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# The co-evolution of social capital and financial development

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**Abstract**

This paper documents the co-evolution of social capital, measured as generalized trust, and financial development over the twentieth century. I use cross generations inherited trust of Americans with foreign ancestors to track trust in their home country in 1913 and 1990. The paper documents a positive cross-section relationship between trust and financial development in 1913. Then, I show that increasing trust is also associated with increasing financial development at the country level over the twentieth century. In other words, countries that experienced larger improvements in trust also experienced a stronger financial development. These results are robust to the introduction of real GDP per capita and trade openness as alternative determinants of financial development.

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> Mr. Untermyer: *Is not commercial credit based primarily upon money or property?*
>
> Mr. Morgan: *No, sir; the first thing is character.*
>
> Mr. Untermyer: *Before money or property?*
>
> Mr. Morgan: *Before money or anything else. Money can not buy it.*
>
> Mr. Untermyer: *So that a man with character, without anything at all behind it, can get all the credit he wants, and a man with the property can not get it?*
>
> Mr. Morgan: *That is very often the case. [...] A man I do not trust could not get money from me on all the bonds in Christendom.*
>
> Mr. Untermyer: *That is the rule all over the world?*
>
> Mr. Morgan: *I think that is the fundamental basis of business.*

Audition of J. Pierpont Mogan by Samuel Untermyer, counsel for the Committee.

Money Trust Investigation: Investigation of financial and monetary conditions in the United States, subcommittee of the committee on banking and currency.

Washington - Government Printing Office - 1913.

# 1 Introduction

As noted by Arrow (1972), "*virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time.*" This statement cannot be more valid than for financial transactions involving debtors and creditors that are mutually dependent as soon as a contract is concluded between them. Accordingly, trust and financial development should evolve simultaneously over time.

Trust is a specific component of social capital. Financial development and social capital are two fields that have received a large interest during the recent years. However, the link between these two concepts has been directly addressed only by Guiso et al. (2004). These authors exploited social capital differences within Italy. In this paper, I document the co-evolution of social capital, measured as generalized trust, and financial development over the twentieth century at the country level. As in Rajan and Zingales (2003), financial development in 1913 and 1990 is measured using the ratio of deposits in commercial banks over GDP, the ratio of total stock market capitalization over GDP, and the number of listed companies per million inhabitants. I use changes in inherited trust among Americans immigrants of different generations to track changes in trust in their home country between 1913 and 1990. I first document a positive cross-section relationship between trust and financial development in 1913. Then, I show that increasing trust is also associated with increasing financial development at the country level over the twentieth century. In other words, countries that experienced larger improvements

trust also experienced a stronger financial development. These results are robust to the introduction of real GDP per capita and trade openness as alternative determinants of financial development.

Most of recent studies about financial development have converged around the institutional question. Since the seminal work of La Porta et al. (1997, 1998), a large number of paper have emphasized the crucial role of the legal and political systems as determinants of financial development. One of the most influential of those paper has been Rajan and Zingales (2003). According to these authors, financial development is partly determined by the degree of openness of an economy. The present paper sheds light on social capital as an alternative determinant of financial development.

Social capital as gained a large interest as a determinant of economic performance. Knack and Keefer (1997) showed that countries with higher social capital have also better institutions, higher and more equal incomes and a better educated population. Similar evidences have been provided by Tabellini (2005) in the case of European regions. Guiso et al. (2006, 2008a, 2008b) presented some evidences about the way economic experiences from the distant past may shape current economic performance, through transmission of adequate norms. Dincer and Uslaner (2010) have found a positive relationship between trust and growth. More recently, Algan and Cahuc (2010) provide new evidences regarding the impact of trust on economic development. See also Zack and Knack (2001), Knack (2001), or Tabellini (2007) for additional developments. As pointed out by Guiso et al. (2004), financial behavior is a domain in which social capital, and the various norms of cooperation associated with this concept, is likely to have large impacts.

This paper is organized as follows. Section 2 presents the methodology and the data. Then, empirical results are presented in section 3. Finally, section 4 concludes the paper.

## 2   Data and methodology

This section, first presents the relationships which will be estimated. These estimations necessitate data on trust in the early twentieth century. Such data do not exist, but can be approximated by inherited trust of Americans. Finally, I briefly describe the data on financial development used in this paper.

The first relationship I am going to estimate is the cross-section relationship between trust and financial development in the early twentieth century. Thus, the estimated model is :

$$\text{FinDev}_i = \alpha + \beta_1 \, \text{Trust}_i + \varepsilon_i, \tag{1}$$

where $\text{FinDev}_i$ denotes financial development in country $i$, $\text{Trust}_i$ represents the level of trust in country $i$, and $\varepsilon_i$ is the error term. The estimation of parameter $\beta_1$ will thus rely on differences in trust across countries. Parameter $\beta_1$ captures the effect of trust on

financial development in space.

The second relation estimated in this paper is the within-country relationship between trust and financial development over the twentieth century. In this case, the estimated model is :

$$\text{FinDev}_{it} = \alpha + \beta_2 \, \text{Trust}_{it} + \text{I}_i + \varepsilon_{it}, \qquad (2)$$

where $\text{FinDev}_{it}$ denotes financial development in country $i$ at time $t$, $\text{Trust}_{it}$ represents the level of trust in country $i$ at time $t$, $\text{I}_i$ is a country fixed effect, and $\varepsilon_{it}$ is the error term. The estimation of parameter $\beta_2$ will thus rely on differences in trust across time at the country level. Parameter $\beta_2$ captures the effect of trust on financial development over time.

