Roth, Felix

Working Paper

Trust and Growth: The Global Evidence over 40 Years

Hamburg Discussion Papers in International Economics, No. 14

Provided in Cooperation with:
University of Hamburg, Department of Economics, Senior Lecturer in International Economics

Suggested Citation: Roth, Felix (2024) : Trust and Growth: The Global Evidence over 40 Years, Hamburg Discussion Papers in International Economics, No. 14, University of Hamburg, Chair of International Economics, Hamburg

This Version is available at:
https://hdl.handle.net/10419/305221

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

FAKULTÄT
FÜR WIRTSCHAFTS- UND
SOZIALWISSENSCHAFTEN

Trust and Growth:
The Global Evidence over 40 Years

Felix Roth

Hamburg Discussion Paper in International Economics [No.14]

University of Hamburg

Senior Lectureship in International Economics

University of Hamburg

Senior Lectureship in International Economics

The Senior Lectureship in International Economics is located at the University of Hamburg. Its research focuses on European economic integration, Economics of Monetary Union and Intangibles and international growth.

The Discussion Paper Series is designed to enable internal and external researchers but also excellent students in the context of the Senior Lectureship to make their research publicly available. The aim is to contribute to the current policy debate and to stimulate research on relevant topics. The views expressed in this paper represent the opinion of the author only. For any questions or comments, please directly contact the author.

Editor:
PD Dr. Felix Roth
University of Hamburg
Senior Lectureship in International Economics
Von-Melle-Park 5
20146 Hamburg
Felix.Roth@uni-hamburg.de
Homepage: https://www.felixroth.net/
ISSN 2625 - 7513 (online)
https://www.wiso.uni-hamburg.de/fachbereich-vwl/ueber-den-fachbereich/mitglieder/roth-felix.html

Trust and Growth: The Global Evidence over 40 Years[1]

Felix Roth[2]

University of Hamburg, Department of Economics

This version: 31 10 2024

This paper analyzes the intertemporal variation of trust on economic growth. Constructing a unique global country panel dataset and applying a system-generalized method of moments (SYSGMM) estimation approach to a sample of 75 global economies over a 40-year time span (1980-2019), this paper finds evidence of a curvilinear (inverted U-shape) relationship between trust and growth.[3] Only a minority of global economies can attain a position close to or above the optimum threshold for trust and growth. Most economies, in fact, fall well below that threshold, and for them, it is incumbent to consider trust-building measures in order to achieve higher growth. In countries that are close to the optimum threshold, however, such policies can likely be neglected. In fact, in countries where trust levels exceed the optimum, an increase in trust might even hamper growth.

Key words: Trust, Growth, Intertemporal Variation, Panel Analysis, Curvilinear (inverted U-shape) Relationship

JEL codes: C33, O43, O47, O50, Z13

1 Introduction

The empirical evidence concerning the impact of trust on economic growth at the country level remains mixed. Whereas the early cross-country investigations in the field found a positive linear relationship (Knack and Keefer 1997, p. 1261; Zak and Knack 2001, p. 308), two follow-up cross-

[1] This paper is an updated version of an earlier manuscript version from 7 January 2024 entitled "*Reassessing the Relationship between Trust and Growth*". This paper will be presented at the 2025 annual meeting of the American Economic Association in San Francisco. The author wants to thank Lars Jonung, Elaine Kiiru, Benjamin Moll, Thomas Straubhaar, Raf van Gestel, and participants at the 2024 International Conference on Empirical Economics at Pennsylvania State University Altoona for valuable comments. The author wishes to thank Jon Stemmler and Antonio Kortum for assistance. This work was supported by the European Commission under the Horizon 2020 program for the GLOBALINTO project (contract number 822259).

[2] Please address all correspondence to: Felix Roth, University of Hamburg, Von-Melle-Park 5, Postfach #17, 20146 Hamburg, Germany (felix.roth@uni-hamburg.de).

[3] A replication package, including all the files and directories that are needed to reproduce the results presented in this paper, is ready for submission upon acceptance of this paper for publication.

country robustness studies showed either that the results of the paper by Knack and Keefer (1997) are robust, but only in a limited sense (Beugelsdijk et al. 2004, p. 118) or found a "*shaky*" relationship between trust and growth (Berggren et al. 2008, p. 251). In addition, the only existing panel data analysis in the field found a curvilinear (inverted U-shape) relationship between trust and growth (Roth 2009, p. 128).

These findings have recently motivated scholars to question the empirical country-level findings of the relationship between trust and growth entirely (Nowrasteh and Forrester 2023: Abstract). Given that prominent scholars from economics and political science stress the theoretical importance of trust for economic performance at the country level (Arrow 1972, p. 345; Fukuyama 1996, p. 7; Putnam 1993, p. 176; Tabellini 2010, p. 684; c.f. Inglehart et al. 1997, pp. 227-228; Olson 1982, pp. 41-47), the current state of the art in this field is unsatisfactory and deserves more rigorous research to resolve the empirical ambivalence between trust and growth at the country level.

This paper builds upon the seminal panel study by Roth (2009) and supports the proposal by Algan and Cahuc (2010, p. 2061) to analyze the intertemporal variation between trust and growth with long enough time series on the evolution of trust in order to control for time invariant specific components. In particular, it goes beyond earlier studies by Roth (2009) in four distinct aspects. First, it extends the country sample from 41 to 75 – covering nearly three-quarters of all countries in the world today before the stepwise case selection. Second, it extends its time-series evolution from the original 25 years to 40 years, covering the period 1980-2019. Third, it applies a tailor-fit synchronization procedure between trust and growth over time to address endogeneity through rigorous research design, thereby developing a unique "*small T, large N*" panel dataset with 392 overall country-time observations for trust and growth. Fourth, it estimates this unique panel dataset with a pronounced intertemporal variation in trust with the help of a difference (DIFFGMM) and system-generalized method-of-moments (SYSGMM) estimation approach to control for endogeneity econometrically (Roodman 2009a, p. 86).

This paper finds a curvilinear (inverted U-shape) relationship between trust and growth, with an optimum level of trust at 44.4 percent. This finding implies that an increase in trust appears to enhance economic growth in countries with initially low levels of trust below the threshold of 44.4 percent. However, this increase tends to retard economic growth in countries that have already achieved a substantial level of trust above the threshold. Given that most countries in the world are located well below the optimum level of trust for growth of 44.4 percent, prioritizing trust-building

policies would be highly beneficial for enhancing growth in these countries. No immediate policy action is needed for the few countries that have already achieved a trust level close to the optimum threshold. The few countries that register above the optimum level should accept slightly lower economic growth in exchange for the multiple benefits stemming from high levels of trust, including, amongst others, democratic stability (Inglehart 1990, 1999; Inglehart et al. 1997; Nannestad 2008, p. 429; Uslaner, 1999).

The remainder of the paper is structured as follows. Section 2 elaborates upon the theoretical relationship between trust and growth. Section 3 presents previous empirical findings. Section 4 discusses the operationalization, data, research design, case selection, and model specification. Section 5 offers descriptive statistics. Section 6 depicts the econometric analysis. Section 7 discusses the findings vis-à-vis the state of the art. Section 8 discusses the policy implications, and section 9 concludes.

2 Relationship between Trust and Economic Growth

2.1 Positive Relationship

What are the direct channels for cultivating a positive relationship between trust and growth? According to the literature in this field, there are three direct channels through which trust might nurture growth. According to Whitely (2000, p. 451), trust facilitates economic growth by i) lowering transaction costs in economic exchange, ii) solving dilemmas posed by collective action, and iii) diminishing principal-agent problems.

First, concerning transaction costs, Arrow (1972, pp. 345-346) argues that virtues such as trust play an essential role in the functioning of the economic system, as they tend to facilitate the process of exchange. Arrow's line of argument is substantiated by a theory of transaction costs, as developed by institutionalist economists, such as North (1990). For North (1990), transaction costs are a part of production costs, which evolve during the economic process of exchange and specialization, such as the costs associated with banking, insurance, finance, wholesale, and retail trade (p. 28). According to this logic, societies demonstrating high levels of trust should produce a higher output than low-trust societies, as the cost of transactions, such as monitoring, enforcing, and protecting contracts, is lower (see here also Fukuyama 1996, pp. 26-27 and Knack and Keefer 1997, pp. 1252-1253).

Second, concerning dilemmas of collective action, Putnam (1993) concludes that high stocks of social capital (and, respectively, trust) in an economic region "*bolster the performance of the polity and the economy, rather than the reverse*" (p. 176). Putnam (1995) introduces four arguments as to why social capital and trust have a positive effect on the economy: they i) promote coordination and cooperation for mutual benefit, ii) solve dilemmas of collective action, iii) weaken the incentives for opportunism, and iv) reduce egoism (p. 76). Putnam's arguments are in line with Hardin (1982) and Ostrom (1990), who argue that in high-trust societies, it should theoretically be easier to cope with free-rider problems that arise over, for example, efforts to reduce CO_2 emissions (Hardin 1982, p. 9) or overfishing (Ostrom 1990, p. 3). Generally, in high-trust societies, people do not so easily take advantage of the public infrastructure.

Third, concerning principal-agent problems, Knack and Keefer (1997) argue that such problems are much less pronounced in high-trust societies (pp. 1252-1253). The authors mention two arguments in this context: i) if entrepreneurs devote more time to monitoring possible malfeasance by partners, employees, and suppliers, they will have less time to devote to innovation in new products and processes; and ii) employment contracts in which managers rely on employees to accomplish their assigned tasks can be difficult to monitor. In a similar vein, Fukuyama (1996) argues that high-trust communities do not rely as much on detailed contracts and legal regulations (p. 26) nor must they resort to coercive means to enforce cooperation (p. 27).

This raises the question whether trust is always positively related to economic growth? Or are there theoretical arguments for a negative and curvilinear relationship between too much – or excessive – trust and economic growth?

2.2 Negative and Curvilinear Relationship

There are three channels by which too much trust might hamper economic growth, thus implying a curvilinear relationship between trust and growth with an optimum point of trust for growth. Too much trust might hamper economic growth by i) allowing disproportionate collective action over time, ii) raising complacency within society, thereby inhibiting innovation and competition, and iii) hampering cooperation given the tendency of trust to act as a double-edge sword.

First, in the context of disproportionate collective action, a possible negative relationship between high levels of trust and economic growth can be found in the literature on collective action by Olson (1982). According to Olson, collective action can undermine the state's power to implement structural reforms or agendas to maintain high economic growth rates. He argues that

stable societies are at risk of accumulating "*collusions*" and "*organizations of collective action*" over time (p. 41). If a society allows a plethora of organizations to function as special interest groups, economic growth is harmed by reduced efficiency, wealth is aggregated in the societies in which they operate, and political life becomes fraught with more divisiveness (p. 47). Hardin (1982) adopts a similar argument, stressing that social capital and trust are merely the means to an end, and introduces the concept of blocking social capital (pp. 91-94). A theoretical synergy between the arguments advanced by Putnam (1993, p. 176) and Olson (1982, pp. 41-47) is developed by Inglehart et al. (1997), who propose a curvilinear (inverted-U shape) relationship between social capital and economic performance (pp. 227-228).

Second, too much trust might lead society to become complacent, which could have the effect of stifling innovation and the entrepreneurial spirit and ultimately hampering economic growth (Cowen 2017, pp. 81-89). Cowen's argument for the US is backed by microeconomic theory and supporting evidence reported in management and organizational literature. Two strands of this literature are worth noting in this context. The work by Gargiulo and Ertug (2006) highlights that too much trust can turn commitment into complacency, which might lead to declining organizational performance (p. 175). The authors, therefore, explicitly model the relationship between trust and economic benefits from an organizational perspective in a curvilinear relationship (inverted U-shape) (p. 174). Moreover, empirical evidence on the relationship between trust and innovation points towards a curvilinear (inverted U-shape) relationship (Bidault and Castello 2009, p. 267; Bischoff et al. 2023, p. 13; Echebarria and Barrutia 2013, pp. 1013-1014).

Third, economic theory clarifies that too much trust can act as a double–edged sword. Cole et al. (2024, p. 10) explicitly model the relationship between trust and welfare at the country level in curvilinear (inverted U-shape), arguing that higher trust does not necessarily imply greater social welfare. The authors argue that while the presence of trust in a society may incline its members to engage in socially beneficial arrangements, it may also induce them to "*circumvent*" such arrangements in cooperation with other like-minded individuals when it promises to be profitable. By hampering cooperation, such activities ultimately thwart the original intentions of the arrangement and thereby reduce the general welfare (p. 1).

3 Previous Findings

Table 1 displays the findings of previous empirical studies on the impact of trust on economic growth.[4] All studies in the list follow the same – or at least a very similar – model specification as introduced in the seminal paper by Knack and Keefer (1997). Therefore, the displayed coefficients showing the impact of trust on economic growth are directly comparable across all papers. The papers differ on three accounts: i) the number of country-time observations reported, ii) the research design, and iii) the estimation approach adopted.

Table 1 Previous Empirical Findings between Trust and Economic Growth

Dependent Variable	Growth of GDP per Capita					
Equation	1	2	3	4	5	6
Authors	KK 1997	ZK 2001	BGS 2004	BEJ 2008	Roth 2009	This Paper
Growth of GDP per Capita	1980-92	1970-92	1970-92	1990-2000	1980-2005	1980-2019
Trust	0.086**	0.060***	0.061**	0.062***	0.18**	0.119***
Trust, squared	-	-	-	-	-0.003***	-0.0013**
Income	yes	yes	yes	yes	yes	yes
Education	yes	yes	yes	yes	yes	yes
Price Level of Investment	yes	yes	yes	yes	yes	yes
Fixed-Effects	no	no	no	no	yes	yes
Time-Effects	no	no	no	no	no	yes
WVS Waves	1-2	1-3	1-3	1-4	1-4	1-7
Further Trust Sources	no	yes	yes	yes	yes	yes
Synchronization	no	no	no	no	yes	yes
Control for Endogeneity	2SLS	2SLS	-	-	FE	GMM
Optimum Trust	63‡	61.2‡	61.2‡	66.1‡	30	44.4
Number of Countries	29	41	41	63	35	75
Number of Time-Periods	-	-	-	-	5	8
Number of Observations	29	41	41	63	115	392

Notes: KK=Knack and Keefer. ZK=Zak and Knack. BGS=Beugelsdijk et al. BEJ=Berggren et al. IV=Instrumental Variable. FE=Fixed-Effects. SYSGMM=System Generalized Method of Moments. Yes=Variable is included in the growth model. No=Variable is not included in the growth model. *, **, *** Significance at the 90, 95, and 99 percent level (one-tailed test). ‡ Maximum Value.

