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Does trust favor macroeconomic stability?*

Marc Sangnier†

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Abstract

This paper investigates the relationship between trust and macroeconomic volatility. In a cross section of countries, we show that higher trust is associated with lower macroeconomic instability. We use the inherited trust of Americans as an instrumental variable of trust in their origin country to overcome all potential reverse causality concerns. We use changes in inherited trust over the XXth century to show that increasing trust also decreases volatility across time. Thus, trust is shown to be an important determinant of macroeconomic stability both in space and time. Finally, we show that trust reduces investment volatility but not public expenditure volatility.
KEYWORDS : Trust, volatility, macroeconomic stability, social capital.
JEL CODES : E02, E30, N10.

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1 Introduction

The cost of real macroeconomic volatility in terms of well-being as been shown by Wolfers (2003) to be quantitatively important. Thus, all the factors that are able to foster or weaken it deserve attention.

This paper investigates the relationship between trust and macroeconomic instability. In a cross section of countries, higher trust is correlated with weaker macroeconomic volatility. We focus on this relationship and test alternative determinants of macroeconomic stability. We disentangle backward causality by using inherited trust of Americans immigrants as an indicator of latent trust in their origin country. Then, we use changes in inherited trust between 1910 and 1970 to show that trust also reduces macroeconomic instability across time at the country level. Last, we turn back to the cross-country relationship and show that trust weakens the volatility of investment, but not of public expenditure.

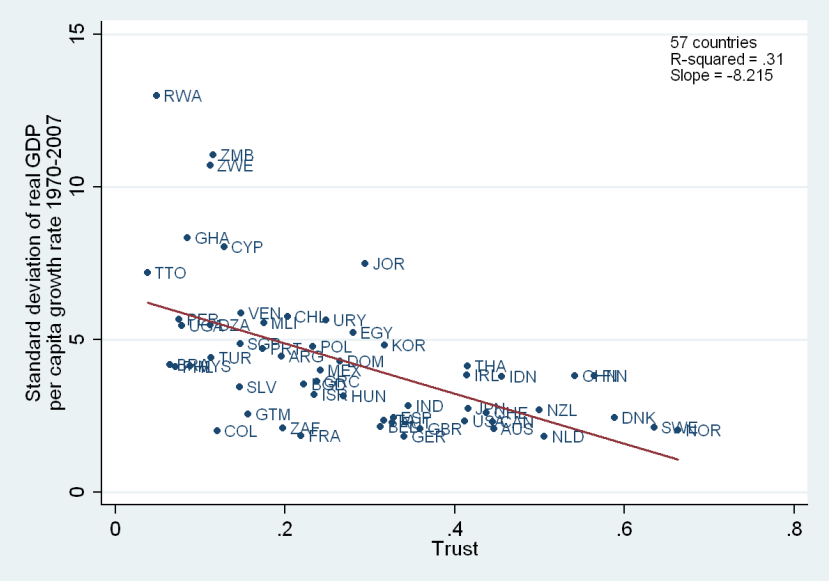
In figure 1, trust is measured in each country by the share of people who answer "*most people can be trusted*" to the following question of the World Values Survey between 1981 and 2008 : "*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?*". Macroeconomic instability is represented by the standard deviation of real GDP per capita growth rate between 1970 and 2007. The negative relationship between these two variables is highly significant. Differences in trust explain up to a third of cross country differences in volatility.

The fact that cultural traits such as norms of cooperation, civic spirit or beliefs regarding the behavior of others have an impact on macroeconomic performance has been massively explored in the literature. See for example Knack and Keefer (1997) and Algan and Cahuc (2010) among others. However, macroeconomic stability remains an unexplored economic outcome that may be in part explained by trust as suggested by the relationship we mentioned.

Trust is an indicator of social capital. This later concept has been defined by Putman (2000) as "the collective values of all social networks and the inclinations that arise from these networks to do things for each others". Thus, trust represents a set of beliefs that favor inter-personal cooperation within the society. Trust may thus favor economic performance.

Trust may favor macroeconomic stability through two channels. First, since trust implies extended civic behavior, it may be associated with better economic management by the authorities if it reflects a greater cohesion of the

Figure 1: Relationship between the standard deviation of real GDP per capita growth rate 1970-2007 and trust 1981-2008.



society. Indeed, it has been shown by Knack and Keefer (1997) that countries with higher trust have also better institutions. According to Acemoglu et al. (2003), countries with better institutions exhibit lower macroeconomic volatility. Hence, if trust deters the discretionary use of public expenditures it can thus implies weaker macroeconomic volatility due to less volatile policies.

Second, following Glaeser et al. (2000), trust, the most general dimension of social capital, is closely linked to trustworthiness.[1] Hence, individual trust can be considered as empathy or as an individual commitment to behave well with other agents. This decreases costs of interactions and allows to build expectations and plans with greater certainty. In line with this reasoning, Knack and Keefer (1997) documented a positive relationship between trust and the share of investment in GDP. But if trust makes investment higher, it should also make it more stable over time, what is also likely to smooth aggregate output. Although explaining the deep mechanisms of these two channels at the individual level is beyond the scope of this paper, these two explanations are tested in the last section,where we show that trust is higly negatively correlated with the volatility of investment but not with the one

[1]This assertion has been discussed by Fehr et al. (2003) and Sapienza et al. (2007).

of public expenditure.

These channels from trust, and social capital in general, to macroeconomic stability can be found under alternative and various forms in the literature that investigates the impact of culture and social capital on economic outcomes. In that dimension, this paper is closely related to all researches that aim to point a link from social capital to economic outcomes.

After the funding pieces of work run by Putman (1993), lots of evidence about the impact of social capital on economic performance have been raised by scholars. 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 evidence have been provided by Tabellini (2005) in the case of European regions. Guiso et al. (2006, 2007 and 2008) presented some evidence about the way economic experiences from the distant past may shape current economic performance, through transmission of adequate norms. Dincer and Uslaner (2007) have found a positive relationship between trust and growth. More recently, Algan and Cahuc (2010) provide new evidence regarding the impact of trust on economic development. See also Zack and Knack (2001), Knack (2001), and Tabellini (2007, 2008) for additional developments.

A key aspect of this literature is about the issue of the malleability of beliefs with respect to current economic situation. In rough terms, a first approach considers that norms and values of a society are very sticky and slow moving parameters and therefore weakly altered by current events ; on the contrary, a second approach emphasizes the changes in beliefs induced by changes in the current economic situation. Our view is closer to the former approach. In this paper, we assume that trust is a *latent component* of a society. Consequently, we consider that latent culture is unaffected by macroeconomic volatility. Our first set of results do rely on this assumption.

Indeed, we first measure trust trough the widely used question of the World Values Survey, using the share of trusting people as a proxy for generalized trust at the country level during the last quarter of the 20th century. However, the hypothesis that *current measure* of trust may be impacted by current macroeconomic outcomes cannot be fully rejected. For example, it has been shown by Giuliano and Spilimbergo (2009) that people who experienced recessions during early adulthood are likely to have lower individual social capital. Hence, we need a measure of trust at the country level that is unaltered by macroeconomic instability. Subsequently, we confirm earlier results by using inherited trust of Americans as an instrument for the latent

trust in their origin country. This method, inspired by Carroll et al. (1994) and used by Fernandez and Fogli (2009) among others, overcome all potential reverse causality effects. As a result, we will conclude that trust decreases macroeconomic volatility in space.

However, the later results do not mean that higher trust is associated with higher economic stability at the country level. In order to investigate this question, we need a time-varying measure of trust. Such a measure does not exist for a long time because values surveys have only been conducted and generalized since 1980. Consequently, to overcome data shortage regarding the time variation of trust, we use the methodology developed by Algan and Cahuc (2010) to track changes in trust using changes in inherited trust measured with different waves of Americans immigrants. This method allows us to exploit the changes in trust over the XXth century to show that countries which have experienced increasing trust also experienced a decrease in macroeconomic volatility.