Most cross-country comparisons of the impact of social capital use the individual answers to subjective questions from surveys such as the World Values Survey or the European Social Survey for example. Individual answers are aggregated at the country level to obtain any indicator of social capital. These surveys have been conducted only since the eighties. This makes the computation of any time-varying indicator of social capital very difficult because individual values are widely recognized as variables that evolve very slowly over time, as deep parameters of any society. Beside this, a direct consequence of the period covered by these surveys is that trust indicators for the early twentieth century cannot be obtained directly.

This challenge can be overcome by using inherited trust of Americans. This method (used by Carroll et al. (1994) and Fernandez and Fogli (2009) among others) relies on the epidemiological approach, i.e., individuals differing only in one dimension are observed in the same context. Differences in any outcome are thus attributed to differences in the dimension of interest. In this paper, I use Americans interviewed in the General Social Survey (GSS), taking into account the country of origin of their ancestors. Selecting different dates of birth and different generations of immigration, it is thus possible to asses differences in trust in origin countries for different periods. Namely, following Algan and Cahuc (2010), inherited trust at time $T$ is estimated using immigrants of second generation born before $T$ ; third generation immigrants born before $T + 25$ ; and fourth generation immigrants born before $T + 50$. This method necessitates to choose a sufficiently large time gap between periods to avoid any overlapping problems. I estimate inherited trust in 1913 and 1990 using this method.[1] This allow to obtain two observations per country for trust.

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[1] Accordingly, trust in 1913 is estimated using Americans of second generation born before 1913, of third generation born before 1938, and of fourth generation born before 1963. Similarly, trust in 1990 is estimated using Americans of second generation born between 1913 and 1990, of third generation born after 1938, and of fourth generation born after 1963.

Concretely, I estimate the following probit model :

$$P(\text{Trust}_i^c = 1) = a_0 + \sum_{j=1}^{n} a_j x_{ji} + I_c + \varepsilon_i, \qquad (3)$$

where $P(\text{Trust}_i^c = 1)$ is the probability that individual $i$, claiming that its ancestors came from country $c$, answers "*most people can be trusted*" to the following question of the GSS : "*Generally speaking, would you say that most people can be trusted or that you can't be too careful in life ?*". $I_c$ is the origin country fixed effect, while Norway is the reference category[2], $x_{ji}$ represents an individual characteristic[3] of respondent $i$, and $\varepsilon_i$ is the error term.

Marginal effects estimated according to equation (3) for 1913 and 1990 are presented in tables 1 and 2. The marginal effects associated with origin countries in 1913 and 1990 are presented by figure 1. This figure and the tables should be read as follows : in 1913, Americans with Canadians ancestors are 12 percents less likely to be trusting than Americans with Norwegian ancestors ; in 1990, Americans with French ancestors are 13 percents less likely to answer "*most people can be trusted*" than Americans with Norwegian ancestors. Comparing inherited trust in 1913 and 1990 for a given country gives information of how trust in the country has evolved with respect to trust in Norway between these two dates. For example, the gap in trust with respect to Norway increased in Switzerland (the marginal effect moves from $-0.08$ to $-0.11$). Similarly, the gap with respect to Norway has vanished and became opposite in the case of Denmark (the marginal effects moves from $-0.15$ to $0.01$).

Following Rajan and Zingales (2003), I collected data on financial development in 1913 and 1990 for 14 countries. I used three different indicators of financial development. The first one is the ratio of deposits in commercial and savings banks to GDP. I updated the data of Rajan and Zingales (2003) using data from Mitchell (2003), Flandreau and Zumer (2004) and the United Nations Statistics Division. The two other indicators are the ratio between stock market capitalization and GDP and the number of listed firms per million people.[4] See Rajan and Zingales (2003) for a discussion of these measures of financial development.

Comparing the evolution of trust and financial development over the twentieth century requires long period data for both financial development and trust. Data on financial development are remarkably limited for the early twentieth century. A similar remark applies to the data on trust which simply do not exist for this period. Given todays state

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[2]The choice of Norway as the reference origin country is arbitrary and does not drive our results.

[3]I control for gender, education, age, age squared, religion, income, marital status, and employment status.

[4]Total stock market capitalization and the number of listed companies are not available for Greece and Spain in 1913. As a consequence, all empirical results using these two variables will rely only on 12 countries.

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of research, the only way to track trust differences in the distant past is to use inherited trust of Americans. This method is constrained both by the number of observations in the GSS and by the number of proposed "country of origin" in this questionnaire. Taking into account these two sets of constraints for available data, the richest regression presented in this paper only includes 14 countries. Since the both data sources are short, it would be virtually impossible (or at least extremely difficult) to assemble a larger data set.

# 3   Empirical results

This section presents the empirical results. I first present the cross-section relationship between trust and financial development in 1913. Then, I look at the within-country relationship between trust and financial development between 1913 and 1990.

Inherited trust offers a unique opportunity to observe the relationship between trust and financial development in the early twentieth century. Figures 2, 3, and 4 plot inherited trust and financial development in 1913. All figures exhibit a positive association between trust and financial development. This suggests that countries with higher generalized trust had a more developed financial system at the beginning of the twentieth century. According to these figures, differences in social capital explain between 15% and 26% of the cross-country differences in financial development in 1913.

