1999
DNK	0.665	0.350	10.228	0.082	0.356	1999
DOM	0.264	0.502	8.371	0.429	0.231	1995
EGY	0.379	0.542	8.116	0.184	0.261	1999
ESP	0.362	0.345	9.846	0.417	0.317	1999
EST	0.228	0.366	9.114	0.506	0.349	1999
FIN	0.580	0.270	10.065	0.132	0.361	1999
FRA	0.222	0.282	10.083	0.103	0.328	1999
GBR	0.297	0.346	10.065	0.121	0.343	1999
GEO	0.187	0.576	7.240	0.492	0.322	1995
GRC	0.237	0.323	9.657	0.158	0.347	1999
HRV	0.184	0.350	9.022	0.369	0.354	1999
HUN	0.218	0.259	9.372	0.152	0.351	1999
IDN	0.516	0.396	7.970	0.735	0.248	1999
IRL	0.352	0.301	10.204	0.121	0.325	1999
ISR	0.235	0.357	9.847	0.344	0.270	1999
ITA	0.326	0.363	10.072	0.115	0.342	1999
JOR	0.277	0.384	8.254	0.593	0.201	1999
JPN	0.431	0.319	10.117	0.012	0.390	1999
KOR	0.273	0.372	9.542	0.002	0.291	1999
LTU	0.249	0.355	9.012	0.322	0.336	1999
LUX	0.260	0.262	10.767	0.530	0.342	1999
LVA	0.171	0.327	8.853	0.587	0.356	1999
MDA	0.147	0.437	7.144	0.554	0.299	1999
MEX	0.213	0.535	9.026	0.542	0.227	1999
NLD	0.598	0.255	10.166	0.105	0.336	1999
NOR	0.653	0.358	10.240	0.059	0.324	1995
NZL	0.491	0.370	9.746	0.397	0.312	1995
PAK	0.308	0.410	7.506	0.710	0.243	1999
PER	0.107	0.493	8.431	0.657	0.250	1999
PHL	0.084	0.495	8.223	0.239	0.243	1999

POL	0.189	0.345	9.141	0.118	0.316	1999
PRT	0.100	0.347	9.703	0.047	0.331	1999
RUS	0.237	0.425	8.780	0.245	0.325	1999
SGP	0.169	0.378	9.945	0.386	0.260	1999
SLV	0.146	0.521	8.305	0.198	0.236	1995
SVK	0.157	0.264	9.300	0.254	0.311	1999
SWE	0.663	0.272	10.047	0.060	0.361	1999
TUR	0.157	0.484	8.661	0.320	0.254	1999
UGA	0.076	0.546	7.076	0.930	0.202	1999
UKR	0.272	0.363	8.231	0.474	0.346	1999
USA	0.358	0.457	10.400	0.490	0.376	1999
VEN	0.159	0.458	8.609	0.497	0.231	1999
VNM	0.413	0.367	7.532	0.238	0.216	1999
ZAF	0.118	0.601	9.120	0.752	0.245	1999
ZWE	0.119	0.731	7.933	0.387	0.205	1999

Note: WVS wave refers to whether the trust data were collected in the 1995-97 wave (denoted 1995), or the 1999-2000 wave (denoted 1999).