[4] There are a substantial number of studies that investigate distinct aspects of the relationship between trust and economic performance, such as the analysis of inherited trust and growth (Algan and Cahuc 2010) and the effect of trust on economic development (for an overview, see Algan and Cahuc 2013). Although these studies are certainly purposeful in their own right, they do not have a direct relevance for this paper, given that they do not use the original model specification as developed by the seminal paper by Knack and Keefer (1997). In addition, only 5 of the 14 studies use panel data, and only 2 of them use fixed-effects estimations (see here Table D1 in Appendix D in the supplementary material).

The first study is the seminal paper by Knack and Keefer (1997). The authors use a cross-sectional analysis with 29 market economies as units of observation. Trust is measured by taking 21 observations from the first wave (1981–84) of the World Value Survey (WVS) and eight observations from the second wave (1990–93) of the WVS. Thus, the authors utilize trust values from 1990 to 1993 to explain the economic growth rate from 1980 to 1992. The authors were aware of the endogeneity problem and argued that reverse causation is not problematic since the correlation coefficient of 0.91 between countries from the first and second waves of the WVS is very high (p. 1267). Knack and Keefer reported a positive linear relationship between trust and economic growth with a coefficient of 0.082. When using an instrumental variable estimation approach with an "ethno-linguistic" group measure and the number of law students as instruments to control for potential endogeneity, trust remained robust with a coefficient of 0.086.

The second study, by Zak and Knack (2001), re-investigates the empirical results from Knack and Keefer (1997). They used a cross-sectional analysis and observations from 41 market economies, based on all three waves from the WVSs (1981 to 1984, 1990 to 1993, and 1995 to 1997), Eurobarometer data, and a government-sponsored survey for the case of New Zealand. Their dependent variables were investment share as a percentage of GDP from 1970 to 1992 and average annual growth of per capita income over the same period. Aware of the endogeneity problem of their research design – arising from having used a measure of trust from 1997 to analyze the growth rate from 1970-1992 – they stress the same argument as Knack and Keefer (1997, p. 1267), i.e. that the correlation coefficient of 0.91 between the first and second wave of the WVS is very high (p. 309). In their depiction of the relationship between trust and economic growth, the authors concluded that a positive relationship exists with a coefficient of 0.063. When using an instrumental variable estimation approach with Catholic, Muslim and Christian Orthodox population shares as instruments to control for potential endogeneity, trust remained robust with a coefficient of 0.060.

The third study, by Beugelsdijk et al. (2004), analyzes the statistical robustness of the results of Knack and Keefer (1997) and Zak and Knack (2001) along four dimensions. They concentrated on the statistical significance and explored the influence of changing sets of conditioning variables on the estimated effect of trust. Moreover, they analyzed the sensitivity of the results by using different proxies or specifications for basic variables, e.g. human capital. Finally, they investigated the effects on the significance and effect size when the 29-country sample of Knack and Keefer (1997) was extended by 12 countries in the Zak and Knack (2001) paper. They found that whereas the results of Zak and Knack (2001) are moderately to highly robust, those from Knack and Keefer

(1997) are robust in only a very limited sense. In addition, Beugelsdijk et al. (2004) concluded that the empirical literature on trust and economic growth is more flawed by data limitations than by econometric problems, such as omitted variable biases. Moreover, the authors conclude that "*their extensive robustness analysis further adds to the empirical evidence that trust matters for explaining variation in economic performance*" (p. 132).

The fourth study, a paper by Berggren et al. (2008), conducted an extensive robustness analysis of the relationship between trust and growth by investigating a later period and a larger sample size. The authors worked with 63 countries using data on trust from the fourth version of the World Value Survey and the Latinobarómetro as well as new data on growth to separate time and sample effects. They investigated whether previous results on the trust-growth relationship for 1970 to 1992, studied by Zak and Knack (2001) and Beugelsdijk et al. (2004), also hold for the 1990s. They found that when outliers are removed (specifically China), the trust-growth relationship is statistically significant at the 95 percent level in only 10 percent of their 1,140 regressions, and that on average the trust coefficient is only half as large as the results that had been previously reported. The authors emphasize, however, that their results do "*not necessarily mean that trust is unimportant for growth, but its importance seems to be more limited and uncertain than previously claimed*" (p. 1).

Whereas the first four studies mentioned above use a cross-country research design, the fifth study by Roth (2009) is the first paper to use a panel dataset with 41 countries over the 25-year period 1980-2005, with an overall number of 129 observations. The paper estimates the within- and between-variation of the relationship between trust and growth with the help of a pooled-panel, fixed-effects and random-effects estimation approach. Analyzing the intertemporal variation between trust and growth for a 41-country sample with 129 observations, the author finds a negative linear relationship between trust and economic growth. More importantly, when excluding the six transition countries from his country sample, Roth (2009) finds a curvilinear relationship when estimating the data with the help of a fixed-effects estimation approach. With a coefficient for the linear term of 0.18 and for the quadratic term of -0.003, the optimum point of trust for growth is 30 percent. The pooled panel and random effects estimation used in the paper produce larger optimum trust points for growth of 53 and 43 percent, respectively. Therefore, although Roth (2009) clearly identifies a curvilinear relationship between trust and growth, the precise optimum point of trust and growth still needs to be identified.

How does this paper contribute to the state of the art? The work builds upon the fifth study by Roth (2009) and is in line with the exercise proposed by Algan and Cahuc (2010, p. 2061) to analyze the intertemporal variation between trust and growth with long enough time series on the evolution of trust in order to control for time invariant specific components. It extends its country sample from 41 to 75 economies and its time-series evolution from 25 years to 40 years, for the period 1980-2019. By applying a tailor-fit synchronization procedure between trust and growth over time to address endogeneity through rigorous research design, this paper develops a unique "*small T, large N*" panel dataset with 392 overall country-time observations. To control for endogeneity, econometrically, this paper estimates the unique panel data with a pronounced intertemporal variation in trust with the help of a system-generalized method-of-moments (SYSGMM) estimation approach (Roodman 2009a, p. 86). This paper corroborates the curvilinear relationship between trust and growth as detected by Roth (2009, pp. 115-118) and establishes an effect of trust on growth with an optimum point at 44.4 percent.

4 Operationalization, Data, Research Design, Case Selection, and Model Specification

4.1 Operationalization

Trust is measured by asking respondents the following survey question: "*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?*".[5] Possible responses to the question include: i) "*Most people can be trusted*"; ii) "*Can´t be too careful*"; iii) "*Don´t know*"; and iv) "*No answer*". In line with the existing literature (e.g. Knack and Keefer 1997, p. 1256; Roth 2009, p. 109), the trust value for each country is calculated by dividing the number of participants responding "*Most people can be trusted*" by the total number of people answering "*Most people can be trusted*" and "*Can´t be too careful*". The answers "*Don't know*" and *"No answer"* are dropped.

4.2 Data

Data on trust are drawn from seven international surveys. Data from 1981 to 2020 are taken from the Integrated Value Study [IVS], which is an integrated dataset consisting of the merged data from: i) the first seven waves of the World Value Survey (1981-2020) (Haerpfer et al. 2021) and

[5] The questionnaire slightly varies over the seven (i-vii) international survey programs used. A detailed overview of slight variations of all survey questions is provided in Appendix F in the supplementary information.

ii) the first five waves of the European Value Survey (1981-2017) (EVS 2021).[6] The data from the IVS were then appended onto the data from five international Barometer surveys, including: iii) the first 20 waves of the Latinobarómetro from 1996-2018 (Latinobarómetro Data 2018); iv) the first five waves of the Arab Barometer from 2006-2019 (Arabbarometer Data 2019); v) the first four waves of the Asianbarometer from 2001-2014 (Asianbarometer 2016); vi) the first, third, and fifth waves of the Afrobarometer from 1999-2013 (Afrobarometer Data 2015); and vii) the 25th wave of the Eurobarometer from 1986 (Rabier et al. 1986). Table A1 in Appendix A in the supplementary material provides an overview of the availability of each survey for each country. Data on Real Gross Domestic Product (GDP), population, education, and price levels of investment are taken from the Penn World Table (PWT) 10.0 (Feenstra et al. 2015).[7] For a precise definition of each variable, see Table E1 in Appendix E. Data on economic freedom from 1995-2015 were taken from The Heritage Foundation (Heritage Foundation 2023). Data on political freedom from 1980 to 2015 were taken from the Freedom House Index (Gorokhovskaia et al. 2023).

4.3 Research Design

To address endogeneity via research design, the analysis uses a precise tailor-fit synchronization procedure between the dependent variable (economic growth) and the independent variables (trust, income, education, and price level of investment). Trust levels in 1980, 1985, 1990, 1995, 2000, 2005, 2010, and 2015 are matched with five-year growth rates of Real GDP per capita for the eight 5-year-intervals: 1981-1985, 1986-1990, 1991-1995, 1996-2000, 2001-2005, 2006-2010, 2011-2015, and 2016-2019.[8, 9] Table 2 provides a visual overview of the synchronization methodology.

[6] The IVS data include an overall number of 450 surveys, 115 countries and 645,249 individual observations from 1981 until 2020.

[7] The PWT10.0 covers 183 countries between 1950 and 2019.

[8] The year of the field work strongly differs in the seven waves of the WVS and the five waves of the EVS among the participating countries. For the aggregated IVS data this means that times series data on interpersonal trust data show highly heterogeneous patterns across countries. For this reason, existing panel studies face problems of endogeneity due to simultaneity (Dearmon and Grier 2009, p. 213; Peiró-Palomino and Tortosa-Ausina 2013, pp. 381-383). To provide the precise synchronization procedure as highlighted in Table 2, this paper interpolates and extrapolates missing data, if necessary [see here Makrychoriti et al. (2021, p. 7) for a similar approach]. For a detailed description of the construction of the trust dataset at hand – including multiple robustness and validity checks concerning potential measurement problems – the reader is referred to Roth (2024a).

[9] The trust data for our 75 countries from 1980 to 2015 is a sub-sample of a 122 country sample from 1980 to 2020 as introduced in Roth (2024a).

Table 2 Tailor-Fit Synchronization Procedure between Trust and Economic Growth

Panel Wave	Trust	→	Economic Growth
1	1980	→	1981-1985
2	1985	→	1986-1990
3	1990	→	1991-1995
4	1995	→	1996-2000
5	2000	→	2001-2005
6	2005	→	2006-2010
7	2010	→	2011-2015
8	2015	→	2016-2019

Note: Due to a lack of data, growth of GDP per capita in the Penn World Table 10.0 stops in 2019.

4.4 Case and sample selection

Following the methodological approach adopted by Lijphart (1971), aimed at maximizing country and time observations, we use the largest panel database for trust produced to date, covering 75 countries from 1980-2015, with an overall number of 392 observations. Given that this analysis is based on time dimensions, only countries with at least two consecutive time observations are used. Therefore, 20 countries with only one time series observation are discarded from our sample in the first step. In the second step, 12 countries without information on human capital from the Penn World Table are excluded. Following the Mankiw et al. (1992) methodology, four oil-producing countries are also excluded from the sample in a third step. Fourth, advancing the argumentation highlighted in the seminal contribution of Knack and Keefer (1997, p. 1255), we exclude 31 countries which are characterized by "Unfreedom".[10] Finally, for our 17 transition economies we only included observations from 2005 onwards.[11] After applying these five steps, we are left with a sample of 75 economies over the 40-year period 1980-2019, with an overall number of 392 country-time observations. Table B1 in Appendix B in the supplementary information gives a complete overview of our case and sample selection. Fig. G1 in Appendix G gives an overview of the various sub-samples of our 75 economies.

[10] The 31 countries excluded from our sample were characterized by "Unfreedom", meaning deemed to be both non-market economies and undemocratic in terms of the political rights and civil liberties extended to their citizens. These determinations were based on data collected and published by The Heritage Foundation (2023) and Freedom House (Gorokhovskaia et al. 2023). The theoretical reason to exclude countries characterized by "Unfreedom" is straightforward: in countries characterized by "Unfreedom", trust only plays a minor role in daily economic activity. Transaction and interactions by free agents are replaced by authoritarian control and surveillance.

[11] The transition process from planned to free market economies is associated with high volatilities in economic growth rates. This is why for our 17 transition economies we only included observations from 2005 onwards.

4.5 Model Specification

The following regression model is used to describe the relationship between trust and economic growth. It is in line with the growth models used in the literature (Roth 2009, p. 110) and follows a curvilinear enhanced approach devised by Forbes (2000, p. 873).

$$Growth_{i,t} = \alpha_i + \beta_1 Trust_{i,t-1} + \beta_2 Trust, Squared_{i,t-1} + \beta_3 Income_{i,t-1} + \beta_4 Education_{i,t-1} + \beta_5 PI_{i,t-1} + \delta_t + \omega_{i,t} \quad (1)$$

where $Growth_{i,t}$ is the five-year growth rate of Real GDP per capita for each country *i* in period *t*; $Trust_{i,t-1}$, $Trust$, $Squared_{i,t-1}$, $Income_{i,t-1}$, $Education_{i,t-1}$ and $PI_{i,t-1}$ are trust, the squared term of trust, ln of Real GDP per capita, education, and price level of investment for country *i* in period *t-1*. α_i represents the country-fixed effect, δ_t the time-fixed effect, and $\omega_{i,t}$ is the error term.

5 Descriptive Statistics

Table 3 displays the summary statistics for all variables utilized in the descriptive and econometric analysis. For the whole period (1980-2019), five-year economic growth rates have a mean value of 1.65 percent and range from -2.79 percent in 1986-1990 in Argentina to 7.56 percent in 2011-2015 in Benin. Trust has a mean value of 30.9, with a minimum value of 3.2 percent in Trinidad and Tobago in 2010 and a maximum value of 75.4 percent in Denmark in 2010. Income, Education, and Price Levels of Investment (PI) all show an adequate size in line with the existing literature (Roth 2009, p. 128). A larger version of Table 3 showing summary statistics for the eight individual panel waves can be found in Table E1 in Appendix E.

Table 3 Summary Statistics, 75 Economies, 1980-2019

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Economic Growth	392	1.65	1.59	-2.79	7.56
Trust	392	30.9	15.6	3.2	75.4
Trust, Squared	392	1200.6	1176.6	10.4	5678.2
Income	392	9.88	0.87	6.82	11.36
Education	392	2.78	0.57	1.14	3.74
PI	392	57.47	20.30	21.96	152.31

Sources: Unique dataset on trust compiled by the author using publicly available data and Penn World Tables 10.0 (Feenstra et al. 2015).