However, this positive relationship could be determined by omitted variables. Table 3 presents the estimated coefficients of equation (1), controlling for differences in real GDP per capita and trade openness in 1913.[5] In columns 1, 3, and 5, only real GDP per capita is introduced as additional regressor. This reinforces the size and improve the significance level of the inherited trust coefficient when the dependent variable is either stock market capitalization over GDP or the number of listed firms per million people. In the case of the ratio of deposits to GDP, the coefficient of inherited trust decreases and becomes less significant but still very close to the 10 percents significance level (the p-value equals 0.113). In columns 2, 4, and 6, I introduce trade openness as an additional explanatory variable. The magnitude of the estimated coefficients of inherited trust is unchanged. Furthermore, the coefficient becomes significant at the 10 percents significance level when the dependent variable is the ratio of deposits to GDP. Summary statistics for these regressions are presented in table 4. According to column 3 of table 3, a 10 percentage points increase in trust with respect to Norway is associated with a 0.2 increase in stock market capitalization, which represents roughly one standard deviation of this variable. Similarly, according to the estimated coefficient of inherited trust presented in column 6, the effect of a 0.1 increase in trust is associated with a one standard deviation change in the number of listed companies. These results show

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[5] Real GDP per capita is taken from the Maddison's database. Trade openness is calculated as the ratio of exports plus imports to GDP using using data from Mitchell (2003).

that the positive cross-country relationship between trust and financial development is sizable and not driven by the simple difference in economic development. Furthermore, the relationship persists when taking into account differences in trade openness, a major determinant of financial development as argued by Rajan and Zingales (2003).

The remaining of this section presents findings regarding the within-country relationship between trust and financial development over the twentieth century. Figures 5, 6, and 7 present the relationship between changes in trust with respect to Norway and changes in financial development with respect to the same country over the period 1913-1990. The three slopes representing the linear relationships between variables are positive. This suggests that changes in inherited trust explain between 5 and 10 percents of changes in financial development.

Table 5 confirms these findings by presenting the estimated coefficients of equation (2). In columns 1, 3, and 5, financial development in 1913 and 1990 is regressed on inherited trust and real GDP per capita for the same dates, together with country fixed effects. In columns 2, 4, and 6, I introduce a time dummy for 1990 to control for potential convergence in financial development across countries, as well as trade openness. The estimated coefficient of inherited trust is significant when the dependent variable is either total stock market capitalization or the number of listed companies. However, it is not significant in the case of the ratio of deposits to GDP. In the case of stock market capitalization, the estimated effect of a 0.1 change in inherited trust equals 0.25, which represent one half of a standard deviation for changes in stock market capitalization. For the number of listed companies, the comparable exercise leads to one third of a standard deviation. In other words, a 0.1 increase in the share of trusting people between 1913 and 1990 is associated with 11 more listed companies at the country level. When included simultaneously, neither real GDP per capita, nor trade openness, are found to be significantly correlated with financial development.

These results show that the positive relationship between trust and financial development is also valid at the country level across time and that the effect of trust on financial development is economically sizable. According to these estimates, the effect of trust on financial development outperform the effect of trade openness or economic development.

# 4   Conclusion

This paper shows that higher social capital, measured as generalized trust, is associated with larger financial development in 1913. Increasing trust is also associated with increasing financial development at the country level over the twentieth century. In other terms, countries that experienced larger improvements in trust also experienced a stronger financial development. This relationship is robust to the introduction of real GDP per capita and trade openness in empirical models.

These results confirm the evidence presented by Guiso et al. (2004) regarding the importance of social capital in financial development, and let room for future research concerning the channels through which social capital favors financial development. This research agenda involves theoretical, as well as empirical work to establish to what extent norms of cooperation are substitutes or necessary conditions to build institutions facilitating financial development.

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# Figures

Figure 1: Inherited trust in 1913 and 1990.