In all our estimations, trust is proved to be an important determinant of macroeconomic stability. However, it is not the only one. A rich literature has examined the key determinants of macroeconomic volatility. Most of theses papers focus on the institutional and political context. Alesina and Drazen (1991) argue that stabilizations are delayed because interest groups fight to know who will bear the economic burden. In the same vain, Rodrik (1999) shows that the greater the latent social conflicts in a society and the weaker its institutions of conflict management, the larger are the effects of external shocks on growth. In the case of less developed countries, Acemoglu et al. (2003) states that macroeconomic fluctuations arise from turbulence created by politicians in weakly institutionalized economies. See also Fernandez and Rodrik (2001), François and Zabojnik (2005), and Acemoglu et al. (2008) for a focus on reforms feasibility. This literature points out the important role of institutions quality in economic management. Our results confirm this effect which goes in the same direction as the one of trust. This lets room for a joint interpretation of institutions and beliefs, these two variables mutually reinforcing, as stressed by François (2008).

The remaining of this paper is organized as follows. Section 2 describes the data we used and the estimation strategy. Section 3 presents simple cross section estimates. Section 4 use inherited trust as an instrument for trust in cross section and panel estimations, this allow to overcome backward causality between economic fluctuations and trust and to asses the within effect of trust on macroeconomic volatility. Section 5 distinguishes between

the volatility of the different components of GDP. Finally, section 6 concludes.

2 Data and estimation strategy

This section documents our estimation strategies and describes the various data used in this analysis.

Cross-country regressions To investigate the effect of trust on macroeconomic instability in space, we estimate following cross country model using ordinary least squares :

$$Volatility_i = a_0 + a_1 Trust_i + \sum_{j=2}^{n} a_j x_{ji} + \varepsilon_i, \tag{1}$$

where $Volatility_i$ is an indicator of macroeconomic instability in country i and $Trust_i$ is the measure of trust in country i for the period of interest. x_{ji} is a control variable which may explain cross section differences in macroeconomic volatility, ε_i is the error term. Some specifications also include regional dummies for Africa, Latin America, Central America, Asia and Middle East to control for common economic patterns. If trust has a negative impact on macroeconomic volatility across countries, then the coefficient of trust, i.e. a_1, will be negative and significant.

Panel regressions To investigate the effect of trust on macroeconomic stability across time, we estimate following panel data model using ordinary least squares :

$$Volatility_{it} = a_0 + a_1 Trust_{it} + \sum_{j=2}^{n} a_j x_{jit} + I_i + \varepsilon_{it}, \tag{2}$$

where the notations are as above, except that subscript it denotes country i at time t. Equation (2) also includes country fixed effects denoted by I_i. Consequently, the estimation of this model gives information about the within effect of trust on economic volatility. If trust has a negative impact on macroeconomic volatility across time at the country level, then the coefficient of trust, i.e. a_1, will be negative and significant.

Measuring trust For each country, we measure generalized trust as the share of people who answer "*most people can be trusted*" to following question of the World Values Survey between 1981 and 2008 : "*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people ?*". The alternative answer is "*can't be too careful*". One of our main hypothesis is that trust is a very slow moving parameter at the country level. Therefore, the later measure of trust is supposed to be a general indicator of social capital over the whole period of interest. See Knack (2001) for a discussion of the validity of generalized trust as an indicator of national social capital.

Inherited trust of Americans This method relies on the assumption that differences in trust among Americans are linked to their ancestors country of origin. We estimate the following expression using a probit model :

$$Trust_i^c = a_0 + \sum_{j=1}^{n} a_j x_{ji} + I_c + \varepsilon_i, \tag{3}$$

where $Trust_i^c$ is the answer of individual i, claiming that its ancestors came from country c, to the trust question of the General Social Survey : "*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, Norway being the omitted category[2], x_{ji} an individual characteristic of respondent i and ε_i the error term. $Trust_i^c$ is equals to 1 if individual i originating from country c answer "*most people can be trusted*", 0 elsewhere. Following Algan and Cahuc (2010), the later model is estimated and using Americans of second, third and fourth generations.

Data on macroeconomic volatility All our macroeconomic indicators are computed from the Penn World Table. All variables are constant price entries. We used data of 57 countries over the period 1970-2007. As a first measure of instability, we compute the standard deviation of GDP per capita growth rate. We also use the frequency of negative growth years. When estimating the effect of changes in inherited trust across time, we use the Maddison database to compute the same volatility indicators over the periods 1910-1940 and 1970-2000.

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

Alternative volatility determinants Testing determinants of macroeconomic instability that may challenge trust, we use indicators of institutional quality, education and fractionalization in the society. We measure differences in political institutions by using means of the "combined polity score" and the "constraint on the executive" variables from the Polity IV data set. Education is represented by the average schooling years in the total population aged 25 and over from Barro and Lee (2000). Ethnolinguistic fractionalization is from Easterly and Levine (1997), whereas ethnic fractionalization is from Alesina et al. (2003).[3]

Macroeconomic control variables Instability regressions also include macroeconomic control variables obtained from the Penn World Table. We follow Anbarci et al. (2005) by using initial wealth, initial population, public expenditure and openness. Public expenditure is measured as the average ratio of public expenditure to GDP between 1970 and 2007, and openness as the average value of exports and imports over GDP between 1970 and 2007. Initial GDP per capita and population are taken in 1970. Cross-country regressions also include the average growth rate over the period and the standard deviation of terms of trade from the World Development Indicators.

3 Cross section estimates

This section documents the empirical relationship between trust and macroeconomic volatility in space. We present results of standard OLS estimations.

To investigate the effect of trust on macroeconomic stability, we first estimate equation (1) with ordinary least squares for 57 countries[4] over the period 1970 - 2007. This period is chosen because it offers the maximum observations for both macroeconomic and control variables. Summary statistics

[3] All these variables have been gathered thanks to the Quality of Government data set : http://www.qog.pol.gu.se/

[4] Observed countries are following : Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Canada, Chile, China, Colombia, Cyprus, Denmark, Dominican Republic, Egypt, El Salvador, Finland, France, Germany, Ghana, Greece, Guatemala, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Egypt, Jordan, Republic of Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Rwanda, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Trinidad and Tobago, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Zambia and Zimbabwe.

of used variables are presented in table 6, presented in appendix.

Table 1 presents the results of the estimation, taking the standard deviation of GDP per capita growth rate between 1970 and 2007 as a measure of macroeconomic instability. Column 1 shows the simplest relationship between trust and volatility. The estimated coefficient of trust is negative and highly significant. Figure 1 presented above depicts the corresponding relationship.

Columns 2 introduces the average growth rate over the period. This variable is correlated both with volatility, according to Ramey and Ramey (1995), and with trust, according to Algan and Cahuc (2010). The estimated coefficient on trust keeps the same order of magnitude and is still significant at the 1% level. Columns 3 and 4 subsequently introduce initial GDP per capita and population as explanatory variables. This decreases the size of the estimated coefficient of trust but leaves it highly significant. In column 4, the estimated coefficients for initial wealth and population are both negative and significant. A one standard deviation increase in trust[5] induces a 0.53 decrease in the standard deviation of GDP per capita growth rate. As a comparison, a similar change in initial GDP per capita (population) induces a 1.21 (0.97) decrease in volatility. Hence, the effect of trust on the standard deviation of GDP per capita growth rate is weaker that the one of initial wealth or initial population size, but of the same order of magnitude. Evaluated at the mean, a 0.53 decrease represents a 12% negative change in standard deviation of GDP per capita growth rate.