Table 4 lists the 75-country sample included in the analysis of this paper. The displayed mean values (μ), standard deviations (σ), and coefficients of variation (cv)[12] are derived from the countries' individual time series (n), which range from 2 to 8 observations[13] for the period 1980-2015. The values of the changes (Δ) of trust were calculated by subtracting the first observation of the time series from the last one. The average μ-value is 27.9, the average σ-value is 3.8, and the average cv-value is 15.6 percent. Positive and negative Δ-values negate each other to an overall value of 0.7. Table 4 points to two critical findings.

First, we find substantial variation in the μ-values[14] of trust across countries, ranging from 3.5 percent in Trinidad and Tobago to 67.9 percent in Norway. This finding is in line with the empirical evidence of a 111-country analysis conducted by Algan and Cahuc (2013, p. 524) and a 122-country analysis by Roth (2024a). Evidence of substantial cross-country variation in trust has been a major factor driving the research design of the cross-country studies by Knack and Keefer (1997) and Zak and Knack (2001), as displayed in Table 1.

[12] The values of the coefficients of variation are calculated by the following formula: [(σ/μ)*100]. For Greece this yields a cv-value of 45.5 percent, according to the calculation: [(12.8/28.2)*100]. The higher the coefficients of variation, the higher the intertemporal variation in trust.

[13] Table C1 in Appendix C shows the available consecutive time-series information for each country.

[14] The large cross-country (μ-values) variation of interpersonal trust was also identified with the help of a bar chart (Fig. E1 in Appendix E).

Table 4 Levels and Changes of Trust in 75 Economies, 1980-2015

No.	Country	μ	σ	cv	n	Δ	No.	Country	μ	σ	cv	n	Δ	No.	Country	μ	σ	cv	n	Δ
1	Albania	11.4	5.1	44.3	3	-12.4	26	Greece	28.2	12.8	45.5	7	-39.7	51	Norway	67.9	4.8	7.0	8	11.7
2	Argentina	22.6	5.6	24.8	8	-1.4	27	Guatemala	20.6	4.4	21.3	5	-12.4	52	Panama	20.1	3.5	17.1	5	0.6
3	Armenia	17.6	3.1	17.8	3	0.5	28	Hong Kong	39.0	5.8	14.8	4	15.9	53	Paraguay	16.8	1.9	11.1	5	-1
4	Australia	46.0	3.5	7.5	8	2.3	29	Hungary	26.0	1.6	6.1	3	2.9	54	Peru	14.1	2.7	19.1	5	7.1
5	Austria	36.8	5.5	14.8	6	16.7	30	Iceland	46.4	6.5	14.1	8	19.6	55	Poland	22.6	2.6	11.4	3	5.2
6	Belgium	32.0	2.3	7.3	7	7.1	31	India	29.6	8.5	28.7	6	-15.7	56	Portugal	18.8	5.0	26.5	7	-10.4
7	Benin	30.2	2.0	6.6	3	4	32	Ireland	39.3	4.0	10.1	7	-2.9	57	Romania	14.9	3.9	26.1	3	-9.1
8	Botswana	11.0	3.0	27.0	5	-2.7	33	Italy	30.4	2.5	8.4	8	2.6	58	Senegal	28.7	1.4	4.9	3	3.3
9	Brazil	7.1	2.0	27.4	6	0.8	34	Japan	40.5	1.9	4.6	8	-3.6	59	Serbia	15.2	1.2	8.1	3	1.3
10	Bulgaria	19.8	1.6	8.3	3	-3.9	35	Jordan	25.3	5.9	23.2	4	-11.2	60	Singapore	28.1	5.6	19.8	4	15.2
11	Canada	45.9	4.1	8.9	8	-3.6	36	Kazakhstan	33.6	4.5	13.4	2	-9	61	Slovakia	16.9	3.0	17.5	3	5.2
12	Chile	18.0	2.6	14.3	6	-7.2	37	Kyrgyzstan	27.9	7.6	27.4	3	8.8	62	Slovenia	21.1	2.5	11.8	3	6.1
13	Colombia	18.2	2.5	13.5	5	-4.7	38	Latvia	24.6	0.8	3.1	2	1.5	63	South Africa	22.3	4.8	21.6	8	-6.7
14	Costa Rica	14.8	2.8	18.6	5	-5.6	39	Lithuania	30.0	1.5	5.1	3	3.7	64	South Korea	32.0	3.7	11.6	8	-4
15	Croatia	18.1	2.5	13.8	3	-5.4	40	Luxembourg	29.8	2.4	8.0	6	2	65	Spain	35.0	2.4	7.0	8	3
16	Cyprus	8.4	0.9	10.8	3	-2.1	41	Madagascar	29.7	2.2	7.3	3	-5.1	66	Sweden	63.4	3.5	5.6	8	6.6
17	Czech Rep.	27.2	3.0	10.8	3	-5.7	42	Malaysia	9.8	1.9	19.3	3	4.3	67	Switzerland	48.8	6.3	12.9	7	14.7
18	Denmark	65.6	7.9	12.0	8	22.2	43	Mali	20.1	4.0	19.9	4	9.4	68	Taiwan	37.2	3.9	10.5	5	4.8
19	Dom. Rep.	23.8	6.1	25.7	5	-13.6	44	Malta	19.1	4.9	25.5	7	11.1	69	Thailand	31.0	7.6	24.5	4	12.6
20	El Salvador	22.2	4.2	19.0	5	-6.2	45	Mexico	24.6	5.6	22.9	8	-2	70	T. and T.	3.5	0.3	8.6	2	-0.6
21	Estonia	35.0	2.9	8.2	3	4.2	46	Mongolia	15.1	4.2	28.0	3	9.8	71	Turkey	10.7	2.7	25.3	6	2.6
22	Finland	59.8	5.2	8.7	8	11.3	47	Morocco	17.0	4.1	24.1	4	-9.8	72	Uganda	15.7	0.6	4.1	4	0.0
23	France	23.0	1.9	8.2	8	2	48	Namibia	29.6	4.1	13.7	5	-8.6	73	UK	37.6	5.0	13.3	8	-4.4
24	Germany	37.4	4.1	11.0	8	12.3	49	Netherlands	54.3	6.3	11.6	8	17.3	74	US	39.8	5.0	12.7	8	-3.8
25	Ghana	11.1	3.3	29.3	3	-7	50	New Zealand	52.9	3.3	6.3	5	7.5	75	Uruguay	28.1	5.0	17.7	5	-6.9
															World Average	27.9	3.8	15.6	5.2	0.7

Notes: T. and T.=Trinidad and Tobago. *Source:* Unique dataset on trust, compiled by the author from publicly available international data.

Second, with an average cv-value of 15.6 percent, we find a pronounced intertemporal variation in the level of trust over the 40 years among our 75 country cases.[15] More than two-thirds (52/75) of the country cases possess cv-values larger than 10.[16] More than one-quarter (20/75) display cv-values larger than 20.[17] The novel evidence presented in Table 4 – alongside the findings of a pronounced intertemporal variation in trust by the existing panel data literature (Roth 2007, pp. 44-49; 2009, pp. 111-114; 2022, p. 182; Paldam 2011, p. 336) and time series evidence for the US (Inglehart 1990, p. 428; 1999, p. 95; Uslaner 1999, p. 132; Putnam 1995, p. 73; 2000, pp. 140-141; Paxton 1999, p. 122), Germany (Noelle-Neumann 2005, p. 5; Inglehart 1990, p. 438), Italy (Inglehart 1990, p. 438; Uslaner 2002, p. 253), Mexico (Inglehart 1990, p. 438; Uslaner 2002, p. 253) and Scandinavian countries (Sonderskov and Dinesen 2014, p. 784) and most previous work on the intertemporal variation of trust for a 122-country sample (Roth 2024a) together with the theoretical work on experiential trust (Glanville and Paxton 2007, pp. 231-232; Sonderskov and Dinesen 2014, p. 783) – refute claims and previous evidence purporting to show that trust is very stable over a long period of time (Uslaner 2002, pp. 160, 230; 2008, pp. 729-730; Putnam 1993, pp. 153, 180) and is approximate time-invariant (Bjornskov 2006, pp. 3-5; 2012, p. 1349; 2022, p. 222).[18,19]

[15] The large intertemporal (cv-values) variation of interpersonal trust was also illustrated with the help of a bar chart (Fig. E2 in Appendix E) and a world map (Fig. E3 in Appendix E).

[16] As a rule of thumb, a coefficient of variation of larger than 10 should be considered a substantial intertemporal variation in trust.

[17] Roth (2024a) analyzes a 122-country sample of both free-market & democratic and non-free-market & non-democratic economies with 723 overall country-time observations and retrieves an average cv-value of 20.8 percent. Next to the free-market economies of Greece and Albania, the study finds very high cv-values for the countries Iran, Indonesia, Saudi Arabia, Palestine, Kuwait, Tunisia, Malawi, Nicaragua and Bosnia and Herzegovina with cv-values of ≥ 30 percent and up to 75 percent for Iran.

[18] Interestingly, the claim that trust is generally stable over time is already questioned by the seminal work by Knack and Keefer (1997). The authors highlight that: *"(…) there are both theoretical and empirical reasons for caution regarding the assumption that trust (…) is stable over longer time periods.*" (p. 1267). Nevertheless, they treat trust as a "culture" variable that changes only slowly over time. As mentioned in section 3 above, they back their claim with empirical evidence of a high correlation of 0.91 between the first and second wave of the World Value Survey (p. 1267). This empirical evidence is problematic for two reasons. First, even if correlation coefficients among our OECD-23 economies are on average high (>0.79), they are much lower among the countries in South and Central America, the Caribbean and Africa (>0.42). Second, to assess the degree of intertemporal variation, correlation coefficients are not ideal. For example, a universal global increase/decline in trust among all economies would indicate high correlation coefficients, although cv-values have increased markedly. Table E2 in Appendix E displays the results for 144 (4x36) correlation coefficients for the eight individual panel waves.

[19] The inaccurate claim that trust is approximate time-invariant is highly problematic given that it is used as a justification to exclude standard and dynamic panel data econometric estimation techniques in order to control for time invariant specific components when estimating the relationship between trust and growth (see Bjornskov 2012, p. 1349; and Bjornskov 2022, p. 222).

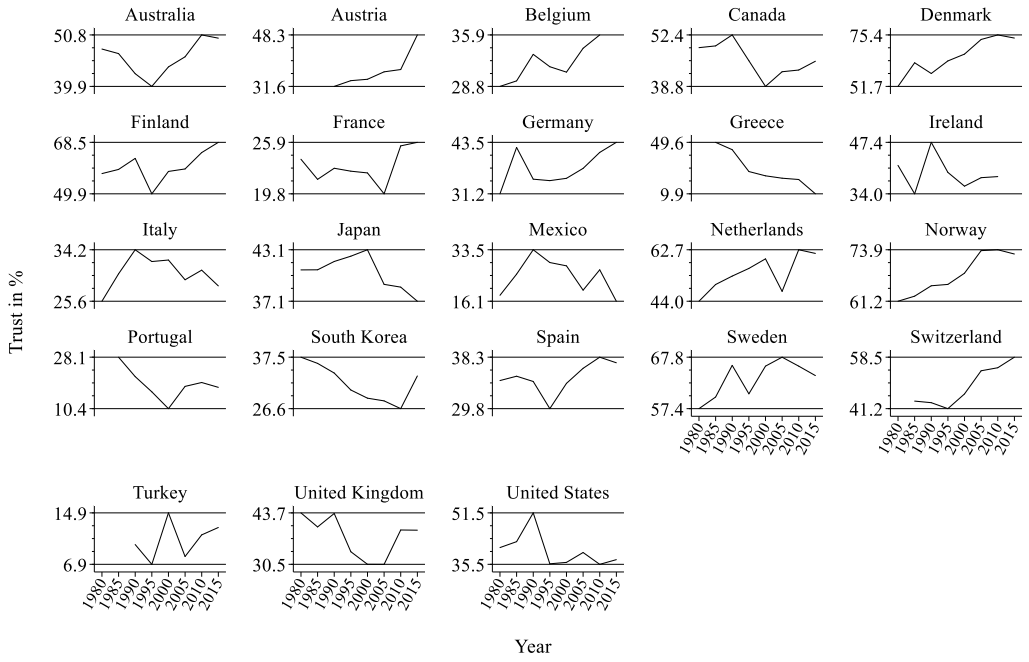

Fig. 1 Trust over Time, 23 OECD Economies, 1980-2015

Note: The Y-axis uses individual scales and depicts minimum and maximum values. *Source:* Unique dataset on trust, compiled by the author from publicly available international data.

To further substantiate the evidence of an intertemporal variation of trust, Fig. 1 displays time series evidence from 1980-2015 for an OECD-23 country sample.[20] Excellent examples of a substantial intertemporal variation of trust can be found in the cases of Greece, with a cv-value of 45.5 percent, and Denmark, with a cv-value of 12 percent. Whereas in Greece, we can trace a continuous decline in trust of 39.7 percentage points from 49.6 percent in 1985 to 9.9 percent in 2015, in Denmark we report a pronounced increase in trust by 22.2 percentage points from 51.7 percent in 1980 to 73.9 percent in 2015.[21]

Other countries with cv-values greater than 10 percent either follow the Greek pattern, such as Portugal (-10.4 percentage points), or the Danish pattern, such as the Netherlands (+17.3 percentage points), Switzerland (+14.7 percentage points), and Germany (+12.3 percentage points), or they show a significant intertemporal variation with down- and upswings, such as in the US, the UK, Ireland, Mexico, and South Korea. Nevertheless, even the country cases with cv-

[20] The use of an OECD-23 country sample is linked to previous empirical work by Roth (2009, p. 115, 117). Using an OECD-23 country sample, the author detected a curvilinear relationship between trust and growth. Trust over Time from 1980 to 2015 for the remaining countries are displayed in Fig. E5 and Fig. E6 in Appendix E.

[21] The exceptional increase of interpersonal trust in Denmark is in line with the finding by Sonderskov and Dinesen (2014, p. 784).

values below 10 percent exhibit an intertemporal variation of trust. In Norway and Finland, we detect significant increases in trust of 11.7 and 11.3 percentage points, respectively, over the period 1980-2015.[22] Only a few countries, such as Japan, follow very stable patterns of trust, with a cv-value as low as 4.6 percent.