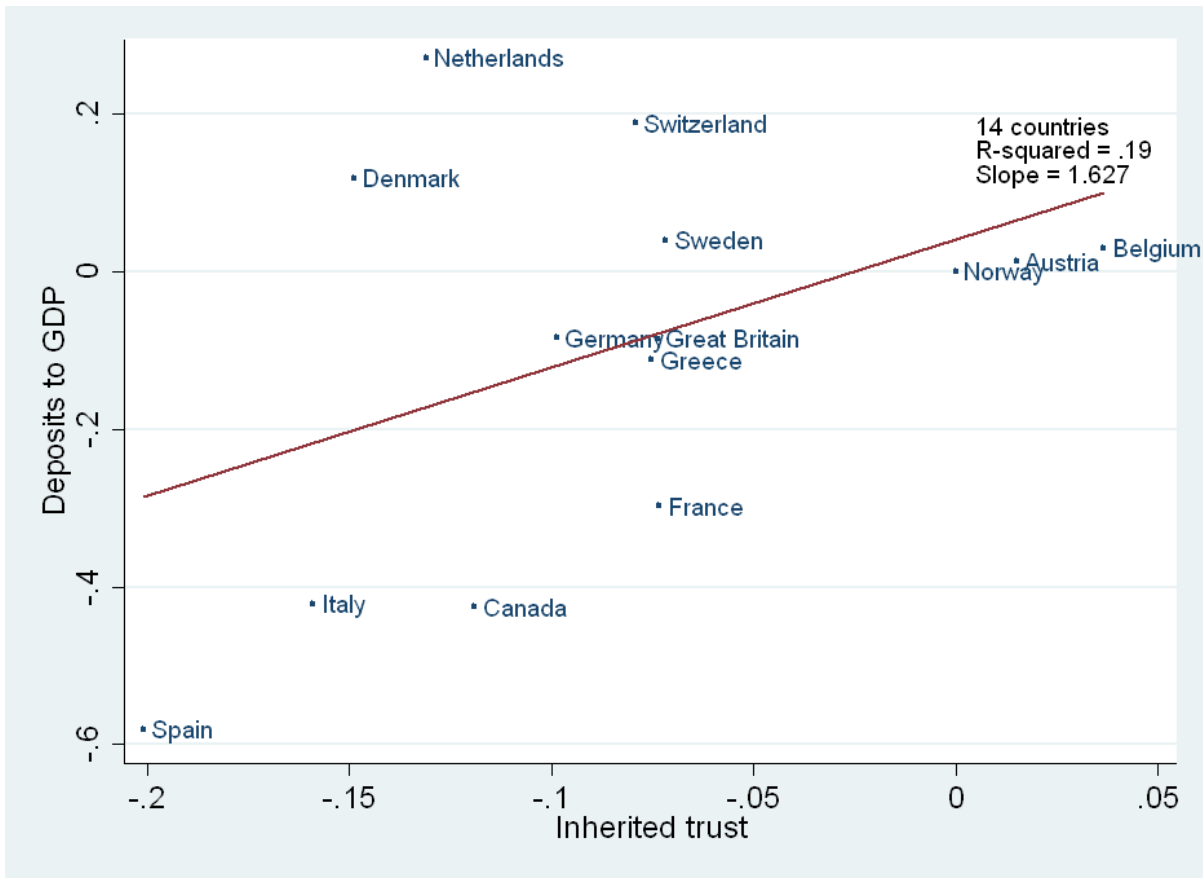Figure 2: Relationship between inherited trust and the ratio of deposits to GDP in 1913.

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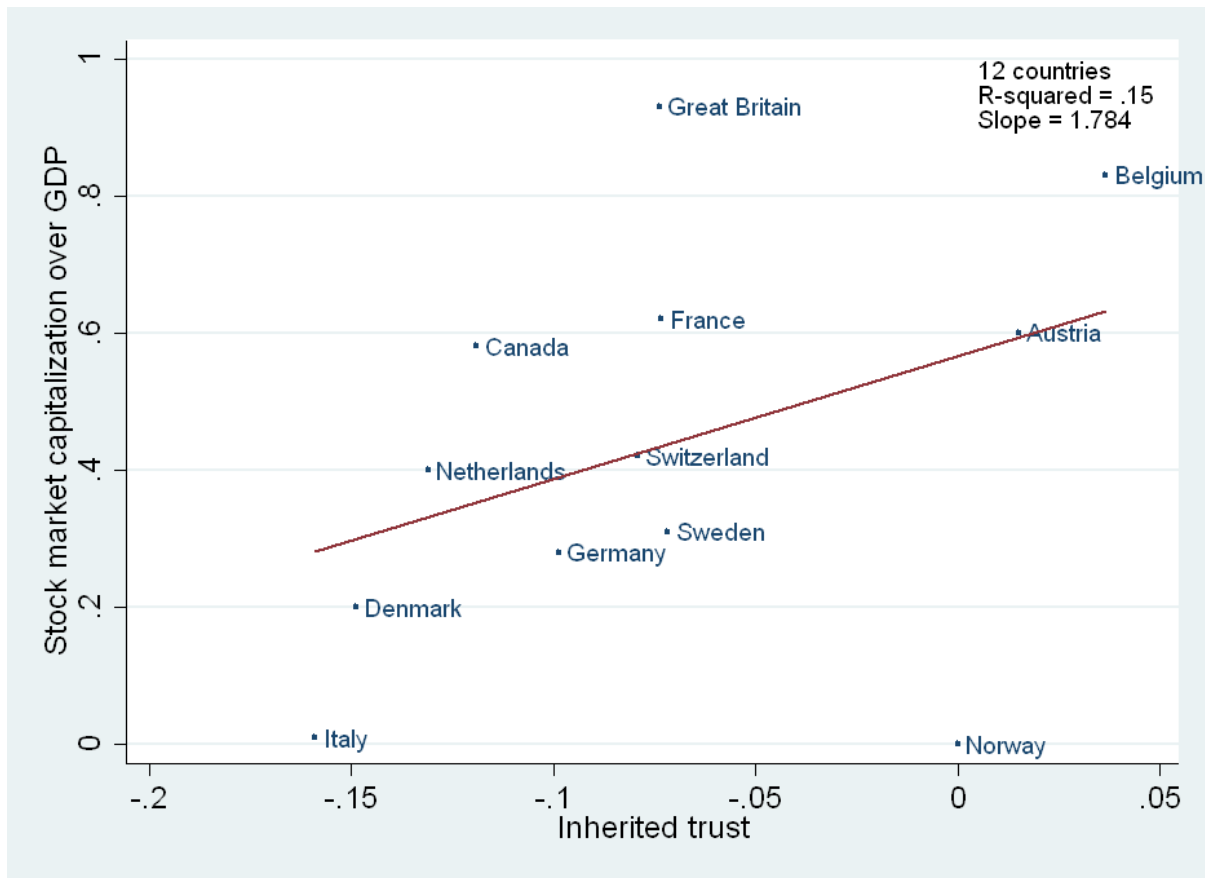Figure 3: Relationship between inherited trust and stock market capitalization over GDP in 1913.