Columns 5 and 6 expand the set of explanatory variables by introducing public expenditure and openness. This change of the econometric specification leaves the estimated coefficient on trust broadly unchanged. Another possible omitted variable is terms of trade shocks. Hence, we include the standard deviation of terms of trade as a control variables in column 7.[6] Although weaker, the estimated coefficient of the trust variables remains highly significant and of the same order of magnitude. In column 8, we introduce regional dummies for Africa, Asia, Latin America, Central America and Middle East. This leaves unchanged the value of the coefficient related to trust.

In column 9, we present the results of the most demanding specification, i.e. including all the above mentioned control variables. According to these

[5]In this sample, the standard deviation of the trust variable equals 0.16, which means that a one standard deviation increase in trust is comparable to an increase of 16 percentage points in the share of trusting people.

[6]Terms of trade data are missing for three countries : Austria, Cyprus and Finland.

results, a one standard deviation increase in trust induces a 0.52 decrease in volatility whereas comparable effects of changes in initial population equals 0.91. Thus, the results presented in table 1 show that trust still explains a major part of cross country differences macroeconomic volatility when controlling for a large set of macroeconomic variables.

Table 2 tests alternative determinants of macroeconomic stability. Indeed, it is possible that the effect of trust on macroeconomic volatility is mediated by omitted variables, such as the quality of institutions, education or fractionalization. If this turns to be true, then the estimated coefficient of trust should be weaker and less significant when introducing these variables. All regressions include the former macroeconomic variables as control variables, except terms of trade changes[7]. Columns 1 to 5 show estimated coefficients of trust and alternative variables, entered separately. In column 1, we first test the effect of institutional quality on macroeconomic stability. Institutional quality has a negative and significant effect on economic instability. A one standard deviation increase in institutional score decreases volatility by 0.95. This effect is just two times bigger than the one associated with a comparable change in trust (0.51). The constraint on the executive, a component of the Polity IV combined score is introduced in column 2 and does not seem to have any effect on the stander deviation of GDP per capita growth rate. The average number of schooling years or the level of fractionalization (measured using two different methods, i.e. ethnic and ethnolinguistic fractionalization) do not bring any additional explanation and leave the estimated coefficient of trust unchanged.

These later results suggest that collective norms and values are more likely to produce good conditions for smooth economical growth than ethnic unity or education. Moreover, this also sustain the hypothesis that generalized trust is not only a matter of education, nor of ethnic proximity. Column 6 show the results when including all alternative variables together. Results remain unchanged. Column 7 presents the estimated coefficient for the most demanding specification, including regional dummies. In this specification, the estimated effect of a one standard deviation in trust equals 0.65 whereas the one associated with a similar change in institutions quality equals 0.87. Hence, both effects have the same order of magnitude. Note that a 0.65

[7]Terms of trade changes are excluded because data are missing for Austria, Cyprus and Finland. We run the same regressions including terms of trade changes and excluding these three countries, but this does not alter the results.

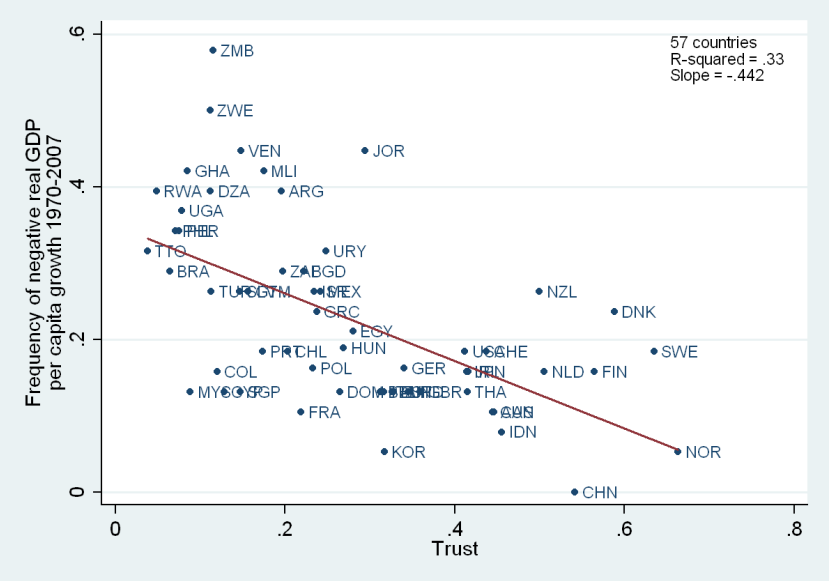
Table 1: Cross country relationship between volatility and trust : macroeconomic control variables.

Dependent variable is the standard deviation of real GDP per capita growth rate 1970-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Trust	-8.216***	-7.768***	-4.961***	-3.295***	-3.295***	-3.285***	-2.926***	-3.251***	-3.257**
	(1.735)	(1.486)	(1.595)	(0.978)	(0.988)	(1.062)	(1.007)	(1.168)	(1.453)
Average growth rate		-0.163	-0.364	-0.290	-0.290	-0.293	-0.301	-0.138	-0.0739
		(0.229)	(0.245)	(0.205)	(0.226)	(0.246)	(0.219)	(0.219)	(0.287)
Initial real GDP per capita (log)			-0.952***	-1.264***	-1.264***	-1.265***	-1.139***	-0.850	-0.464
			(0.338)	(0.335)	(0.354)	(0.338)	(0.361)	(0.513)	(0.557)
Initial population (log)				-0.668***	-0.668***	-0.666***	-0.583***	-0.683***	-0.629***
				(0.144)	(0.142)	(0.178)	(0.143)	(0.173)	(0.208)
Public expenditure					7.67e-07				0.0198
					(0.0260)				(0.0312)
Openness						0.000174			-0.00121
						(0.00461)			(0.00515)
Terms of trade							0.0206		0.0284
							(0.0194)		(0.0323)
Regional dummies								Yes	Yes
Constant	6.518***	6.770***	14.72***	23.19***	23.19***	23.17***	20.81***	19.02***	13.34*
	(0.678)	(0.912)	(3.348)	(4.165)	(4.854)	(4.338)	(4.619)	(5.989)	(6.716)
Observations	57	57	57	57	57	57	54	57	54
R-squared	0.311	0.320	0.429	0.573	0.573	0.573	0.579	0.624	0.640

OLS regressions
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Regional dummies are included for Africa, Latin America, Central America, Asia and Middle East

Figure 2: Relationship between the frequency of negative real GDP per capita growth 1970-2007 and trust 1981-2008.



change in standard deviation of real GDP per capita growth rate represents a 15% drop in volatility.

To sum up results presented in table 1 and 2, we note that trust is substantially associated with macroeconomic stability, measured as the standard deviation of real GDP per capita growth rate, and that institutional quality is the strongest alternative explanatory variable. Having said that, we now focus on an alternative measure of macroeconomic instability in order to get more evidences about the effect of trust on economic stability.

Figure 2 depicts the relationship between trust and the frequency of negative growth of real GDP per capita. Tables 7 and 8, presented in appendix, replicate the estimations presented above but using the frequency of negative growth of real GDP per capita as dependent variable. The estimated coefficient of trust is negative and significant in all specifications. Column 7 of table 8, which presents estimated coefficients for the most demanding specification, gives a point estimate of -0.123 for the coefficient of trust. The corresponding effect on the frequency of negative real GDP per capita growth for a one standard deviation change equals -0.019. Evaluated at the mean, this represents a 16% drop in volatility. Note that when including

Table 2: Cross country relationship between volatility and trust : alternative determinants.