6 Econometric Analysis and Results

6.1 Econometric Estimation Approach

With a lagged initial income term on the right-hand side of the equation, and the fact that the dataset at hand is one of small T (8) and large N (75) with a ratio of T/N = 0.11, in order to control for endogeneity, the baseline model in equation (1) is estimated using a dynamic panel estimation approach. Standard methods of dynamic panel estimation are the difference (Arellano and Bond, 1991) and the system (Arellano and Bover 1995; Blundell and Bond 1998; Bond et al. 2001) generalized method of moments (GMM). Both estimators have been designed for "*small T, large N*" panels to fit models with one dynamic dependent variable, additional controls, and fixed effects (Roodman 2009b). Whereas difference GMM transforms all regressors by differencing (Arellano and Bond 1991), the system GMM estimator augments the difference GMM estimator by building a system of two equations—the original equation and the transformed one (Arellano and Bover 1995; Blundell and Bond 1998; Bond et al. 2001). This allows the introduction of more instruments and substantially improves efficiency (Roodman 2009b, p. 86).

A practical test to evaluate whether to use difference or system GMM is provided by Bond et al. (2001). The authors argue that if the coefficients for the difference GMM estimation is below or close to the fixed effects estimation, then the instruments of the difference GMM estimator should be considered weak, and the system GMM estimator should be used. Applying this test to our paper, we find that the optimum trust level for growth for our difference GMM estimations are similar to the fixed effects estimations. Following the reasoning by Bond et al. (2001), we decided to estimate equation (1) via a system GMM approach. When implementing the difference and system GMM approach, we use the xtabond2 command as introduced by Roodman (2009b, p. 121).

[22] The exceptional increase of interpersonal trust in Norway and Finland is in line with the finding by Sonderskov and Dinesen (2014, p. 784).

6.2 Econometric Analysis

Following the existing literature (Roth 2009), regression 1 in Table 5 estimates equation (1) with the help of a fixed effects robust-estimation approach and our full sample with 75 countries from 1980 until 2019, with an overall number of 392 observations. Regression 1 yields a highly significant (at least 95-percent-level) curvilinear relationship between trust and growth with coefficients of 0.080 for the linear term and -0.00120 for the quadratic term. The positive influence attenuates as the level of trust rises and reaches zero when the indicator takes on a mid-range of 33.3 percent. From 33.3 percent onwards, Trust has a negative impact on growth. Fig. 2 depicts the respective augmented partial residual plot in order to interpret the curvilinear relationship between Trust and growth in regression 1 graphically.[23] For the other variables, we find a significant (99-percent-level) negative coefficient for Income (-4.14), an insignificant coefficient for Education (-0.86) and a highly significant (95-percent-level) negative coefficient for our Price Level of Investment (PI) (-0.02). Apart from the negative coefficient for Education our results are perfectly in line with the curvilinear findings by the existing literature which find an optimum point of Trust of 30 percent (see here Table 1).

Given the fact that equation (1) has a lagged initial income term on the right hand side of the equation, estimating equation (1) without controlling for the endogenous income term leads to biased econometric results. Thus, regression 2 controls for the endogenous income term with the help of a Difference GMM estimator.[24] Regression 2 yields a highly significant (at least 95-percent-level) relationship between Trust and growth with coefficients of 0.128 for the linear term and -0.00197 for the quadratic term. With this set of coefficients, we find an optimum point of trust of 32.5 percent. This is slightly below our fixed-effects estimation in regression 1. For the other variables, we find a significant (99-percent-level) negative coefficient for Income (-5.17), an insignificant negative coefficient for Education (-0.15) and a slightly significant (90-percent-level) negative coefficient for our Price Level of Investment (PI) (-0.02).

[23] Estimating the relationship between trust and growth linearly delivers weak and insignificant relationships (see here Tables E3 and E4 in Appendix E for replications of Tables 5 and 6 modeling Trust in a linear manner).

[24] Given that we use a precise synchronization strategy between trust and growth we do not believe that endogeneity poses an issue between Trust and Growth. Thus Trust was treated as a predetermined variable in regressions 2-5 in Table 5. Nonetheless, if we treat Trust and Trust-Squared as endogenous, when using our Difference GMM estimator we receive a significant (at the 95-percent-level) curvilinear relationship between trust and growth with an optimum point of trust for growth at 40.8 percent. However, once controlling for endogeneity the linear coefficient of Trust increases significantly to 0.297, leading to a very high economic growth rate of 6.1 percent at the optimum point of trust of 40.8 percent (see here results in regression 3 in Table E5 in Appendix E).

Table 5 Trust and Economic Growth – Curvilinear Estimations

Dependent Variable	Growth	Growth	Growth	Growth	Growth
Estimation Method	FE	DIFFGMM	DIFFGMM	SYSGMM	SYSGMM
Equation	1	2	3	4	5
$Trust_{i,t-1}$	0.080**	0.128**	0.205**	0.110**	0.119***
	(2.10)	(2.31)	(2.19)	(2.25)	(3.21)
$Trust, Squared_{i,t-1}$	-0.00120***	-0.00197***	-0.00306**	-0.00119**	-0.00134***
	(-2.71)	(-2.76)	(-2.59)	(-2.85)	(-2.86)
$Income_{i,t-1}$	-4.14***	-5.17***	-6.80***	-1.38***	-1.31***
	(-6.98)	(-5.16)	(-2.34)	(-2.85)	(-2.98)
$Education_{i,t-1}$	-0.86	-0.15	-2.32	1.71**	1.73***
	(-1.10)	(-0.11)	(-0.83)	(2.63)	(3.18)
$PI_{i,t-1}$	-0.02**	-0.02*	-0.01	-0.03***	-0.03***
	(-2.65)	(-1.91)	(-1.27)	(-2.93)	(-2.84)
Constant	42.45***	-	-	9.61***	8.78***
	(5.44)	-	-	(2.79)	(2.77)
N° of Instruments	-	113	35	141	86
Specification	RO	FI	CI	FI	2nd-3rd
AB Test AR(2)	-	0.10	0.17	0.08	0.09
AB Test AR(3)	-	0.09	0.09	0.16	0.17
Hansen Test	-	1.00	0.13	1.00	0.66
R-Squared	0.34	-	-	-	-
Optimum Point	33.3	32.5	33.5	46.2	44.4
Countries	75	75	75	75	75
Waves	8	8	8	8	8
Observations	392	317	317	392	392
Period	1980-2019	1980-2020	1980-2019	1980-2019	1980-2019

Notes: ***p < 0.01, **p < 0.05, *p < 0.1. AB Test=Arellano-Bond test for autocorrelation in differences (*p*-value). Hansen Test=Hansen test of joint validity of instruments (*p*-value). FE=Fixed-Effects. DIFF- and SYSGMM=Differenced and System Generalized Method of Moments. RO=Robust. FI=Full Instruments. CI=Collapsed Instruments. 2nd-3rd=Only 2nd and 3rd lags are used. Numbers in parentheses are t-values. Time dummies are included in every specification. All specifications include orthogonal deviations, small-sample corrections, two-step estimation, and Windmeijr-corrected cluster-robust errors. In specifications 2-4, $Income_{i,t-1}$ was treated as endogenous. $Trust_{i,t-1}$, Trust, $Squared_{i,t-1}$ and $Education_{i,t-1}$ were treated as predetermined. $PI_{i,t-1}$ was treated as exogenous. *Sources*: Unique dataset on trust, compiled by the author from publicly available international data and Penn World Tables 10.0 (Feenstra et al., 2015).

However, our Hansen test of joint validity of instruments returns a perfect p-value of 1.00, which is a classic sign of instrument proliferation. To lower our instrument count, regression 3 therefore collapses[25] our instruments to reduce its size from 113 to 35. The Hansen test now returns a valid value of 0.13. Regression 3 yields a highly significant (95-percent-level) curvilinear relationship between trust and growth with coefficients of 0.205 for the linear term and -0.00306

[25] See here Roodman 2009b, pp. 107-108 for the underlying methodology.

for the quadratic term. However, our optimum point still stands at 33.5 percent is thus very close to the results of our fixed-effects estimation. Moreover, we still get an insignificant and negative coefficient for our Education (-2.32) and an insignificant coefficient for our Price Level of Investment (-0.01) variable.

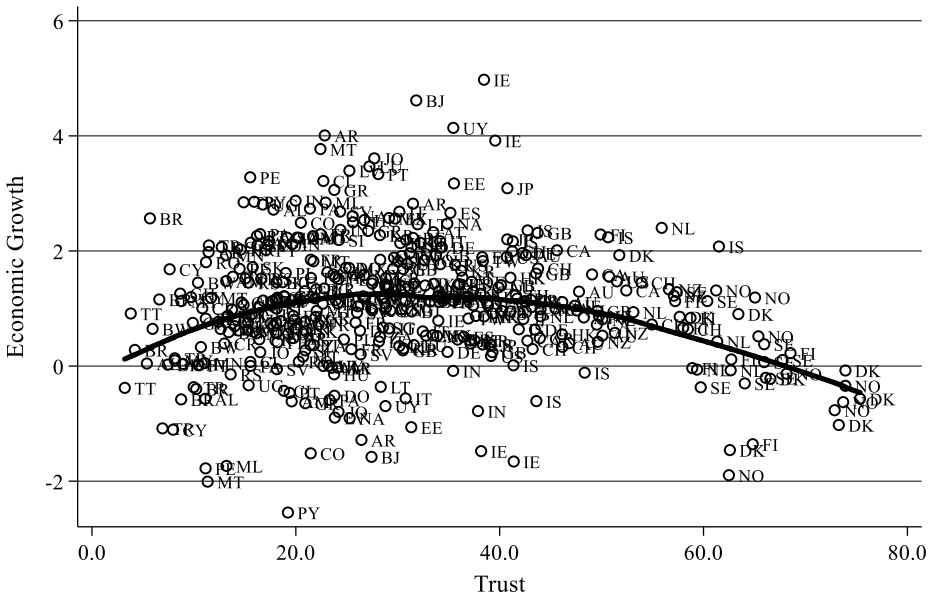

Fig. 2 Trust and Economic Growth, Fixed-Effects Estimation, Augmented Partial Residual Plot

Notes: The numbers arrayed along the y- and x-axis depict percentages. The optimum value is located at 33.3 percent and resembles the fixed-effects estimation results from Regression 1 in Table 5. *Source:* Unique dataset on interpersonal trust, compiled by the author from publicly available international data.

Following the reasoning by Bond et al. (2001), regression 4 estimates equation 1 via System GMM. Using a full instrument set with 141 instruments we retrieve a highly significant (at the 95-percent-level) curvilinear relationship between Trust and growth with coefficients of 0.110 for the linear term and -0.00119 for the quadratic term and an optimum point of Trust for growth at 46.2 percent. Given that our Hansen test of joint validity of instruments renders a perfect p-value of 1.00 to lower our instrument count regression 5 uses only the 2nd and 3rd lag reducing our instrument set to 86 instruments. Regression 5 finally yields very good econometric results when estimating equation (1). We find a highly significant (99-percent-level) relationship between Trust and growth with coefficients of 0.119 for the linear term and -0.00134 for the quadratic term. Our optimum point for trust and growth takes on a mid-range of 44.4 percent. Moreover, all other variables are highly significant at the 99-percent level and show the correct magnitudes and signs. Our Hansen test of joint validity of instruments is now better with a *p*-value of 0.66. Using a

benchmark *p*-value of 0.05, our Arellano-Bond test for autocorrelation in differences indicates the absence of a second- order correlation.

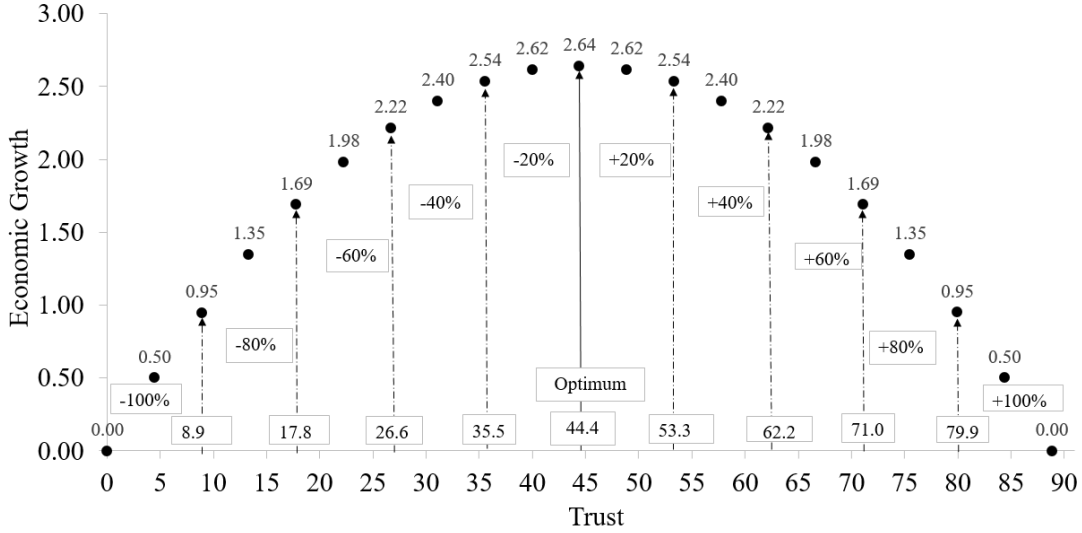

Fig. 3 Trust and Economic Growth, Predicted Values

Notes: The numbers arrayed along the y- and x-axis depict percentages. The optimum value is located at 44.4 percent.
Source: Unique dataset on interpersonal trust, compiled by the author from publicly available international data.

To acquire a better understanding of the implications of our econometric results, see Fig. 3, which illustrates the findings between trust and growth from Regression 5 in Table 5. In a country with a low level of trust, an increase in trust is associated with an increase in economic growth if the increase in trust occurs on the left-hand side of the distribution (the optimum value of the graph is 44.4 percent). Once a threshold of 44.4 percent of trust is exceeded, the increase in trust will hamper economic growth. To further highlight the impact of trust on growth, Fig. 3 matches five negative and five positive trust thresholds of consecutive ±20 percent steps from the optimum point of 44.4 percent with their respective economic growth rates.[26] The figure clarifies that in a ±20 percent trust radius (≥35.5 percent and ≤ 53.3 percent), a decline in economic growth rates of 0.10 percentage points, from 2.64 percent to 2.54 percent of growth, is relatively modest. This loss in economic growth becomes more pronounced, however, the further the distance is from the optimum point of 44.4 percent. Therefore, with a ±40 percent trust radius (<35.5 percent and >53.3 percent), we witness an acceleration of the decline in growth by 0.32 percentage points from 2.54

[26] With an optimum level of 44.4 percent, the lower bound level of the first ±20 percent trust radius is thus 35.5 percent [44.4-8.9 (-8.9=44.4*-0.20)] and the upper bound level is thus 53.3 percent [(44.4+8.9 (8.9=44.4*0.20)].

percent to 2.22 percent. Fig. E4 in Appendix E shows the groups for all 75 economies in their respective trust thresholds and distance to the optimum level of 44.4 percent.