Figure 4: Relationship between inherited trust and the number of listed companies per million people in 1913.
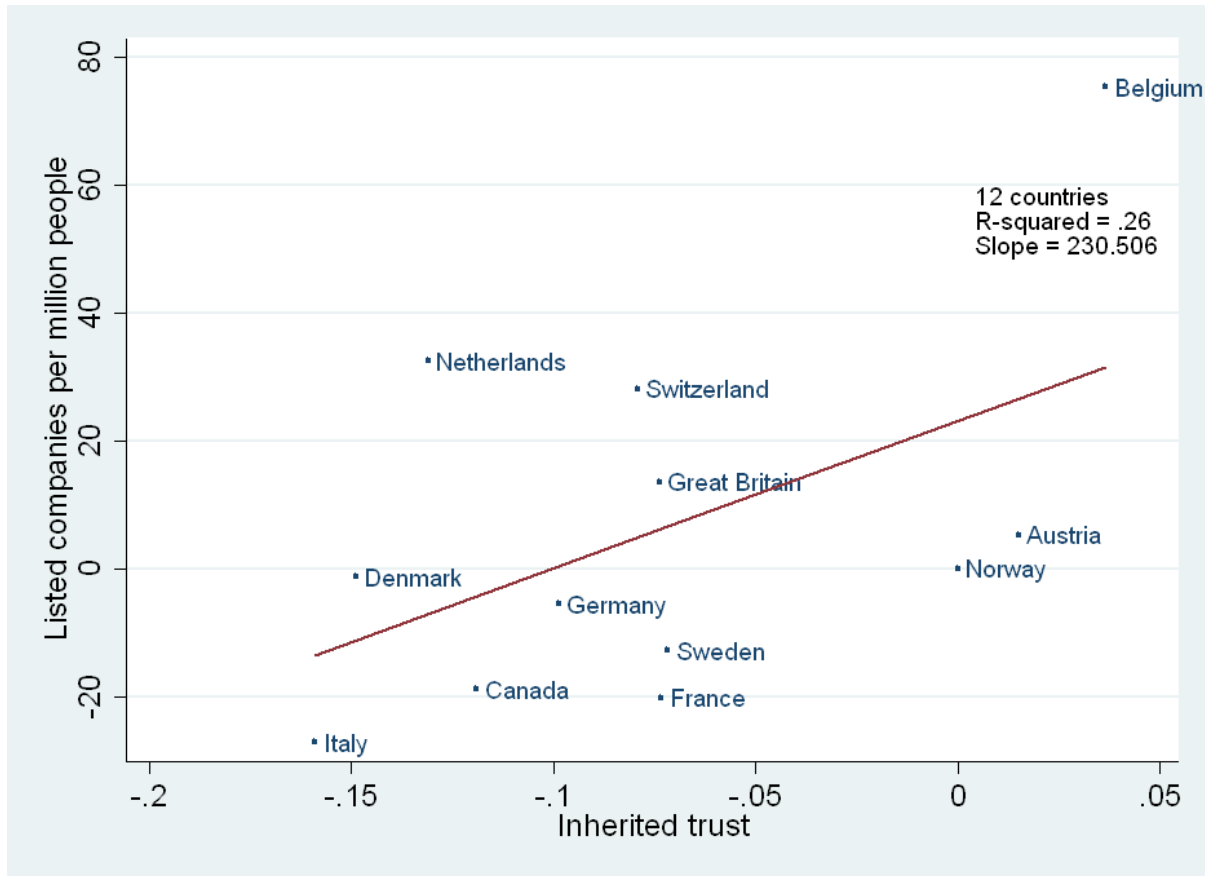
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Figure 5: Changes in inherited trust and in the ratio of deposits to GDP 1913-1990.
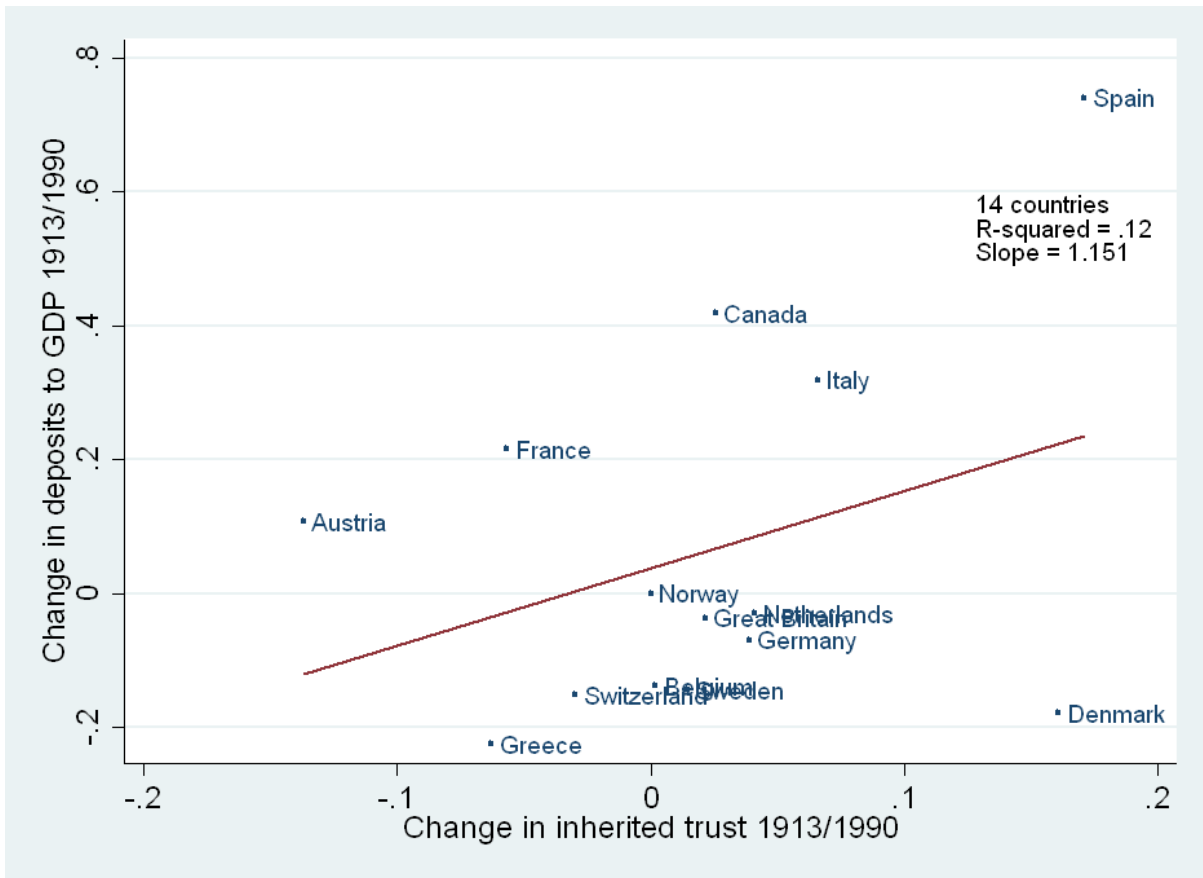