Dependent variable is the standard deviation of real GDP per capita growth rate 1970-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trust	-3.166***	-3.545***	-4.062***	-3.449***	-3.269***	-4.041***	-4.056**
	(1.073)	(1.198)	(1.335)	(1.078)	(1.072)	(1.377)	(1.573)
Polity IV	-0.170***					-0.159***	-0.156*
	(0.0590)					(0.0576)	(0.0790)
Constraint on the executive		0.0646					
		(0.0913)					
Schooling years			0.179			0.173	0.0844
			(0.166)			(0.171)	(0.148)
Ethnic fractionalization				-1.074		-0.757	-0.468
				(1.190)		(1.113)	(1.096)
Ethnolinguistic fractionalization					-1.078		
					(1.335)		
Regional dummies							Yes
Constant	16.02***	23.97***	25.77***	25.05***	25.37***	20.33***	15.76*
	(5.789)	(5.421)	(5.985)	(5.459)	(4.781)	(6.450)	(8.120)
Observations	57	57	57	57	57	57	57
R-squared	0.625	0.578	0.581	0.581	0.581	0.636	0.673

OLS regressions
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Regional dummies are included for Africa, Latin America, Central America, Asia and Middle East
Average growth rate, initial GDP per capita and population, public expenditure and openness are included in all regressions

regional dummies, trust is the unique significant explanatory variable.

Higher trust is associated with lower macroeconomic volatility measured as the frequency of negative growth years. Thus, this alternative indicator of macroeconomic instability confirm earlier results. Note that the two most demanding specifications lead to following conclusion : a 10 percentage points increase in the share of trusty people implies a 10% drop in macroeconomic volatility.

4 Instrumental variables estimates

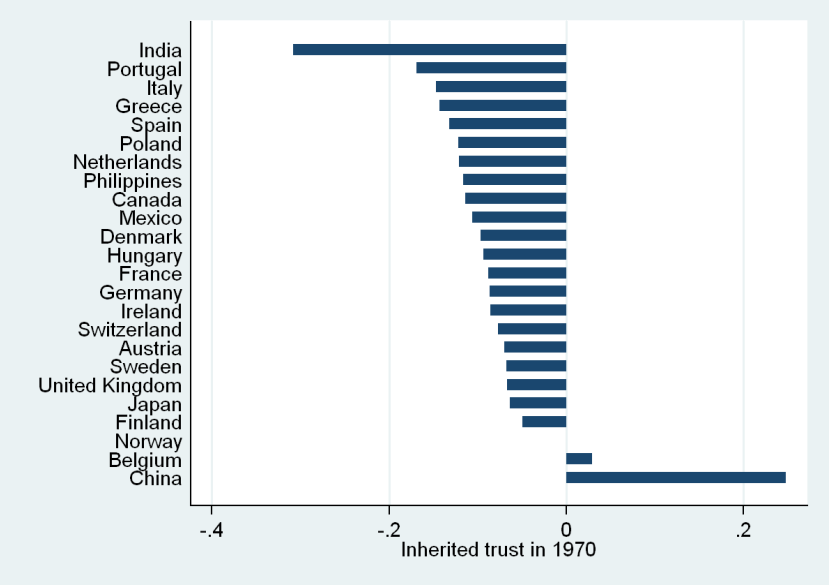
In this section, we use the inherited trust of US immigrants as an instrument for trust in their origin country. We first present the estimation method for inherited trust. Then, we use inherited trust as an instrument for trust in cross section estimations. Finally, we use changes in inherited trust to track changes in trust at the country level over the XXth century.

Inherited trust of Americans

It has been shown by Giuliano and Spilimbergo (2009) that macroeconomic events, in particular macroeconomic shocks, are likely to alter beliefs of agents. As a consequence, aggregate trust could be influenced by past and current macroeconomic volatility. Although this may look totally opposed to our assumption about social capital, their approach is compatible with ours. In fact, they argue that beliefs are formed during early adulthood, this is the so called "impressionable years hypothesis", and remain almost unchanged after it. Hence, beliefs are changing slowly over time because only a fraction of the population is likely to change beliefs as a reaction to current macroeconomic situation. Thus, our identification hypothesis remain plausible despite the potential reverse causality in the medium term. However, to be sure to avoid all reverse causality concerns and consistent with our view of deep trust as a indicator of latent social capital, we now take inherited trust of US immigrant as an alternative measure of trust in their origin country.

This strategy has for main advantage to avoid all effects of potential reverse causality from macroeconomic instability to trust. This approach relies on the assumption that differences in beliefs among Americans with foreign origins are linked to differences in beliefs between their countries of origin. In order to be sure that observed Americans have not been affected by macroe-

Figure 3: Inherited trust of US immigrants in 1970.



conomic volatility after 1970, we focus on individuals whose forbears have immigrated before 1970. Hence, assuming 25 years between each generation, selected individuals are immigrants of second generation born before 1970 ; third generation immigrants born before 1995 ; and fourth generation immigrants. In appendix, table 9 presents the share of trusting Americans by origin country.

Having estimated equation (3), marginal effects are reported in table 10, presented in appendix. Marginal effects of origin countries are also represented in figure 3. The main drawback of this approach is to shrink the number of available countries from 57 to 24. Most of the least developed countries are lost due to this method. Summary statistics for the observations used in this estimation are presented in table 9 in appendix. See table 12, also in appendix, for a detailed description of the used control variables.

Cross section instrumental variable estimates

We will now use origin country fixed effects as an instrument for trust differences in cross country regressions. Instrumental variables estimations are

run with 24 countries[8]. Due to data shortness, we restrict ourselves to a specification that includes trust (instrumented by inherited trust), institutions, education, ethnic fractionalization and initial GDP per capita. Summary statistics for this sample are presented in table 11, presented in appendix.

Table 3 displays the estimates of the effect of trust and others alternative variables on our two indicators of macroeconomic instability. Columns 6 to 10 present the estimated coefficients when including a dummy variable for Asia. Columns 5 and 10 report the first stage estimates of associated regressions. The bottom lines of these columns report the F-test for excluded instrument (the statistic equals 5.64 (5.60) for column 5 (10)), and Cragg-Donald statistic for the Stock and Yogo (2002) test for weak instrument (the Cragg-Donald statistic is larger than the Stock and Yogo critical value in both columns). In all of our regressions, the estimated coefficient of trust is negative and significant at the 5% level when standard deviation of real GDP per capita growth rate is the dependent variable, and at the 1% level when the frequency of negative real GDP per capita growth is used as dependent variable.

In column 1 the dependent variable is the standard deviation of GDP per capita growth rate. The associated p-value of the Wu-Hausman test equals 0.32. This indicates that trust is endogenous and validates the need of an instrument. The estimated coefficient of trust amounts -3.72. Hence, a one standard deviation change in trust is associated with a 0.56 decrease in the standard deviation of GDP per capita growth rate. Comparable effect of the alternative significant explanatory variables equals 0.26 for Polity IV. Hence, trust has the most important effect on standard deviation of GDP per capita growth rate in this specification. Evaluated at the mean, a 0.56 change in volatility represents a 19% move. Column 2 presents the results of corresponding OLS regression. Comparing the estimated coefficient suggest that our former OLS estimates of the effect of trust on macroeconomic instability were biased downwards.

Additional instrumental variable estimation confirm earlier results. In column 3, we estimated the effect of trust on the frequency of negative growth events. The estimated coefficient of trust is significant at the 1% level and equals -0.63. None of the alternative explanatory variables is significant.

[8]Observed countries are following : Austria, Canada, China, Denmark, United Kingdom, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Mexico, Netherlands, Norway, Philippines, Poland, Spain, Sweden, Switzerland, India, Portugal and Belgium.

A 10 percentage points increase in the share of trusty people induces a 6.3 percentage point decrease in the frequency of negative growth years between 1970 and 2007. Given that the average value of this indicator is 0.16, such a change represents a 40% cut in volatility at the mean.

However, as presented in table 9 (in appendix), the estimation of inherited trust is made from a really small number of respondent for some countries. This is especially the case for Asian countries for example (China, India, Japan and Philippines). This fact encourages to control for potential biases for these countries by introducing a dummy variable. This is what we do in the second part of table 3 (columns 6 to 10). The estimated coefficients are unchanged when including a dummy variable for Asia.