6.3 Sensitivity Analysis

To test the sensitivity of the results, Table 6 shows specification tests, when i) excluding influential cases, ii) excluding regional groups, iii) excluding panel waves, and iv) adding control variables and v) analyzing case study alterations. The first row (labeled "*None*") reports the regression coefficient and t-value taken from Regression 5 in Table 5. Successive rows reflect the effects of trust on growth when the indicated change is made.

Rows 2, 3, and 4 clarify that neither the exclusion of either Norway (the country with the largest average level of trust) or Trinidad and Tobago (the country with the smallest average level of trust), nor both countries together, alters the significance of the curvilinear relationship between trust and growth.[27] Once trust values that exceed the threshold of trust for growth are excluded (> 44.4 percent), we detect, as predicted, a reversal of results. The curvilinear relationship loses significance (row 5) and the linear relationship gains significance.[28] Rows 6-10 show results when analyzing distinct regional groups. When excluding countries from Africa, South America, Central America and the Caribbean and Asia (rows 6-8), our curvilinear relationship remains significant at the 95 to 99-percent level. When excluding countries from Asia and Eastern Europe (rows 9-10), our curvilinear relationship remains significant – though only at 90 to 95-percent level.

Rows 11-13 show results when excluding the last panel wave (row 11), the first panel wave (row 12) and both the last and first panel waves at the same time (row 13). In all three specifications our curvilinear relationship between trust and growth remains significant at least at the 95-percent level. To detect potential channels for our curvilinear result between trust and growth, in rows 14-16, we control for globalization indicators, namely: Openness, Economic and Financial Globalization.[29] When adding these distinct control variables, we find that our curvilinear relationship loses significance. We link these results to the concept of overconfidence. Too much economic and financial globalization might lead to overconfidence and respectively lead to investment distortions (Malmendier and Tate 2005), to financial crisis (Ho et al. 2016) and might

[27] We attain similar robust results when excluding Greece (the country with the highest cv-value of trust) or Latvia (the country with the lowest cv-value of trust), or both countries together.

[28] As expected the linear relationship becomes significant (at the 95-percent level) and attains a coefficient of 0.035 (see here Regression 5 in Table E4 in Appendix E).

[29] Data for Openness and Economic and Financial Globalization is taken from Gräbner et al. (2021).

harm economic growth (Law and Singh 2014, Gupta et al. 2023). Following economic historians (Aliber and Kindleberger 2005) the underlying channel behind this pattern might be described as a process of overconfidence (or too much trust or mania) followed by panic, financial crisis and economic downturn.

Table 6 Trust and Economic Growth – Sensitivity Analysis

Row	S. Change	Trust C.	Trust-Sq C.	t-Value	Cs	Obs.	Instr.	AB-AR2	Hansen	OP
1	None	0.119***	-0.00134***	3.21/-2.86	75	392	86	0.09	0.66	44.4
Excluding Influential Cases										
2	NO	0.128***	-0.00151***	3.26/-3.10	74	384	86	0.08	0.71	42.4
3	TT	0.129***	-0.00144***	3.14/-2.87	74	390	86	0.09	0.69	44.8
4	NO+TT	0.137***	-0.00161***	3.15/-3.00	73	382	86	0.08	0.74	42.5
5	HTVs	0.162	-0.00250	2.62/-2.25	70	326	86	0.07	0.85	-
Excluding Regional Groups										
6	Exc. Africa	0.123***	-0.00134***	3.03/-2.89	65	350	86	0.09	0.98	45.9
7	Exc. SA	0.0718**	-0.00088**	2.30/-2.15	68	352	86	0.07	0.92	40.8
8	Exc. CAA	0.144***	-0.00177**	2.86/-2.60	69	365	86	0.12	0.88	40.7
9	Exc. Asian	0.076**	-0.00081*	2.10/-1.95	64	351	86	0.06	0.94	46.9
10	Exc. EE	0.095*	-0.00144**	1.86/-1.79	62	354	86	0.67	0.97	33.0
Excluding Panel Waves										
11	1980-2015	0.115***	-0.00134***	2.72/-2.68	75	323	82	0.07	0.76	42.5
12	1985-2019	0.105**	-0.00122**	2.50/-2.36	75	370	82	0.09	0.60	43.0
13	1985-2015	0.119**	-0.00140**	2.29/-2.36	75	301	78	0.07	0.70	42.5
Adding Control Variables										
14	Openness	0.053	-0.00053	1.39/-1.19	73	385	106	0.80	1.00	-
15	Economic Globalization	0.066	-0.00080	1.53/-1.62	73	384	106	0.10	1.00	-
16	Financal Globalization	0.072	-0.00079	1.42/-1.33	73	384	106	0.13	0.99	-
Case Study Alterations										
17	All	0.059	-0.00043	1.21/-0.70	110	580	86	0.01	0.34	-
18	All-Oil	0.077*	-0.00068	1.72/-1.24	106	566	86	0.01	0.47	-
19	All-Oil-Unfree	0.107**	-0.00114**	2.32/-2.09	75	435	86	0.05	0.85	46.9
20	All-Oil-Unfree-Tr	0.119***	-0.00134***	3.21/-2.86	75	392	86	0.09	0.66	44.4

Notes: S.=Specification. C.=Coefficient. Sq.=Square. Cs.=Countries. Obs.=Observations. Instr.=Instruments. AB= Arellano-Bond test for autocorrelation in differences (*p*-value). Hansen=Hansen test of joint validity of instruments (*p*-value). OP=Optimum Point. NO=Norway. TT=Trinidad and Tobago. HTVs=High Trust Values. SA=South America. CAA= Central America and Caribbean. EE=Eastern-Europe. Oil=Oil Producing Countries. Unfree= Countries characterized by "Unfreedom". Tr=Observations form Transition countries before 2005. ***p < 0.01, **p < 0.05, *p < 0.1. Time dummies are included in every specification. System Generalized Method of Moments estimations include orthogonal deviations, small-sample corrections, two-step estimation, and Windmeijr-corrected cluster-robust errors. In all specifications, $Income_{i,t-1}$ was treated as endogenous, $Trust_{i,t-1}$, Trust, $Squared_{i,t-1}$ and $Education_{i,t-1}$ were treated as predetermined and $PI_{i,t-1}$ was treated as exogenous. In correspondence the specification in Regression 5 in Table 5, all regressions only use the 2nd and 3rd lag as instruments and use a benchmark *p*-value of 0.05 for our Arellano-Bond test for autocorrelation. *Sources*: Unique dataset on interpersonal trust, compiled by the author from publicly available international data and PWT 10.0 (Feenstra et al. 2015).

In rows 17-20 we analyze the results before applying our case specifications as highlighted in section 4.4. When analyzing all 110 countries with an overall 580 observations in row 17 we retrieve an insignificant curvilinear relationship between trust and growth. When excluding our 4

oil-producing countries in row 18 our curvilinear relationship still remains insignificant. Once we exclude our 31 countries characterized by Unfreedom in row 19 our curvilinear relationship becomes significant at the 95-percent-level. When only including observations from 2005 onwards for our 17 transition economies in row 20 we retrieve our base econometric result.

7 Discussion in the light of the previous empirical results and theory

How does the curvilinear relationship between trust and growth, presented in this study, fit into previous research in this field? Concerning previous studies in this field, our findings corroborate earlier results, which found a curvilinear relationship between trust and growth (Roth, 2009). When controlling for endogeneity with the help of a System GMM estimator, this paper finds that the optimum point of trust for growth is located at 44.4 percent, which is close to the random effects estimation, but higher than the fixed-effects and lower than the pooled panel estimate results, as reported in Roth (2009, pp. 115, 118). Furthermore, the findings bring in line the positive findings by Knack and Keefer (1997, p. 1261) and Zak and Knack (2001, p. 308) with the negative finding by Roth (2009, pp. 118, 120). The linear term of the curvilinear relationship is in line with the positive findings by Knack and Keefer (1997, p. 1261) and Zak and Knack (2001, p. 308). The negative quadratic term is in line with the negative finding by Roth (2009, p. 118, 120).

How does the curvilinear relationship between trust and growth fit into the broader empirical and theoretical literature? Two points are worth mentioning here. First, the detected curvilinear relationship between trust and growth at the country level is in line with curvilinear findings regarding trust and economic performance at various levels of analysis. At the regional level, studies find a non-linear (Peiro-Palomino 2016, p. 15) and negative (Schneider et al. 2000, p. 313) relationship between trust and economic growth. At the organization level, studies find a curvilinear relationship between trust and innovation (Bidault and Castello 2009, p. 267; Bischoff et al. 2023, p. 13; Echebarria and Barrutia 2013, pp. 1013-1014; and McFadyen and Cannella 2004, p. 743). In addition, our curvilinear relationship is in line with the finding of Inglehart et al. (1997, p. 227-228) that there exists a curvilinear relationship between social capital and economic performance. Furthermore, our finding is very similar to that of Barro and Sala-i-Martin (2004), who uncovered a curvilinear relationship between democracy and economic growth. Their estimates imply that democratization seems to foster growth in countries that had previously not been strongly democratic but to hamper growth in countries that had already achieved a high level of democracy (p. 529). Given the importance of trust for democracy (Inglehart 1990, 1999;

Inglehart et al. 1997; Nannestad 2008, p. 429; and Uslaner 1999), this finding aligns strongly with our own.

Second, the finding suggests that the three theoretical channels that assert a curvilinear relationship between trust and growth appear to be correct. In this respect, both theoretical strands (Putnam 1993; and Olson 1982) on trust and growth are correct, but they pinpoint only one side of the coin. Trust exhibits a positive effect on growth, but at a certain threshold, it can also hamper economic growth. Moreover, the reflections by Cowen (2017), that too much trust might lead society to become complacent, stifling innovation and the entrepreneurial spirit and ultimately hampering economic growth (pp. 81-89) seems to be accurate. Finally, the assertion that trust is a double-edged sword (Cole et al. 2024, p. 10) seems to approximate reality. Although the presence of trust in a society may incline its members to engage in beneficial arrangements, it may also induce them to "*circumvent*" such arrangements in cooperation with other like-minded individuals when it promises to be profitable. By hampering cooperation, such activities ultimately thwart the original intentions of the arrangement and thereby reduce the general welfare (Cole et al. 2024, p. 1).

8 Policy Implications

What are the policy implications of our curvilinear finding for trust and economic growth? Our finding implies that an increase in interpersonal trust in countries with low levels of trust (such as in Trinidad and Tobago, where the interpersonal trust value is on average, 3.5 percent, or 7.1 percent in Brazil) tends to significantly stimulate economic growth. However, that positive influence is diminished as the level of trust rises and reaches zero, when the indicator takes on a mid-range of 44.4 percent. Therefore, an increase in trust appears to enhance economic growth in countries with initially low levels of trust but inhibits economic growth in countries that already demonstrated a substantial level of trust.

To better understand the global policymaking implications, Fig. 4 shows a world map of the 75 countries examined in this study over a 40-year period. Countries that are close (±20-percent trust radius with values ranging between ≥35.5 and ≤ 53.3 percent) to the optimum threshold of trust for growth are depicted in light grey. Countries exceeding the optimum trust threshold for growth (above 20 percent trust radius with values >53.3 percent) are displayed in dark grey. Finally, countries with average trust levels below the optimum threshold (below the 20-percent trust radius with values of <35.5 percent) are depicted in black.

Fig. 4 Optimum levels of trust across 75 economies, 1980-2015

Notes: Countries with optimum levels of trust for growth ($\geq$35.5 and $\leq$ 53.3 percent) are shown in light grey. Countries that exceed the optimum trust for growth threshold (>53.3 percent) appear in dark grey. And countries with average trust levels below the optimum threshold for growth (<35.5 percent) are shown in black. *Source:* Author's own dataset on trust, compiled from publicly available international data.

Fig. 4 clarifies that 17 percent of the countries in our sample (13 out of the 75 – namely Austria, Australia, Canada, Germany, Hong Kong, Iceland, Ireland, Japan, New Zealand, Switzerland, Taiwan, the UK and the US) are close to an optimum level of trust for growth, 7 percent of the countries have too much trust for growth (5 out of 75 – namely Denmark, Finland, the Netherlands, Norway, and Sweden) and a large majority of 76 percent (57 out of the 75 countries) have a level of trust that are well below the optimum trust for growth threshold, including all countries from Africa, South America, Central America and the Caribbean, Central and South-East Asia and almost all from South- and Eastern Europe.

For a large majority of these countries, to be able to improve their prospects of achieving greater economic growth, it is crucial for them to implement trust-building public policies, including increased political freedoms, redistributive transfers of wealth and enhanced educational opportunities (Knack and Zak 2003, p. 91; Sonderskov and Dinesen 2014, p. 791-792). Countries close to the optimum levels of trust do not need to take further action. And countries with very high levels of trust should accept slightly lower economic growth in exchange for the multiple benefits stemming from high levels of trust, including amongst others democratic stability (Inglehart 1990, 1999; Inglehart et al. 1997; Nannestad 2008, p. 429; Uslaner 1999).

How do we account for the fact that the five economies Denmark, Finland, the Netherlands, Norway, and Sweden, exhibit too much trust for economic growth? Three conjectures are worth considering. First, it might be the fact that the dataset from the PWT 10.0 has not yet incorporated the full range of intangible capital investments that are characteristic of fully-fledged knowledge economies, such as the four Scandinavian economies (Roth 2024b). Given that countries such as Sweden and Finland frequently rank among the most intangible capital-intensive economies in the world, this might lead to a under-appreciation of growth rates in the PWT 10.0 data (Roth 2024c).