Figure 6: Changes in inherited trust and in stock market capitalization over GDP 1913-1990.
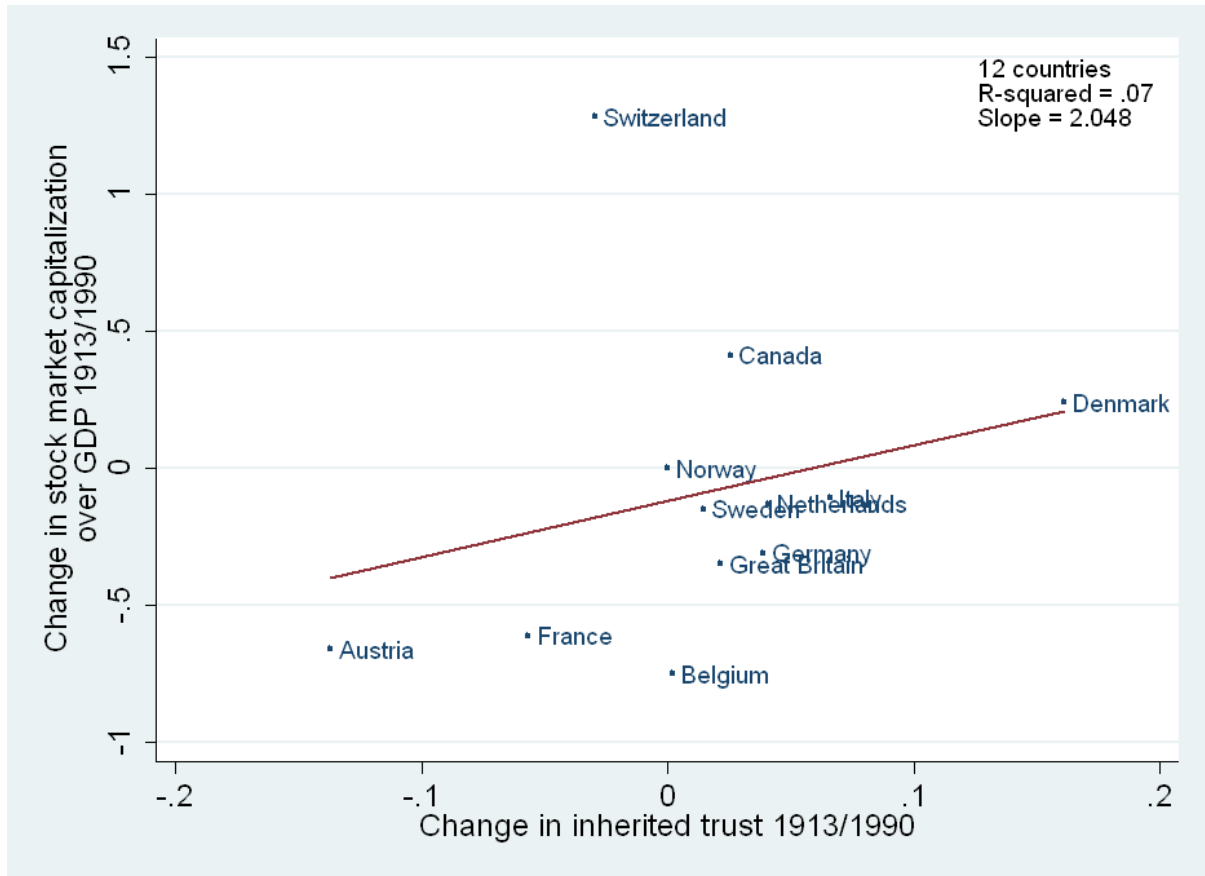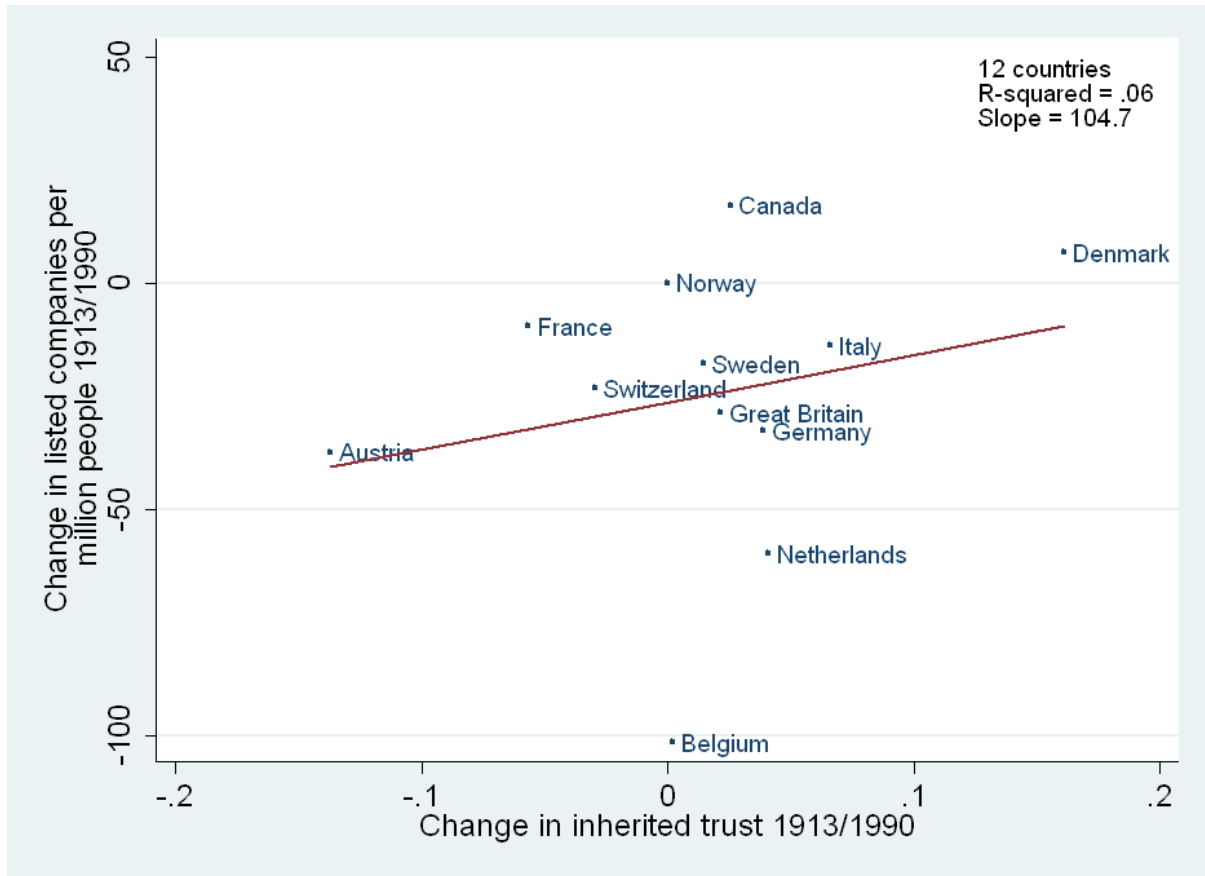
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Figure 7: Changes in inherited trust and in the number of listed companies per million people 1913-1990.