Using instrumental variables allows to avoid all endogeneity concerns and to show that trust has a strong and significant effect on the indicators of macroeconomic instability in cross country regressions. Moreover, alternative explanatory variables exhibits both weaker coefficients and lower significance when trust is instrumented by inherited trust. Estimated effects of trust on macroeconomic instability are of great magnitude. In the case of the frequency of negative growth events, we estimated that a 10 percentage points change in trust induces up to a 40% cut in the frequency of negative growth events at the mean. Using the standard deviation of real GDP per capita growth rate as dependent variable, the same change in trust induce a 13% cut in volatility. This later results is closer to the effects estimated in simple OLS regressions with more countries, but it is much stronger than the effect estimated with OLS for the limited sample.

The results of this instrumental variable strategy offer the opportunity to state that trust is not only associated with macroeconomic stability in a cross section of countries, but also that trust decreases macroeconomic volatility.

Within estimates

We will now investigate whether the effect of trust on volatility is also valid at the country level. Here, we use changes in inherited trust of US immigrants as a proxy for trust changes in their origin country. We follow Algan and Cahuc (2010) by using different immigration waves to assess changes in inherited trust. Accordingly, inherited trust in year T is estimated using second generation immigrants born before T, third generation immigrants born before $T + 25$ and fourth generation immigrants born before $T + 50$. We estimated inherited trust in 1910 and 1970 with respect to Norwegian

Table 3: Cross country relationship between volatility and trust : instrumental variables.

Dependent variables are
S.d. : the standard deviation of real GDP per capita growth rate 1970-2007
Freq. : the frequency of negative real GDP per capita growth 1970-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	S.d.		Freq.			S.d.		Freq.		
	IV	OLS	IV	OLS	First stage	IV	OLS	IV	OLS	First stage
Trust	-3.718**	-1.390	-0.634***	-0.247		-3.565**	-1.516	-0.639***	-0.233	
	(1.544)	(1.165)	(0.197)	(0.162)		(1.420)	(1.227)	(0.186)	(0.149)	
Inherited trust					0.786**					0.806**
					(0.331)					(0.341)
Schooling years	0.0776	-0.0444	0.0255	0.00518	0.0338**	0.0950	-0.0193	0.0249	0.00227	0.0375**
	(0.143)	(0.141)	(0.0172)	(0.0123)	(0.0161)	(0.135)	(0.145)	(0.0178)	(0.0108)	(0.0163)
Polity IV	-0.0576*	-0.0948**	0.00496	-0.00121	0.0239***	-0.0377	-0.0765	0.00436	-0.00333	0.0277**
	(0.0311)	(0.0391)	(0.00453)	(0.00477)	(0.00792)	(0.0391)	(0.0501)	(0.00510)	(0.00518)	(0.0101)
Ethnic fractionalization	-0.858	-0.631	-0.0462	-0.00851	-0.0529	-0.902	-0.686	-0.0448	-0.00205	-0.0616
	(0.555)	(0.599)	(0.0822)	(0.0641)	(0.126)	(0.574)	(0.657)	(0.0832)	(0.0638)	(0.133)
Initial real GDP per capita (log)	-0.304	-0.0523	-0.0279	0.0139	-0.0970*	-0.607	-0.298	-0.0187	0.0424	-0.149**
	(0.293)	(0.263)	(0.0351)	(0.0355)	(0.0503)	(0.422)	(0.467)	(0.0501)	(0.0364)	(0.0621)
Asia						-0.607	-0.441	0.0184	0.0513	-0.0994
						(0.547)	(0.639)	(0.0436)	(0.0558)	(0.0911)
Constant	7.092***	5.057***	0.435*	0.0967	0.915**	9.645***	7.120*	0.358	-0.143	1.356**
	(1.924)	(1.546)	(0.233)	(0.264)	(0.348)	(3.280)	(3.699)	(0.369)	(0.266)	(0.468)
Observations	24	24	24	24	24	24	24	24	24	24
R-squared		0.461		0.276	0.511		0.473		0.305	0.533
F-test for excluded instrument					5.64					5.60
P-value of Wu-Hausman test	0.32		0.04			0.38		0.03		
Cragg-Donald statistic					6.00					6.21
Stock and Yogo critical values					5.15					5.07

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
In columns 1, 3, 6 and 8, trust is instrumented by inherited trust

immigrants.[9] Due to the limited number of observations available for inherited trust in 1910, our sample is restricted to 22 countries.[10] We use the Maddison database to construct our two volatility indicators for the periods 1910-1940 and 1970-2000. The choice of this two periods is made essentially because the estimation of inherited trust for different dates requires both a sufficient number of observations for each period and a sufficient gap to avoid overlapping generations.[11] Here, we estimates equation (2) using a reduced form for instrumental variables since observed trust is not available for 1910.

In table 4, we run OLS regressions with country fixed effects. All the variables are defined with respect to Norway. We include a time dummy in order to control for potential convergence in volatility between countries. In even-numbered columns, we control for initial real GDP per capita in 1910 and 1970 and for the average growth rate during the two periods of interest.

All estimated coefficients are non-significant when the standard deviation of real GDP per capita growth rate is used as dependent variable. The estimated coefficient of inherited trust is thus not significantly different from zero. However, the corresponding coefficient is negative and significant at the 10% level when we use the frequency of negative growth events as dependent variable. This result is robust to the introduction of initial GDP per capita and average growth rate as control variables, the size of the coefficient is unchanged. The relationship between changes in trust and changes in volatility, measured as the frequency of negative growth events, is represented in figure 4. According to these estimations, a 0.1 increase in inherited trust between 1910 and 1970 induces a 0.065 decrease in the difference between a country and Norway volatility. Given that this later variable is equal to 0.10 on average, such a change is quantitatively important.

These results show that changes in trust across time are also associated with opposite changes in macroeconomic volatility. Thus, the earlier results

[9] Inherited trust in 1910 is estimated using second generation immigrants born before 1910, third generation immigrants born before 1935 and fourth generation immigrants born before 1960. Inherited trust in 1970 is estimated using second generation immigrants born between 1910 and 1970, third generation immigrants born between 1935 and 1995 and fourth generation immigrants born after 1960.

[10] Observed countries are following : Austria, Belgium, Canada, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Mexico, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom and Yugoslavia.

[11] Although this choice is ultimately arbitrary, our results are robust to changes in the definition of the periods, provided that the two necessary conditions mentioned in text are satisfied.

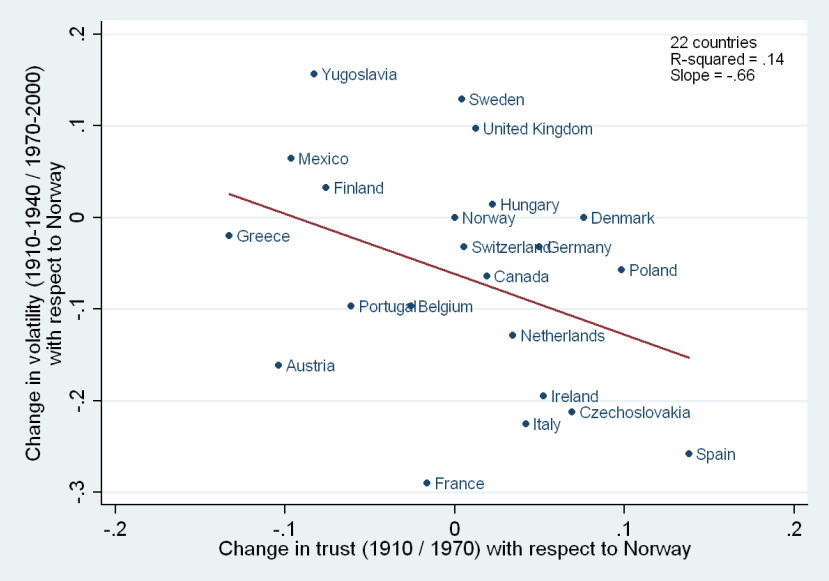
Table 4: Inherited trust and macroeconomic volatility : within estimates.