Second, the pure focus on GDP per capita growth rates might be highly problematic given their well-known weaknesses, as pointed out by the "beyond GDP approach" (Stiglitz et al. 2009). A wider reform of the national accounting framework that involves the inclusion of environmental, educational, health, and social capital would permit a more accurate signaling of real economic performance, to allow developed and emerging countries to strive for sustainable economic growth (Roth and Thum 2013, p. 506). Given that the five mentioned economies all score in the top rankings on environmental, educational, health, and social capital might lead to an under-appreciation of growth rates by the PWT 10.0.

Third, even if these five economies experience less-than-optimum growth rates policymakers and citizens in these countries should willingly choose to sustain their high levels of trust, which grant them multiple advantages that attach to high-trust societies, including amongst others democratic stability (Inglehart 1990, 1999; Inglehart et al. 1997; Nannestad 2008, p. 429; and Uslaner 1999).

9 Conclusion

This paper analyzes the intertemporal variation of trust on growth by taking a unique global country panel dataset and using a system-GMM estimation for a sample of 75 economies over a 40-year period, 1980-2019. The paper finds evidence of a curvilinear (inverted U-shape) relationship between trust and growth, with an optimum level of trust for growth at 44.4 percent. The curvilinear relationship corroborates earlier panel data results, but it calls into question findings that posit a general positive relationship between trust and economic growth. Only a minority of countries worldwide can position themselves close to or above the optimum threshold for trust and growth. Most countries are located well below that threshold, and for them, the implementation of trust-building policies is imperative for growth. For the few countries already close to the optimum threshold for trust on growth, there is no need to take immediate policy

action. And the handful of countries that register above the optimum level of trust should accept slightly lower economic growth in exchange for greater democratic stability.

These results call for a re-evaluation of the theoretical implications and empirical findings on the relationship between trust and economic growth. More theoretical and empirical research is needed in order to clarify the relationship. The conventional wisdom that has informed the character of social science and economics discussion over the past 25 years, namely, that trust is necessarily linearly positively related to economic performance, must be re-examined. The relationship depends on the level of trust that already exists in a country, thus determining whether it is imperative for policymakers to invest in trust-building exercises.

Overall, our research results open up two promising avenues for future research, which we have not covered in this paper due to space and data limitations. The first avenue would entail an in-depth analysis of the determinants of trust over time for our country sample of 75 economies from 1980 to 2019. The second avenue is an extension of our country sample and time-series evolution, using the data from the eight waves of the Integrated Value Survey, the upcoming waves from the five international Barometer survey programs and data from the future releases of the Penn World Tables.

References

Afrobarometer Data (2015) All Countries, Rounds 1-5, 1999-2015, available at http://www.afrobarometer.org

Ahlerup P, Olsson O, Yanagizawa D (2009) Social capital vs institutions in the growth process. European Journal of Political Economy 25: 1-14

Algan Y, Cahuc P (2010) Inherited Trust and Growth. American Economic Review 100 (5): 2060–2092

Algan Y, Cahuc P (2013) Trust and Growth. Annual Review of Economics 5: 521-549.

Aliber, R. Z. and C.P. Kindleberger (2005). Manias, Panics, and Crashes: A History of Financial Crises, Wilely Investment Classic, New York.

Arabbarometer Data (2019) All Countries, Rounds 1-5, 2006-2019, available at https://www.arabbarometer.org/survey-data/data-downloads/

Arellano M, Bond S (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies 58; 277–297

Arellano M, Bover O (1995) Another look at the instrumental variable estimation of error-components models. Journal of Econometrics 68: 29–51

Arrow KJ (1972) Gifts and Exchanges. Philosophy and Public Affairs 1 (4): 343–362

Asianbarometer Data (2016) All Countries, Rounds 1-4, 2001-2016, available at https://www.asianbarometer.org/data?page=d10

Barro R, Sala-i-Martin X (2004) Economic Growth. MIT Press, Cambridge, MA and London

Barro R, Lee JW (2013) A New Data Set of Educational Attainment in the World, 1950-2010. Journal of Development Economics 104: 184–198
Berggren N, Elinder M, Jordahl H (2008) Trust and Growth: A Shaky Relationship. Empirical Economics 35: 251-274
Beugelsdijk S, De Groot H, Van Schaik A (2004) Trust and Economic Growth: A Robustness Analysis. Oxford Economic Papers 56: 118–134
Bidault F, Castello A (2009) Trust and creativity: Understanding the role of trust in creativity-oriented joint developments. R&D Management 39: 259-270
Bischoff TS, Hipp A, Runst P (2023) Firm innovation and generalized trust as a regional resource. Research Policy 52 (8): 104813
Bjornskov C (2006) The determinants of trust. Public Choice 130: 1-21
Bjornskov C (2012) How does social trust affect economic growth?. Southern Economic Journal 78 (4): 1346-1368
Bjornsjov C (2022) Social trust and patterns of growth. Southern Economic Journal 89: 216-237
Bjornskov C, Meon PG (2015) The Productivity of Trust. World Development 70: 317-331
Blundell R, Bond S (1998) Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics 87: 115–143
Bond S, Hoeffler A, Temple J (2001) GMM Estimation of Empirical Growth Models. CEPR Discussion Paper No. 3048 (Centre for Economic Policy Research, London)
Cole HL, Krueger D, Mailath GJ, Park Y (2024) Trust in Risk Sharing: A Double-Edged Sword. Review of Economic Studies 91(3): 1448-1497.
Cowen T (2017) The Complacent Class: The Self-Defeating Quest for the American Dream. St Martin`s Press, London
Cox N (2015) MIPOLATE: Stata module to interpolate values. Statistical Software Components S458070 (Boston College Department of Economics, revised 19 Dec 2016)
Dearmon J, Grier K (2009) Trust and development. Journal of Economic Behavior and Organization 71 (2): 210–220
Echebarria C, Barrutia JM (2013) Limits of Social Capital as a Driver of Innovation: An Empirical Analysis in the Context of European Regions. Regional Studies 47: 1001-1017
EVS (2021) EVS Trend File 1981-2017. GESIS Data Archive, Cologne. ZA7503 Data file Version 2.0.0, doi:10.4232/1.13736
Feenstra RC, Inklaar R, Timmer MP (2015) The Next Generation of the Penn World Table. American Economic Review 105 (10): 3150–3182
Forbes K (2000) A Reassessment of the Relationship between Inequality and Growth. American Economic Review 87: 869–887
Fukuyama F (1996) Trust — The Social Virtues and the Creation of Prosperity. Free Press Paperbacks, New York, NY
Gargiulo M, Ertug G (2006) The dark side of trust. In: Bachmann R, Zaheer A (ed) Handbook of trust research. Edward Elgar, Cheltenham, pp 165-186
Glanville JL, Paxton P (2007) How do we learn to trust? A confirmatory tetrad analysis of the sources of generalized trust. Social Psychology Quarterly 70: 230–242
Gorokhovskaia Y, Shahbaz A, Slipowitz A (2023) Marking 50 Years in the Struggle for Democracy, Freedom in the World 2023. available at https://freedomhouse.org
Gräbner, C, Heimberger, P, Kapeller, J, and Springholz, F (2021). Understanding economic openness: A review of existing measures, Review of World Economics 157: 87–120.
Gupta, R, Stander L, and Vaona, A (2023) Openness and growth: Is the relationship non-linear? International Journal of Finance and Economics 28: 3071-3099.

Haerpfer C, Inglehart R, Moreno A, Welzel C, Kizilova K, Diez-Medrano J, Lagos M, Norris P, Ponarin E, Puranen B, et al. (eds) (2021) World Values Survey Time-Series (1981-2020) Cross-National Data-Set. Madrid and Vienna: JD Systems Institute & WVSA Secretariat. Data File Version 2.0.0, doi:10.14281/18241.15

Hardin R (1982) Collective Action. Johns Hopkins University Press, Baltimore, MD

Heliwell J (1996) Economic Growth and Social Capital in Asia. NBER Working Paper 5470. National Bureau of Economic Research, Cambridge, MA

Heritage Foundation (2023) Index of Economic Freedom. available at Index of Economic Freedom: Promoting Economic Opportunity and Prosperity by Country (heritage.org)

Ho, P.H., Huang, C.-W., Lin, C.Y., Yen, J.F. (2016). CEO Overconfidence and financial crisis: Evidence from bank lending and leverage, Journal of Financial Economics 120: 194-209.

Horváth R (2013) Does trust promote growth?. Journal of Comparative Economics 41: 777-788

Inglehart R (1990) Culture Shift. Princeton University Press, Princeton, NJ

Inglehart R (1999) Trust, Well-Being and Democracy. In: Warren ME (ed) Democracy and Trust. Cambridge University Press, Cambridge, pp 88–120

Inglehart R, Granato J, Leblang D (1997) The Impact of Culture on Economic Growth. In: Inglehart R (ed) Modernization and Postmodernization: Cultural, Economic, and Political Change in 43 Societies. Princeton University Press, Princeton, NJ, pp 216-236

James H (2015) Generalized Morality, Institutions and Economic Growth, and the Intermediating Role of Generalized Trust. KYKLOS 68 (2): 165-196

Knack S, Keefer P (1997) Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. The Quarterly Journal of Economics 112 (4): 1251–1288

Knack S, Zak PJ (2003) Building Trust: Public Policy, Interpersonal Trust, and Economic Development. Supreme Court Economic Review 10: 91-107

La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny R (1997) Trust in Large Organizations. The American Economic Review 87 (2): 333-338

Latinobarómetro Data (2018) All Countries, Rounds 1995-2018, available at https://www.latinobarometro.org/latContents.jsp

Law, S L, and Singh, N (2014) Does too much finance harm economic growth? Journal of Banking & Finance 41: 36-44.

Lijphart A (1971) Comparative Politics and the Comparative Method. The American Political Science Review 65: 682-693

Lim, S, Morshed AKM Mahbud, Khun C (2018) Trust and macroeconomic performance: A two-step approach. Economic Modelling 68: 293–305

Malmendier, U. and G. Tate (2005). CEO Overconfidence and Corporate Investment. The Journal of Finance LX: 2661-2700.

Mankiw NG, Romer D, Weil DN (1992) A Contribution to the Empirics of Economic Growth. The Quarterly Journal of Economics 107: 407-437

McFadyen A, Cannella Jr AA (2004) Social Capital and Knowledge Creation: Diminishing Returns of the Number and Strength of Exchange. Academy of Management

Makrychoriti P, Pasiouras F, Tasiou M (2021) Financial stress and economic growth: The moderating role of trust. KYKLOS 75 (1): 48-74

Nannestad P (2008) What have we learned about generalized trust, if anything. Annual Review of Political Science 11: 413-436.

Noelle-Neumann E (2005) Vertrauen ist Besser. Frankfurter Allgemeine Zeitung 166: 5.

North DC (1990) Institutions, Institutional Change and Economic Performance. Cambridge University Press, Cambridge

Nowrasteh A, Forrester C (2023) Trust Doesn't Explain Regional U.S. Economic Development and Five Other Theoretical and Empirical Problems with the Trust Literature. KYKLOS 76 (3): 461-477
Olson M (1982) The rise and decline of nations: Economic growth, stagflation, and social rigidities. Yale University Press, New Haven, CT
Ostrom E (1990) Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press, Cambridge
Paldam M (2011) Generalized Trust: The Macro Perspective. In: Sacconi L, Antoni G (ed) Social Capital, Corporate Social Responsibility, Economic Behaviour and Performance. Palgrave Macmillan, pp 331-357
Paxton P (1999) Is Social Capital Declining in the United States – A Multiple Indicator Assessment?. American Journal of Sociology 105: 88–127
Peiró-Palomino J, Tortosa-Ausina E (2013) Can trust effects on development be generalized? A response by quantile. European Journal of Political Economy 32: 377–390
Peiró-Palomino J (2016) Social Capital and Economic Growth in Europe: Nonlinear Trends and Heterogeneous Regional Effects. Oxford Bulletin of Economics and Statistics 78 (5): 717-751
Putnam R (1993) Making Democracy Work: Civic Traditions in Modern Italy. Princeton University Press, Princeton, NJ
Putnam R (1995) Bowling Alone: America's Declining Social Capital. Journal of Democracy 6: 65–78
Putnam R (2000) Bowling Alone: The Collapse and Revival of American Community. Simon & Schuster, New York, NY
Rabier JR, Helene R, Inglehart R (1986) Eurobarometer 25: Holiday, Travel and Environmental Problems. ICPST Study Number 8616
Roodman D (2009a) How to do xtabond2: An Introduction to Difference and System GMM in Stata. The Stata Journal 9: 86–136
Roodman D (2009b) A Note on the Theme of Too Many Instruments. Oxford Bulletin of Economics and Statistics 71: 135–158
Roth F (2007) Social Capital, Trust and Economic Growth – A Cross-sectional and Panel Analysis. Dissertation, University of Göttingen
Roth F (2009) Does Too Much Trust Hamper Economic Growth?. KYKLOS 62 (1): 103–128
Roth F (2022) Social Capital, Trust and Economic Growth. In: Roth F (ed) Intangible Capital and Growth. Springer, Cham, pp 167-185
Roth F (2024a) Is Generalized Trust Stable over Time?, Hamburg Discussion Papers in International Economics, No. 15, University of Hamburg, Department of Economics, Hamburg.
Roth F (2024b) Intangible Capital and Labor Productivity Growth Revisited. In: Bloch C, Protogerou A, Vonortas NS (ed) Measuring Intangibles and Productivity – A Micro, Meso and Macro Perspective. Routledge, New York, NY, forthcoming
Roth F (2024c) Intangible capital and labor productivity growth at the macro, meso, and micro levels: A review of the literature and insights for public policies. Science and Public Policy, forthcoming
Roth F, Thum AE (2013) Intangible Capital and Labor Productivity Growth—Panel Evidence for the EU from 1998-2005. Review of Income and Wealth 59: 486-508
Schneider G, Plümper T, Baumann S (2000) Bringing Putnam to the European Regions on the Relevance of Social Capital for Economic Growth. European Urban and Regional Studies 7: 307–317

Stiglitz J, Sen A, Fitoussi JP (2009) Report by the Commission on the Measurement of Economic Performance and Social Progress. http://www.stiglitz-sen-fitoussi.fr
Sonderskov KM, Dinesen PT (2014) Danish Exceptionalism: Explaining the Unique Increase in Social Trust over the Past 30 Years. European Sociological Review 30 (6): 782-795
Tabellini G (2010) Culture and Institutions: Economic Development in the Regions of Europe. Journal of the European Economic Association 8 (4): 677-716
Uslaner E (1999) Democracy and Social Capital. In: Warren ME (ed) Democracy and Trust. Cambridge University Press, Cambridge, pp 121–150
Uslaner E (2002) The Moral Foundations of Trust. Cambridge University Press, Cambridge
Uslaner E (2008) Where you stand depends upon where your grandparents sat. Public Opinion Quarterly 72: 725-740
Whiteley PF (2000) Economic Growth and Social Capital. Political Studies 48 (3): 443–466
Zak P, Knack S (2001) Trust and Growth. The Economic Journal 111: 295–321