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# Tables

Table 1: Estimation of inherited trust in 1913.

Dependent variable is individual trust

| | | | |
|---|---|---|---|
| Austria | 0.0149* | Male | -0.00534 |
| | (0.00820) | | (0.0123) |
| Canada | -0.119*** | Age | 0.0128*** |
| | (0.0141) | | (0.00187) |
| Denmark | -0.149*** | Age squared | -9.08e-05*** |
| | (0.00164) | | (1.86e-05) |
| Great Britain | -0.0739*** | Married | 0.0489*** |
| | (0.00180) | | (0.0109) |
| France | -0.0733*** | Protestant | 0.0245 |
| | (0.00713) | | (0.0197) |
| Germany | -0.0988*** | Catholic | 0.0494 |
| | (0.00345) | | (0.0459) |
| Greece | -0.0753*** | Education | 0.0402*** |
| | (0.00715) | | (0.00163) |
| Italy | -0.159*** | Employed | 0.0405** |
| | (0.0143) | | (0.0170) |
| Nehterlands | -0.131*** | Income | 0.000761 |
| | (0.00276) | | (0.00242) |
| Spain | -0.201*** | | |
| | (0.0121) | | |
| Sweden | -0.0717*** | Observations | 6769 |
| | (0.00228) | Pseudo R-squared | 0.0535 |
| Switzerland | -0.0793*** | | |
| | (0.00306) | | |
| Belgium | 0.0366** | | |
| | (0.0178) | | |

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in parentheses. Marginal effects of a probit model. For dummy variables, the reported coefficient denotes the effect of a discrete change. The reference origin country is Norway. The sample is made of Americans of second generation born before 1913, of third generation born before 1938, and of fourth generation born before 1963. A constant term and year fixed effects for the year of interview are also included.

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Table 2: Estimation of inherited trust in 1990.