Dependent variables are
S.d. : the standard deviation of real GDP per capita growth rate
Freq. : the frequency of negative real GDP per capita growth

	(1)	(2)	(3)	(4)
	S.d.		Freq.	
Inherited trust	8.332	6.599	-0.660*	-0.654*
	(14.47)	(14.63)	(0.333)	(0.325)
Average growth		0.0658		-0.0471**
		(0.530)		(0.0220)
Initial GDP per capita		-2.100		-0.0693
		(1.967)		(0.0978)
Time dummy	0.178	-0.487	-0.0618**	-0.0849*
	(0.685)	(0.885)	(0.0253)	(0.0412)
Constant	1.359	2.208	0.169***	0.163**
	(2.068)	(2.458)	(0.0505)	(0.0617)
Observations	44	44	44	44
Number of countries	22	22	22	22
R-squared (within)	0.039	0.065	0.319	0.469

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

Figure 4: Relationship between changes in trust and changes in the frequency of real GDP per capita negative growth.



found in cross country regressions are also valid across time at the country level : increasing trust reduces macroeconomic volatility both in space and time.

5 Volatility of GDP components

In this section, we turn back to cross country regressions and investigate how the volatility of the different components of GDP is linked to trust. We use standard OLS regressions in order to maximize the number of observations and thus include a large number of control variables. Indeed, using instrumental variables as in section 4 would reduce the number of observations. However, results presented in this section hold for instrumental variables.

The sample is identical to the one used in table 1. We computed the standard deviation of real per capita growth rate of investment, consumption and public expenditure. Our main interest lies in the comparison between estimated coefficients of trust when using the volatility of investment or public expenditure as dependent variables. Consistently with the two channels from trust to volatility stressed in the introduction, this comparison should allow

to determine the most important one. Here, consumption can be seen as a benchmark since it is a by-product of GDP.

Estimated coefficients are reported in table 5. For each dependent variable, we present the simplest relationship and then control by macroeconomic variables and regional dummies. Columns 1, 4 and 7 show that the estimated coefficient of trust is stronger for investment than for public expenditure or consumption. However, the significance of the estimated coefficient disappears in columns 8 and 9 when we introduce control variables, the standard deviation of public expenditure being the dependent variable. Although weaker, the estimated coefficient of trust remains sizable and significant if the dependent variable is the volatility of investment, in columns 5 and 6. Logically, the estimated coefficient of trust is close to the one found in table 1 in the case of consumption. These results suggest that the level of trust has no effect on the volatility of public expenditure but has an effect on the volatility of investment.

This suggests that trust has an effect on macroeconomic volatility through the investment channel, not through the public expenditure channel. This interpretation fosters the idea that trust acts as a social commitment which induces greater certainty in investment. This in turn invalidates the idea that governments create less economic turbulences in countries with higher trust.

6 Conclusion

In a cross section of countries, trust has been shown to be negatively associated with macroeconomic instability. Higher trust reduces the frequency of crisis and weakens the standard deviation of real GDP per capita growth rate. Using trust of Americans as a latent indicator of trust in their origin country, we provided additional evidence of these effects, avoiding all potential reverse causality concerns. In particular, we showed that an increase in trust implies a decrease in the frequency of negative growth events at the country level. Finally, turning back to simple cross country regressions, we showed that trust reduces the volatility of investment, but not of public expenditure.

Our estimates suggest that trust is likely to be a key determinant in macroeconomic stability. Thus lower volatility can be added to the list of economic outcomes favored by higher trust.

Table 5: Cross country relationship between volatility and trust : GDP components.

Dependent variable are the standard deviations of consumption, investment and public expenditure per capita real growth rate 1970-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Consumption			Investment			Public expenditure		
Trust	-10.00***	-5.137***	-3.841**	-33.96***	-13.57**	-9.080*	-21.89***	-2.056	-1.444
	(1.865)	(1.719)	(1.874)	(6.407)	(5.643)	(5.312)	(4.512)	(3.828)	(4.066)
Average growth rate		-0.638*	-0.377		-2.090*	-2.017**		-1.389**	-0.877
		(0.341)	(0.347)		(1.107)	(0.997)		(0.569)	(0.794)
Initial real GDP per capita (log)		-1.865***	-1.380**		-4.784***	-3.070		-4.608***	-4.032*
		(0.436)	(0.638)		(1.451)	(1.882)		(1.544)	(2.170)
Initial population (log)		-0.839***	-0.791***		-1.933***	-2.796***		-1.470**	-1.396**
		(0.212)	(0.208)		(0.608)	(0.727)		(0.611)	(0.580)
Public expenditure		-0.0653***	-0.0596**		-0.00213	0.0349		0.0648	0.0649
		(0.0202)	(0.0256)		(0.120)	(0.122)		(0.0629)	(0.0799)
Openness		-0.00596	-0.00610		0.00342	-0.00719		0.00360	0.00279
		(0.00689)	(0.00692)		(0.0190)	(0.0176)		(0.0108)	(0.0123)
Regional dummies			Yes			Yes			Yes
Constant	7.131***	35.90***	29.20***	25.11***	84.25***	72.05***	12.80***	60.34***	52.81*
	(0.739)	(6.059)	(7.586)	(2.485)	(21.93)	(23.91)	(1.982)	(19.79)	(27.62)
Observations	57	57	57	57	57	57	57	57	57
R-squared	0.316	0.581	0.617	0.338	0.578	0.648	0.225	0.592	0.616

OLS regressions
*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses
Regional dummies are included for Africa, Latin America, Central America, Asia and Middle East

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A Additional tables

Table 6: Summary statistics for cross section estimates.

	Observations	Mean	Standard deviation	Min	Max
Standard deviation of real GDP per capita growth rate	57	4.265648	2.385279	1.818257	12.9899
Frequency of negative real GDP per capita growth	57	.2278456	.1238682	0	.5789474
Trust	57	.2741402	.1618129	.038	.6635294
Average growth rate	57	2.305332	1.497585	-.9566029	7.634783
Initial real GDP per capita (log)	57	8.67874	.9585759	6.332128	10.11073
Initial population (log)	57	9.552289	1.465519	6.420972	13.61755
Public expenditure	57	62.32881	15.71817	34.04399	116.2479
Openness	57	59.57115	45.77882	15.90387	332.9543
Terms of trade	54	17.8965	15.62477	2.375333	66.43972
Africa	57	.1578947	.3678836	0	1
South America	57	.122807	.3311331	0	1
Central America	57	.0877193	.2854008	0	1
Asia	57	.1754386	.3837227	0	1
Middle East	57	.0350877	.1856372	0	1
Polity IV	57	4.263814	5.627724	-7.171429	10
Constraint on the executive	57	3.755282	3.484759	-8.6	7
Schooling years	57	6.04631	2.72075	.4755714	11.40629
Ethnic fractionalization	57	.3470398	.2447324	.001998	.930175
Ethnolinguistic fractionalization	57	.2472807	.2597448	0	.8357907

All variables are measured over the period 1970-2007, except trust which is measured over the period 1981-2008.
Changes in terms of trade are missing for Austria, Cyprus and Finland

Table 7: Cross country relationship between volatility and trust : macroeconomic control variables (continued).