Online Appendices

Online Appendices

Appendix A. Data Sources on Trust

Table A1 Raw Data on Trust in 75 Countries

No.	Country	Study	No.	Country	Study	No.	Country	Study
1	Albania	IVS	26	Greece	IVS, EB	51	Norway	IVS
2	Argentina	IVS, Latino	27	Guatemala	IVS, Latino	52	Panama	Latino
3	Armenia	IVS	28	Hong Kong	IVS, Asian	53	Paraguay	Latino
4	Australia	IVS	29	Hungary	IVS	54	Peru	IVS, Latino
5	Austria	IVS	30	Iceland	IVS	55	Poland	IVS
6	Belgium	IVS, EB	31	India	IVS	56	Portugal	IVS, EB
7	Benin	Afro	32	Ireland	IVS, EB	57	Romania	IVS
8	Botswana	Afro	33	Italy	IVS, EB	58	Senegal	Afro
9	Brazil	IVS, Latino	34	Japan	IVS, Asian	59	Serbia	IVS
10	Bulgaria	IVS	35	Jordan	IVS, Arab	60	Singapore	IVS, Asian
11	Canada	IVS	36	Kazakhstan	IVS	61	Slovakia	IVS
12	Chile	IVS, Latino	37	Kyrgyzstan	IVS	62	Slovenia	IVS
13	Colombia	IVS, Latino	38	Latvia	IVS	63	South Africa	IVS, Afro
14	Costa Rica	Latino	39	Lithuania	IVS	64	South Korea	IVS, Asian
15	Croatia	IVS	40	Luxembourg	IVS, EB	65	Spain	IVS, Latino, EB
16	Cyprus	IVS	41	Madagascar	Afro	66	Sweden	IVS
17	Czech Rep.	IVS	42	Malaysia	IVS, Asian	67	Switzerland	IVS
18	Denmark	IVS, EB	43	Mali	IVS, Afro	68	Taiwan	IVS, Asian
19	Dom. Rep.	IVS, Latino	44	Malta	IVS	69	Thailand	IVS, Asian
20	El Salvador	IVS, Latino	45	Mexico	IVS, Latino	70	T. and T.	IVS
21	Estonia	IVS	46	Mongolia	Asian	71	Turkey	IVS
22	Finland	IVS	47	Morocco	IVS, Arab, Afro	72	Uganda	IVS, Afro
23	France	IVS, EB	48	Namibia	Afro	73	UK	IVS, EB
24	Germany	IVS, EB	49	Netherlands	IVS, EB	74	US	IVS
25	Ghana	IVS, Afro	50	New Zealand	IVS	75	Uruguay	IVS, Latino

Notes: IVS=Integrated Value Survey. Arab=Arab Barometer. Afro=Afro Barometer. Latino= Latinobarómetro. Asian=Asian Barometer. EB=Eurobarometer. *Sources*: Unique dataset on trust, compiled by the author from publicly available international data.

Appendix B. Case Selection

Table B1 Stepwise Case Selection for 75 Countries out of 142 Countries

No.	Country	NT	Missing	Oil	Political Freedom (A)	Economic Freedom (B)	Unfreedom (A&B=0)	Total
1	Albania	0	0	0	0	1	0	1
2	Algeria	0	0	0	0	0	1	0
3	Andorra	0	1	-	-	-	-	0
4	Argentina	0	0	0	1	0	0	1
5	Armenia	0	0	0	0	1	0	1
6	Australia	0	0	0	1	1	0	1
7	Azerbaijan	0	1	-	-	-	-	0
8	Bahrain	1	-	-	-	-	-	0
9	Austria	0	0	0	1	1	0	1
10	Bangladesh	0	0	0	0	0	1	0
11	Belarus	0	1	-	-	-	-	0
12	Belgium	0	0	0	1	1	0	1
13	Benin	0	0	0	1	0	0	1
14	Bolivia	0	0	0	0	0	1	0
15	Bosnia Herze.	0	1	-	-	-	-	0
16	Botswana	0	0	0	1	1	0	1
17	Brazil	0	0	0	1	0	0	1
18	Bulgaria	0	0	0	1	1	0	1
19	Burkina Faso	0	0	0	0	0	1	0
20	Burundi	1	-	-	-	-	-	0
21	Cambodia	0	0	0	0	0	1	0
22	Cameroon	1	-	-	-	-	-	0
23	Canada	0	0	0	1	1	0	1
24	Cape Verde	0	1	-	-	-	-	0
25	Chile	0	0	0	1	1	0	1
26	China	0	0	0	0	0	1	0
27	Colombia	0	0	0	0	1	0	1
28	Costa Rica	0	0	0	1	1	0	1
29	Cote d´Ivoire	1	-	-	-	-	-	0
30	Croatia	0	0	0	1	0	0	1
31	Cyprus	0	0	0	1	1	0	1
32	Czech Rep.	0	0	0	1	1	0	1
33	Denmark	0	0	0	1	1	0	1
34	Dom. Rep.	0	0	0	1	0	0	1
35	Ecuador	0	0	0	0	0	1	0
36	Egypt	0	0	0	0	0	1	0
37	El Salvador	0	0	0	1	1	0	1
38	Estonia	0	0	0	1	1	0	1
39	Ethiopia	0	0	0	0	0	1	0

40	Finland	0	0	0	1	1	0	1
41	France	0	0	0	1	1	0	1
42	Georgia	0	1	-	-	-	-	0
43	Germany	0	0	0	1	1	0	1
44	Ghana	0	0	0	1	1	0	1
45	Greece	0	0	0	1	1	0	1
46	Guatemala	0	0	0	0	1	0	1
47	Guinea	1	-	-	-	-	-	0
48	Haiti	1	-	-	-	-	-	0
49	Honduras	0	0	0	0	0	1	0
50	Hong Kong	0	0	0	0	1	0	1
51	Hungary	0	0	0	1	1	0	1
52	Iceland	0	0	0	1	1	0	1
53	India	0	0	0	1	0	0	1
54	Indonesia	0	0	0	0	0	1	0
55	Iran	0	0	1	-	-	-	0
56	Iraq	0	0	1	-	-	-	0
57	Ireland	0	0	0	1	1	0	1
58	Israel	1	-	-	-	-	-	0
59	Italy	0	0	0	1	1	0	1
60	Japan	0	0	0	1	1	0	1
61	Jordan	0	0	0	0	1	0	1
62	Kazakhstan	0	0	0	0	1	0	1
63	Kenya	0	0	0	0	0	1	0
64	Kosovo	1	-	-	-	-	-	0
65	Kuwait	0	0	1	-	-	-	0
66	Kyrgyzstan	0	0	0	0	1	0	1
67	Latvia	0	0	0	1	1	0	1
68	Lebanon	0	1	-	-	-	-	0
69	Lesotho	0	0	0	0	0	1	0
70	Liberia	1	-	-	-	-	-	0
71	Libya	0	1	-	-	-	-	0
72	Lithuania	0	0	0	1	1	0	1
73	Luxembourg	0	0	0	1	1	0	1
74	Macau	1	-	-	-	-	-	0
75	Madagascar	0	0	0	0	1	0	1
76	Malawi	0	0	0	0	0	1	0
77	Malaysia	0	0	0	0	1	0	1
78	Mali	0	0	0	1	0	0	1
79	Malta	0	0	0	1	1	0	1
80	Mauritius	1	-	-	-	-	-	0
81	Mexico	0	0	0	0	1	0	1
82	Moldova	0	0	0	0	0	1	0

83	Mongolia	0	0	0	1	0	0	1
84	Montenegro	0	1	-	-	-	-	0
85	Morocco	0	0	0	0	1	0	1
86	Mozambique	0	0	0	0	0	1	0
87	Myanmar	1	-	-	-	-	-	0
88	Namibia	0	0	0	1	1	0	1
89	Netherlands	0	0	0	1	1	0	1
90	New Zealand	0	0	0	1	1	0	1
91	Nicaragua	0	0	0	0	0	1	0
92	Niger	1	-	-	-	-	-	0
93	Nigeria	0	0	0	0	0	1	0
94	North Macedonia	0	1	-	-	-	-	0
95	North Cyprus	1	-	-	-	-	-	0
96	Norway	0	0	0	1	1	0	1
97	Pakistan	0	0	0	0	0	1	0
98	Palestine	0	1	-	-	-	-	0
99	Panama	0	0	0	1	1	0	1
100	Paraguay	0	0	0	0	1	0	1
101	Peru	0	0	0	1	1	0	1
102	Philippines	0	0	0	0	0	1	0
103	Poland	0	0	0	1	1	0	1
104	Portugal	0	0	0	1	1	0	1
105	Puerto Rico	0	1	-	-	-	-	0
106	Qatar	1	-	-	-	-	-	0
107	Romania	0	0	0	1	1	0	1
108	Russia	0	0	0	0	0	1	0
109	Rwanda	0	0	0	0	0	1	0
110	Saudi Arabia	0	0	1	-	-	-	0
111	Senegal	0	0	0	1	0	0	1
112	Serbia	0	0	0	1	1	0	1
113	Sierra Leone	1	-	-	-	-	-	0
114	Singapore	0	0	0	0	1	0	1
115	Slovakia	0	0	0	1	1	0	1
116	Slovenia	0	0	0	1	1	0	1
117	South Africa	0	0	0	1	1	0	1
118	South Korea	0	0	0	1	1	0	1
119	Spain	0	0	0	1	1	0	1
120	Sudan	0	0	0	0	0	1	0
121	Swaziland	1	-	-	-	-	-	0
122	Sweden	0	0	0	1	1	0	1
123	Switzerland	0	0	0	1	1	0	1
124	Taiwan	0	0	0	1	1	0	1
125	Tajikistan	1	-	-	-	-	-	0

126	Tanzania	0	0	0	0	0	1	0
127	Thailand	0	0	0	0	1	0	1
128	Togo	1	-	-	-	-	-	0
129	T. and T.	0	0	0	1	1	0	1
130	Tunisia	0	0	0	0	0	1	0
131	Turkey	0	0	0	0	1	0	1
132	Uganda	0	0	0	0	1	0	1
133	Ukraine	0	0	0	0	0	1	0
134	UK	0	0	0	1	1	0	1
135	US	0	0	0	1	1	0	1
136	Uruguay	0	0	0	1	1	0	1
137	Uzbekistan	1	-	-	-	-	-	0
138	Venezuela	0	0	0	0	0	1	0
139	Vietnam	0	0	0	0	0	1	0
140	Yemen	0	0	0	0	0	1	0
141	Zambia	0	0	0	0	0	1	0
142	Zimbabwe	0	0	0	0	0	1	0
-	-	20	12	4	-	-	31	-
-	142	122	110	106	-	-	75	75

Notes: Herze.=Herzegovina. T. and T.=Trinidad and Tobago. NT=No Times Series Observations. Oil=Oil-Exporting Countries. *Source*: Unique dataset on trust, compiled by the author from internationally available data.

Appendix C. Country and Time Coverage for Trust

Table C1 Country and Time Coverage for Trust, 75 Economies, 1980-2015

No.	Country	1980	1985	1990	1995	2000	2005	2010	2015	μ	σ	cv	n	Δ
1	Albania						X	X	X	11.4	5.1	44.3	3	-12.4
2	Argentina	X	X	X	X	X	X	X	X	22.6	5.6	24.8	8	-1.4
3	Armenia						X	X	X	17.6	3.1	17.8	3	0.5
4	Australia	X	X	X	X	X	X	X	X	46.0	3.5	7.5	8	2.3
5	Austria			X	X	X	X	X	X	36.8	5.5	14.8	6	16.7
6	Belgium	X	X	X	X	X	X	X		32.0	2.3	7.3	7	7.1
7	Benin						X	X	X	30.2	2.0	6.6	3	4
8	Botswana				X	X	X	X	X	11.0	3.0	27.0	5	-2.7
9	Brazil			X	X	X	X	X	X	7.1	2.0	27.4	6	0.8
10	Bulgaria						X	X	X	19.8	1.6	8.3	3	-3.9
11	Canada	X	X	X	X	X	X	X	X	45.9	4.1	8.9	8	-3.6
12	Chile			X	X	X	X	X	X	18.0	2.6	14.3	6	-7.2
13	Colombia				X	X	X	X	X	18.2	2.5	13.5	5	-4.7
14	Costa Rica				X	X	X	X	X	14.8	2.8	18.6	5	-5.6
15	Croatia						X	X	X	18.1	2.5	13.8	3	-5.4
16	Cyprus						X	X	X	8.4	0.9	10.8	3	-2.1
17	Czech Rep.						X	X	X	27.2	3.0	10.8	3	-5.7
18	Denmark	X	X	X	X	X	X	X	X	65.6	7.9	12.0	8	22.2
19	Dom. Rep.				X	X	X	X	X	23.8	6.1	25.7	5	-13.6
20	El Salvador				X	X	X	X	X	22.2	4.2	19.0	5	-6.2
21	Estonia						X	X	X	35.0	2.9	8.2	3	4.2
22	Finland	X	X	X	X	X	X	X	X	59.8	5.2	8.7	8	11.3
23	France	X	X	X	X	X	X	X	X	23.0	1.9	8.2	8	2
24	Germany	X	X	X	X	X	X	X	X	37.4	4.1	11.0	8	12.3
25	Ghana						X	X	X	11.1	3.3	29.3	3	-7
26	Greece		X	X	X	X	X	X	X	28.2	12.8	45.5	7	-39.7
27	Guatemala				X	X	X	X	X	20.6	4.4	21.3	5	-12.4
28	Hong Kong					X	X	X	X	39.0	5.8	14.8	4	15.9
29	Hungary						X	X	X	26.0	1.6	6.1	3	2.9
30	Iceland	X	X	X	X	X	X	X	X	46.4	6.5	14.1	8	19.6
31	India			X	X	X	X	X	X	29.6	8.5	28.7	6	-15.7
32	Ireland	X	X	X	X	X	X	X		39.3	4.0	10.1	7	-2.9
33	Italy	X	X	X	X	X	X	X	X	30.4	2.5	8.4	8	2.6
34	Japan	X	X	X	X	X	X	X	X	40.5	1.9	4.6	8	-3.6
35	Jordan					X	X	X	X	25.3	5.9	23.2	4	-11.2
36	Kazakhstan							X	X	33.6	4.5	13.4	2	-9
37	Kyrgyzstan						X	X	X	27.9	7.6	27.4	3	8.8
38	Latvia						X	X		24.6	0.8	3.1	2	1.5
39	Lithuania						X	X	X	30.0	1.5	5.1	3	3.7
40	Luxembourg		X	X	X	X	X	X		29.8	2.4	8.0	6	2