Dependent variable is individual trust

| | | | |
|---|---|---|---|
| Austria | -0.122*** | Male | 0.0599*** |
| | (0.0101) | | (0.0208) |
| Canada | -0.0935*** | Age | 0.00427 |
| | (0.00708) | | (0.00577) |
| Denmark | 0.0118* | Age squared | -5.95e-06 |
| | (0.00688) | | (6.08e-05) |
| Great Britain | -0.0524*** | Married | 0.0383 |
| | (0.0104) | | (0.0250) |
| France | -0.130*** | Protestant | -0.0101 |
| | (0.00695) | | (0.0179) |
| Germany | -0.0600*** | Catholic | -0.0208 |
| | (0.0124) | | (0.0167) |
| Greece | -0.138*** | Education | 0.0447*** |
| | (0.0129) | | (0.00401) |
| Italy | -0.0932*** | Employed | 0.0202* |
| | (0.0107) | | (0.0121) |
| Netherlands | -0.0900*** | Income | 0.00272 |
| | (0.00846) | | (0.00312) |
| Spain | -0.0300*** | | |
| | (0.00727) | | |
| Sweden | -0.0574*** | Observations | 2859 |
| | (0.0119) | Pseudo R-squared | 0.0597 |
| Switerland | -0.109*** | | |
| | (0.00902) | | |
| Belgium | 0.0385** | | |
| | (0.0160) | | |

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Marginal effects of a probit model. For dummy variables, the reported coefficient denotes the effect of a discrete change. The reference origin country is Norway. The sample is made of Americans of second generation born between 1913 and 1990, of third generation born after 1938, and of fourth generation born after 1963. A constant term and year fixed effects for the year of interview are also included.

Table 4: Summary statistics for cross-section estimates in 1913.

| | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Deposits | 14 | .549 | .249 | .065 | .916 |
| Stock market capitalization | 12 | .592 | .293 | .16 | 1.09 |
| Listed companies | 12 | 39.205 | 28.618 | 6.32 | 108.7 |
| Inherited trust | 14 | -.084 | .067 | -.201 | .0366 |

"Deposits" is the ratio of deposits in commercial banks to GDP. "Stock market capitalization" is the ratio of total stock market capitalization to GDP. "Listed companies" is the number of publicly traded domestic companies per million inhabitants. These variables are given in absolute terms whereas they are defined with respect to Norway in table 3.

Table 6: Summary statistics for the relationship between trust and financial development over time at the country level, 1913-1990.

| | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Change in deposits | 14 | .058 | .275 | -.225 | .739 |
| Change in stock market capitalization | 12 | -.095 | .555 | -.75 | 1.28 |
| Change in listed companies | 12 | -25.061 | 31.772 | -101.49 | 17.05 |
| Change in inherited trust | 14 | .018 | .081 | -.137 | .171 |

"Deposits" is the ratio of deposits in commercial banks to GDP. "Stock market capitalization" is the ratio of total stock market capitalization to GDP. "Listed companies" is the number of publicly traded domestic companies per million inhabitants. Changes are computed for each country between 1913 and 1990.

Table 3: Relationship between trust and financial development, cross-section estimates in 1913.

| Dependent variable : | Deposits | | Stock market capitalization | | Listed companies | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Inherited trust | 1.438 | 1.632* | 2.012*** | 1.957*** | 244.3* | 273.4** |
| | (0.836) | (0.795) | (0.530) | (0.575) | (122.1) | (105.3) |
| Real GDP per capita | 0.00789 | 0.00209 | 0.0316*** | 0.0327*** | 1.915** | 1.350* |
| | (0.00624) | (0.00562) | (0.00599) | (0.00616) | (0.719) | (0.586) |
| Openness | | 0.212*** | | -0.0409 | | 21.94*** |
| | | (0.0425) | | (0.0406) | | (5.592) |
| Constant | -0.0534 | -0.00814 | 0.185 | 0.176 | -0.0622 | 4.739 |
| | (0.0777) | (0.0769) | (0.112) | (0.113) | (10.83) | (9.439) |
| Observations | 14 | 14 | 12 | 12 | 12 | 12 |
| R-squared | 0.286 | 0.548 | 0.795 | 0.803 | 0.512 | 0.761 |

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in parentheses. OLS regressions. All variables are defined with respect to Norway.

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Table 5: Relationship between trust and financial development over time at the country level, 1913-1990.

| Dependent variable : | Deposits | | Stock market capitalization | | Listed companies | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Inherited trust | 1.100 | 1.168 | 2.661*** | 2.292** | 116.4** | 142.7** |
| | (1.245) | (1.387) | (0.681) | (0.894) | (50.78) | (53.32) |
| Real GDP per capita | -0.00152 | -0.00147 | 0.0137*** | 0.0272** | 1.176** | 0.870 |
| | (0.00230) | (0.00377) | (0.00322) | (0.0109) | (0.379) | (0.508) |
| Openness | | 0.0623 | | -0.138 | | 15.60 |
| | | (0.0529) | | (0.105) | | (8.704) |
| Time dummy | | 0.00830 | | 0.392 | | -6.196 |
| | | (0.110) | | (0.278) | | (10.07) |
| Constant | 0.0103 | -8.89e-05 | 0.532*** | -0.102 | -1.850 | 8.458 |
| | (0.0999) | (0.181) | (0.0821) | (0.476) | (5.440) | (17.80) |
| Observations | 28 | 28 | 24 | 24 | 24 | 24 |
| Number of countries | 14 | 14 | 12 | 12 | 12 | 12 |
| R-squared (within) | 0.174 | 0.188 | 0.436 | 0.660 | 0.539 | 0.598 |

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in parentheses. OLS regressions with country fixed effects. All variables are defined with respect to Norway.