Dependent variable is the frequency of negative real GDP per capita growth 1970-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Trust	-0.443***	-0.299***	-0.191***	-0.149**	-0.149***	-0.134**	-0.159**	-0.110*	-0.129*
	(0.0827)	(0.0493)	(0.0629)	(0.0559)	(0.0547)	(0.0570)	(0.0601)	(0.0585)	(0.0657)
Average growth rate		-0.0524***	-0.0601***	-0.0583***	-0.0649***	-0.0621***	-0.0551***	-0.0513***	-0.0545***
		(0.00765)	(0.00675)	(0.00615)	(0.00687)	(0.00658)	(0.00558)	(0.00666)	(0.00700)
Initial real GDP per capita (log)			-0.0365***	-0.0445***	-0.0598***	-0.0452***	-0.0407***	-0.0178	-0.0337*
			(0.0116)	(0.0108)	(0.0147)	(0.0110)	(0.0112)	(0.0136)	(0.0175)
Initial population (log)				-0.0170***	-0.0177***	-0.0131**	-0.0192***	-0.0168***	-0.0186**
				(0.00577)	(0.00598)	(0.00645)	(0.00590)	(0.00583)	(0.00866)
Public expenditure					-0.00146**				-0.00116*
					(0.000703)				(0.000668)
Openness						0.000245*			-1.26e-05
						(0.000141)			(0.000162)
Terms of trade							0.000331		-0.000362
							(0.000624)		(0.000866)
Regional dummies								Yes	Yes
Constant	0.349***	0.431***	0.736***	0.951***	1.198***	0.910***	0.931***	0.653***	0.907***
	(0.0294)	(0.0252)	(0.101)	(0.119)	(0.187)	(0.127)	(0.125)	(0.147)	(0.226)
Observations	57	57	57	57	57	57	54	57	54
R-squared	0.335	0.701	0.760	0.795	0.812	0.799	0.799	0.839	0.846

OLS regressions
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Regional dummies are included for Africa, Latin America, Central America, Asia and Middle East

Table 8: Cross country relationship between volatility and trust : alternative determinants (continued).

Dependent variable is the frequency of negative real GDP per capita growth 1970-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trust	-0.134**	-0.138**	-0.158**	-0.138**	-0.137**	-0.151**	-0.123*
	(0.0570)	(0.0605)	(0.0602)	(0.0574)	(0.0566)	(0.0632)	(0.0659)
Polity IV	-0.00442**					-0.00441**	-0.00268
	(0.00204)					(0.00205)	(0.00261)
Constraint on the executive		0.000268					
		(0.00325)					
Schooling years			0.00469			0.00411	0.00357
			(0.00522)			(0.00556)	(0.00540)
Ethnic fractionalization				-0.00283		0.00637	-0.00706
				(0.0369)		(0.0365)	(0.0393)
Ethnolinguistic fractionalization					0.000268		
					(0.00325)		
Regional dummies							Yes
Constant	0.968***	1.157***	1.222***	1.159***	1.173***	1.017***	0.829***
	(0.219)	(0.205)	(0.208)	(0.205)	(0.199)	(0.214)	(0.252)
Observations	57	57	57	57	57	57	57
R-squared	0.828	0.815	0.817	0.815	0.815	0.830	0.852

OLS regressions
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Regional dummies are included for Africa, Latin America, Central America, Asia and Middle East
Average growth rate, initial GDP per capita and population, public expenditure and openness are included in all regressions

Table 9: Summary statistics for the estimation of inherited trust in 1970.

	Mean	Standard deviation
Male	.4662977	.498882
Age	45.72331	17.01775
Age squared	2380.203	1723.408
Married	.5655215	.4957074
Protestant	.5913458	.491604
Catholic	.2678503	.4428562
Education	13.3693	2.825144
Employed	.6915687	.4618634
White	.9765583	.1513075
Income	5.483588	3.164271
	Observations	Share of trusting
Austria	60	0.47
Canada	326	0.4
China	11	0.73
Denmark	127	0.45
United Kingdom	3,239	0.5
Finland	54	0.5
France	394	0.43
Germany	3,359	0.44
Greece	52	0.38
Hungary	72	0.44
Ireland	2,416	0.44
Italy	861	0.38
Japan	31	0.42
Mexico	338	0.31
Netherlands	287	0.4
Norway	337	0.54
Philippines	12	0.33
Poland	433	0.42
Spain	130	0.35
Sweden	302	0.48
Switzerland	86	0.5
India	15	0.13
Portugal	42	0.36
Belgium	27	0.52
Total	13,011	0.45

Table 10: Estimation of inherited trust in 1970.

Dependent variable is trust of US immigrant

Male	0.0130**	France	-0.0878***
	(0.00635)		(0.00379)
Age	0.0103***	Germany	-0.0864***
	(0.00184)		(0.00251)
Age squared	-6.34e-05***	Greece	-0.143***
	(1.90e-05)		(0.00388)
Married	0.0449***	Hungary	-0.0933***
	(0.00763)		(0.00431)
Protestant	0.00854	Ireland	-0.0857***
	(0.00937)		(0.00444)
Catholic	0.0313	Italy	-0.147***
	(0.0213)		(0.00971)
Education	0.0427***	Japan	-0.0634**
	(0.00185)		(0.0276)
Employed	0.0388***	Mexico	-0.106***
	(0.0100)		(0.0149)
White	0.102***	Netherlands	-0.121***
	(0.0393)		(0.00152)
Income	0.00162	Philippines	-0.116***
	(0.00197)		(0.0157)
Norway	Reference	Poland	-0.122***
			(0.00915)
Austria	-0.0699***	Spain	-0.132***
	(0.00581)		(0.00817)
Canada	-0.114***	Sweden	-0.0679***
	(0.00735)		(0.00274)
China	0.248***	Switzerland	-0.0767***
	(0.0309)		(0.00261)
Denmark	-0.0967***	India	-0.308***
	(0.00287)		(0.0153)
United Kingdom	-0.0665***	Portugal	-0.169***
	(0.00269)		(0.00702)
Finland	-0.0498***	Belgium	0.0289***
	(0.00632)		(0.0108)
Observations			13011
Pseudo R-squared			0.0613

Probit regression
Dummy variables are included for the year of interview
Standard erros clustered at the origin country level
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Summary statistics for instrumental variables estimates.

	Observations	Mean	Standard deviation	Min	Max
Standard deviation of real GDP per capita growth rate	24	2.904208	.9333571	1.818257	4.759578
Frequency of negative real GDP per capita growth	24	.1595543	.0679555	0	.3421053
Trust	24	.3744049	.1516615	.0707071	.6635294
Inherited trust	24	-.0852167	.0944203	-.308	.248
Schooling years	24	7.538149	1.962095	3.246	10.29743
Polity IV	24	7.182143	4.683038	-7.171429	10
Ethnic fractionalization	24	.217775	.1957984	.011928	.71242
Initial real GDP per capita (log)	24	9.155595	.8939536	6.332128	10.11073
Asia	24	.1666667	.3806935	0	1

All variables are measured over the period 1970-2007

Table 12: General Social Survey control variables
All our results are robust to alternative definitions of the variables.

Sex	Respondent's gender. Equals 1 for males and 0 for females.
Age	Respondent's age in years.
Age squared	Square of respondent's age.
Protestant and Catholic	Respondent's religious affiliation. The omitted category is "other" or "none".
Education	Completed years of formal education.
Employed	Respondent's employment status. Equals 1 for "full time", "part time" or "self employed". The omitted category is "retired", "housewife", "student", "unemployed" or "other".
White	Respondent's race. Equals 1 for "white". The omitted category is "black" or "other".
Income	Respondent's family income, corrected for family size. Our measure of income is slightly different from the one use in other analysis using the GSS. Usually, the GSS variable INCOME is used as a measure of income differences. This variable gives information about the respondent's total family income and is coded using 12 income brackets for the entire period covered by the survey. Using this variable without any transformation has two drawbacks. First, this does not take into account the size of the family. Second, the fact that the same coding is used for the whole period makes it an inappropriate measure because both of inflation and the increasing standard of living. Hence, we first create broad family income deciles using the income variables defined for shorter time periods (INCOME72, INCOME77, etc.). Then, we divide this new variable by the household's size using the HOMPOP variable.

B Robustness checks

This section provides some robustness checks of our empirical evidence.

Longer period of time

The cross section estimates presented in this paper rely on the period 1970-2007 because this is the period that offers the largest number of observations for our variables. Here, we replicate the same exercise but on the period 1950-2007. This choice reduces the number of observed countries from 57 to 38. We only report the specifications with the standard deviation of real GDP per capita growth rate as dependent variable. Table 13 presents the estimated coefficients when introducing macroeconomic control variables for the period 1950-2007. Results are virtually identical to those obtained in table 1. In table 14, we introduce alternative explanatory variables and replicate the results of table 2. Results are unchanged. These regressions show that our main results do not depend on the chosen period.

Omitted variable : level of inequalities

Another possible omitted variable is inequality. In fact, more unequal countries tend to grow less and to have a population with a lower level of trust, this may thus alter the link between trust and volatility. Hence, we take the the Gini coefficient of the World Development Indicators and replicate the cross section regressions estimates over the period 1970-2007. A selection of results is presented in table 15. The Gini coefficient is missing for Cyprus, so we have only 56 observations. Once we have controlled for inequalities, the estimated coefficient of other variables remains the same. Including all variables together leaves the estimated coefficient of trust unchanged.

Table 13: Cross country relationship between volatility and trust : robustness check.

Dependent variable is the standard deviation of real GDP per capita growth rate 1950-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Trust	-3.999***	-4.592***	-4.030**	-2.878**	-2.755**	-2.751**	-2.643**	-2.643	-3.661*
	(1.150)	(1.124)	(1.641)	(1.139)	(1.165)	(1.171)	(1.204)	(1.582)	(1.832)
Average growth rate		0.537*	0.492	0.464**	0.340	0.516**	0.459***	0.558***	0.588***
		(0.276)	(0.303)	(0.206)	(0.202)	(0.205)	(0.166)	(0.194)	(0.200)
Initial real GDP per capita (log)			-0.206	-0.556**	-0.784**	-0.605**	-0.232	-0.471	0.258
			(0.329)	(0.261)	(0.293)	(0.274)	(0.295)	(0.469)	(0.567)
Initial population (log)				-0.496***	-0.472***	-0.608***	-0.342***	-0.578***	-0.547***
				(0.125)	(0.133)	(0.147)	(0.112)	(0.161)	(0.155)
Public expenditure					-0.0246				0.0158
					(0.0220)				(0.0206)
Openness						-0.0122			-0.00563
						(0.00794)			(0.00909)
Terms of trade							0.0258*		0.0433***
							(0.0127)		(0.0132)
Regional dummies								Yes	Yes
Constant	4.981***	3.799***	5.467*	12.68***	16.14***	14.50***	8.040**	12.26**	4.812
	(0.495)	(0.690)	(2.743)	(2.854)	(3.727)	(3.068)	(3.349)	(4.520)	(6.251)
Observations	38	38	38	38	38	38	35	38	35
R-squared	0.222	0.336	0.343	0.558	0.581	0.581	0.526	0.618	0.653

OLS regressions
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Regional dummies are included for Africa, Latin America, Central America, Asia and Middle East

Table 14: Cross country relationship between volatility and trust : robustness check (continued).

Dependent variable is the standard deviation of real GDP per capita growth rate 1950-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trust	-2.273*	-2.225*	-3.469**	-2.561**	-2.639**	-3.448**	-3.230*
	(1.290)	(1.189)	(1.279)	(1.210)	(1.200)	(1.358)	(1.789)
Polity IV	-0.0867					-0.140**	-0.133*
	(0.0589)					(0.0645)	(0.0770)
Constraint on the executive		-0.0967					
		(0.0745)					
Schooling years			0.208			0.340**	0.372*
			(0.132)			(0.156)	(0.203)
Ethnic fractionalization				0.239		-0.173	-0.117
				(0.800)		(0.779)	(0.868)
Ethnolinguistic fractionalization					-0.359		
					(1.098)		
Regional dummies							Yes
Constant	16.49***	15.59***	20.97***	17.22***	18.26***	21.62***	22.50***
	(3.972)	(4.080)	(3.778)	(4.278)	(4.646)	(4.163)	(6.326)
Observations	38	38	38	38	38	38	38
R-squared	0.628	0.624	0.628	0.601	0.602	0.690	0.715

OLS regressions
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Regional dummies are included for Africa, Latin America, Central America, Asia and Middle East
Average growth rate, initial GDP per capita and population, public expenditure and openness are included in all regressions

Table 15: Cross country relationship between volatility and trust : controlling for inequalities.

Dependent variables are
S.d. : the standard deviation of real GDP per capita growth rate 1970-2007
Freq. : the frequency of negative real GDP per capita growth 1970-2007

	(1) S.d.	(2) S.d.	(3) S.d.	(4) S.d.	(5) S.d.	(6) Freq.	(7) Freq.	(8) Freq.	(9) Freq.	(10) Freq.
Trust	-3.736**	-3.392**	-3.676**	-3.290*	-3.572**	-0.146**	-0.131*	-0.152**	-0.136**	-0.143**
	(1.578)	(1.628)	(1.515)	(1.657)	(1.725)	(0.0619)	(0.0672)	(0.0657)	(0.0663)	(0.0648)
Gini coefficient	-0.0270	-0.0348	-0.0319	-0.0232	-0.0186	0.000164	-0.000450	6.81e-05	0.000247	0.000328
	(0.0383)	(0.0556)	(0.0385)	(0.0355)	(0.0449)	(0.00117)	(0.00135)	(0.00122)	(0.00114)	(0.00146)
Average growth rate	-0.391	-0.133	-0.315	-0.228	-0.437	-0.0647***	-0.0545***	-0.0641***	-0.0611***	-0.0656***
	(0.270)	(0.269)	(0.302)	(0.254)	(0.298)	(0.00703)	(0.00737)	(0.00668)	(0.00681)	(0.00696)
Initial real GDP per capita (log)	-1.337***	-0.702	-1.058**	-0.370	-1.405***	-0.0587***	-0.0333*	-0.0573***	-0.0376*	-0.0600***
	(0.385)	(0.601)	(0.406)	(0.445)	(0.401)	(0.0153)	(0.0184)	(0.0149)	(0.0188)	(0.0151)
Initial population (log)	-0.571***	-0.613***	-0.513***	-0.568***	-0.567***	-0.0176**	-0.0177**	-0.0177**	-0.0175**	-0.0175**
	(0.190)	(0.222)	(0.173)	(0.179)	(0.198)	(0.00726)	(0.00830)	(0.00743)	(0.00693)	(0.00741)
Public expenditure	-0.00166	0.00409	0.00880	0.00673	-0.00336	-0.00139*	-0.00106	-0.00135*	-0.00121	-0.00142*
	(0.0259)	(0.0288)	(0.0253)	(0.0268)	(0.0253)	(0.000740)	(0.000741)	(0.000717)	(0.000728)	(0.000753)
Openness	0.00165	-0.00177	0.00316	-0.00277	0.00257	0.000128	1.78e-05	0.000125	3.20e-05	0.000146
	(0.00520)	(0.00566)	(0.00508)	(0.00480)	(0.00606)	(0.000141)	(0.000165)	(0.000147)	(0.000141)	(0.000140)
Terms of trade			0.0254					3.69e-05		
			(0.0201)					(0.000610)		
Polity IV				-0.189***					-0.00411*	
				(0.0585)					(0.00215)	
Ethnic fractionalization					-0.645					-0.0126
					(1.404)					(0.0469)
Regional dummies		Yes					Yes			
Constant	24.29***	17.90**	20.11***	15.74**	24.84***	1.168***	0.899***	1.159***	0.982***	1.179***
	(5.875)	(8.222)	(5.409)	(6.086)	(5.795)	(0.226)	(0.255)	(0.214)	(0.250)	(0.226)
Observations	56	56	54	56	56	56	56	54	56	56
R-squared	0.573	0.628	0.593	0.638	0.575	0.817	0.847	0.816	0.828	0.818

OLS regressions
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Regional dummies are included for Africa, Latin America, Central America, Asia and Middle East