41	Madagascar						X	X	X	29.7	2.2	7.3	3	-5.1
42	Malaysia						X	X	X	9.8	1.9	19.3	3	4.3
43	Mali					X	X	X	X	20.1	4.0	19.9	4	9.4
44	Malta	X	X	X	X	X	X	X		19.1	4.9	25.5	7	11.1
45	Mexico	X	X	X	X	X	X	X	X	24.6	5.6	22.9	8	-2
46	Mongolia						X	X	X	15.1	4.2	28.0	3	9.8
47	Morocco					X	X	X	X	17.0	4.1	24.1	4	-9.8
48	Namibia				X	X	X	X	X	29.6	4.1	13.7	5	-8.6
49	Netherlands	X	X	X	X	X	X	X	X	54.3	6.3	11.6	8	17.3
50	New Zealand				X	X	X	X	X	52.9	3.3	6.3	5	7.5
51	Norway	X	X	X	X	X	X	X	X	67.9	4.8	7.0	8	11.7
52	Panama				X	X	X	X	X	20.1	3.5	17.1	5	0.6
53	Paraguay				X	X	X	X	X	16.8	1.9	11.1	5	-1
54	Peru				X	X	X	X	X	14.1	2.7	19.1	5	7.1
55	Poland						X	X	X	22.6	2.6	11.4	3	5.2
56	Portugal		X	X	X	X	X	X	X	18.8	5.0	26.5	7	-10.4
57	Romania						X	X	X	14.9	3.9	26.1	3	-9.1
58	Senegal						X	X	X	28.7	1.4	4.9	3	3.3
59	Serbia						X	X	X	15.2	1.2	8.1	3	1.3
60	Singapore					X	X	X	X	28.1	5.6	19.8	4	15.2
61	Slovakia						X	X	X	16.9	3.0	17.5	3	5.2
62	Slovenia						X	X	X	21.1	2.5	11.8	3	6.1
63	South Africa	X	X	X	X	X	X	X	X	22.3	4.8	21.6	8	-6.7
64	South Korea	X	X	X	X	X	X	X	X	32.0	3.7	11.6	8	-4
65	Spain	X	X	X	X	X	X	X	X	35.0	2.4	7.0	8	3
66	Sweden	X	X	X	X	X	X	X	X	63.4	3.5	5.6	8	6.6
67	Switzerland		X	X	X	X	X	X	X	48.8	6.3	12.9	7	14.7
68	Taiwan				X	X	X	X	X	37.2	3.9	10.5	5	4.8
69	Thailand					X	X	X	X	31.0	7.6	24.5	4	12.6
70	T. and T.						X	X		3.5	0.3	8.6	2	-0.6
71	Turkey			X	X	X	X	X	X	10.7	2.7	25.3	6	2.6
72	Uganda					X	X	X	X	15.7	0.6	4.1	4	0
73	UK	X	X	X	X	X	X	X	X	37.6	5.0	13.3	8	-4.4
74	US	X	X	X	X	X	X	X	X	39.8	5.0	12.7	8	-3.8
75	Uruguay				X	X	X	X	X	28.1	5.0	17.7	5	-6.9
-	Observations	22	26	31	44	51	74	75	69	392	392	392	392	392
-	Average	38.2	39.5	37.9	31.7	29.6	27.8	28.8	28.6	27.9	3.8	15.6	5.2	0.7

Notes: T. and T.=Trinidad and Tobago.
Source: Unique dataset on trust, compiled by the author from publicly available international data.

Appendix D. Additional Literature on Trust and Economic Performance

Table D1 Additional Literature on Trust and Alternative Measures of Economic Performance

Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Authors	Heliwell	LLSV	Whitely	DG	AOY	AC	Horváth	PT	AC	BM	James	LMK	MPT	Bjornskov
Year	1996	1997	2000	2009	2009	2010	2013	2013	2013	2015	2015	2018	2021	2022
Model specification of KF1997	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panel Data	-	-	-	**Y**	-	-	-	**Y**	-	-	-	**Y**	**Y**	**Y**
Fixed-Effects	-	-	-	-	-	**Y**	-	-	-	-	-	-	**Y**	-
Number of Countries	17	40	34	51	46	24	46	80	52	67	81	61	23	64
Number of Observations	17	40	34	119	46	24	46	208	52	67	81	152	1376	477

Abbreviations: KF=Knack and Keefer, LLSV=La Porta et al., DG=Dearmon and Grier, AOY=Ahlerup et al., AC=Algan and Cahuc, PT=Peiró-Palomino and Tortosa-Ausina, AC=Algan and Cahuc, BM=Bjornskov and Meon, LMK=Lim et al., and MPT=Makrychoriti et al.

Appendix E. Additional Descriptive and Econometric Results

Table E1 Variable Definition, Source and Summary Statistics of Individual Waves, 1980-2019

Variable	Definition	Source	Year	Observations	Mean	Standard Dev.	Minimum	Maximum
Economic Growth	5 year growth rates of Real GDP per capita [Real GDP at constant 2017 national prices (in mil. 2017US$) divided by population (in mil.)]	Penn World Table 10.0, Feenstra et al. (2015)	1981-1985	22	1.32	1.85	-2.14	6.74
			1986-1990	26	2.29	2.04	-2.79	7.38
			1991-1995	31	1.47	1.59	-0.81	5.68
			1996-2000	44	2.25	1.49	-1.96	6.91
			2001-2005	51	2.07	1.20	0.04	4.96
			2006-2010	74	1.23	1.77	-2.02	5.22
			2011-2015	75	1.62	1.69	-1.68	7.56
			2016-2019	69	1.39	1.00	-1.26	3.85
Trust	Dividing the number of participants who respond "*Most people can be trusted*" by the number of participants answering "*Most people can be trusted*" and "*Can´t be too careful*"	Integrated Value Survey, Latinobarómetro, Arabbarometer, Asianbarometer, Afrobarometer, Eurobarometer	1980	22	38.2	13.3	11.3	61.2
			1985	26	39.5	13.1	11.7	62.6
			1990	31	37.9	14.9	6.6	66.1
			1995	44	31.7	14.1	6.9	65.4
			2000	51	29.6	15.5	4.2	68.1
			2005	74	27.8	14.9	3.8	73.7
			2010	75	28.8	15.7	3.2	75.4
			2015	69	28.6	17.0	5.4	73.9
Trust, Squared	Squared Term of Trust	Integrated Value Survey, Latinobarómetro, Arabbarometer, Asianbarometer, Afrobarometer, Eurobarometer	1980	22	1626.8	1009.4	128.8	3750.5
			1985	26	1724.9	1073.2	136.4	3917.0
			1990	31	1648.3	1169.9	43.6	4369.4
			1995	44	1198.0	1030.7	47.8	4274.9
			2000	51	1111.8	1154.1	17.7	4644.3
			2005	74	990.0	1116.2	14.5	5432.0
			2010	75	1070.4	1206.9	10.4	5678.2
			2015	69	1100.9	1306.3	29.0	5464.5
Income	Ln of Real GDP per capita	Penn World Table 10.0, Feenstra et al. (2015)	1980	22	9.99	0.45	8.60	10.52
			1985	26	10.10	0.45	8.99	10.90
			1990	31	10.07	0.70	7.50	11.01
			1995	44	9.86	0.77	7.65	11.03
			2000	51	9.83	1.00	6.82	11.25
			2005	74	9.74	0.99	7.04	11.35
			2010	75	9.85	0.94	7.38	11.36
			2015	69	9.89	0.90	7.37	11.25
Education	Denotes a measure based on years of schooling and returns to education	Penn World Table 10.0, Feenstra et al. (2015), Barro and Lee (2013)	1980	22	2.66	0.43	1.87	3.35
			1985	26	2.74	0.45	1.80	3.39
			1990	31	2.73	0.54	1.49	3.46
			1995	44	2.65	0.56	1.58	3.52
			2000	51	2.66	0.60	1.14	3.58
			2005	74	2.77	0.59	1.17	3.63
			2010	75	2.87	0.58	1.22	3.70
			2015	69	2.96	0.59	1.31	3.74
Price Level of Investment	Price level of capital formation (price level of USA GDP in 2017=1)	Penn World Table 10.0, Feenstra et al. (2015)	1980	22	44.14	13.67	28.07	89.31
			1985	26	38.25	13.91	21.96	98.22
			1990	31	63.00	17.28	30.28	111.87
			1995	44	61.67	22.81	31.35	152.31
			2000	51	51.38	18.13	24.61	128.42
			2005	74	57.56	20.29	28.08	100.41
			2010	75	64.25	20.56	33.90	125.31
			2015	69	60.84	17.95	33.68	104.59

Notes: Dev. = Deviation. *Sources*: Unique dataset on trust, compiled by the author from publicly available international data and Penn World Tables (Feenstra et al., 2015).

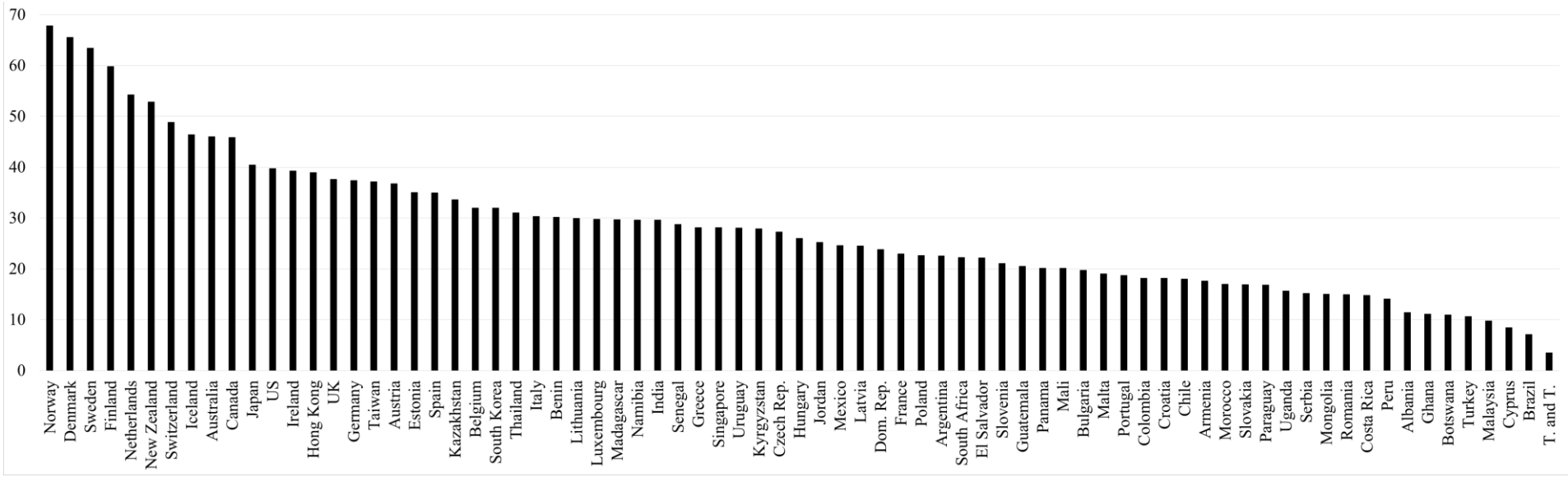

Fig. E1 Average Levels of Trust across 75 Economies, 1980 to 2015

Notes: Trust values are given in percent. Average levels of trust range from 3.5 percent in Trinidad and Tobago to 68 percent in Norway. *Source*: Unique dataset on trust, compiled by the author from publicly available international data.

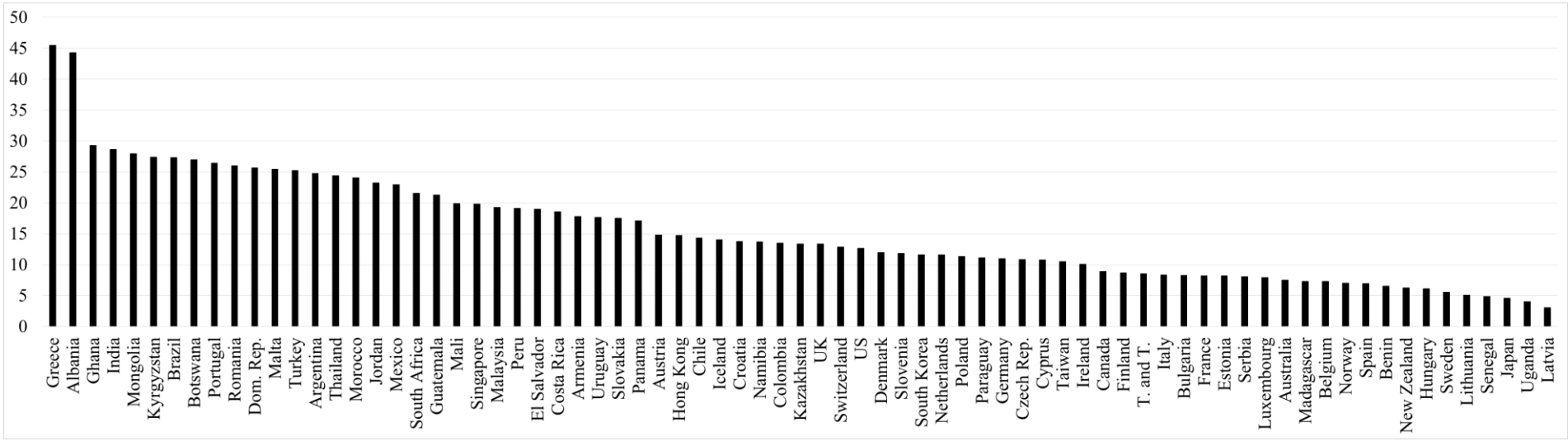

Fig. E2 Coefficients of Variation for Trust in 75 Economies, 1980-2015

Notes: Cv-values of trust range from 3.1 percent in Latvia to 45.5 percent in Greece. *Source*: Unique dataset on trust, compiled by the author from publicly available international data.

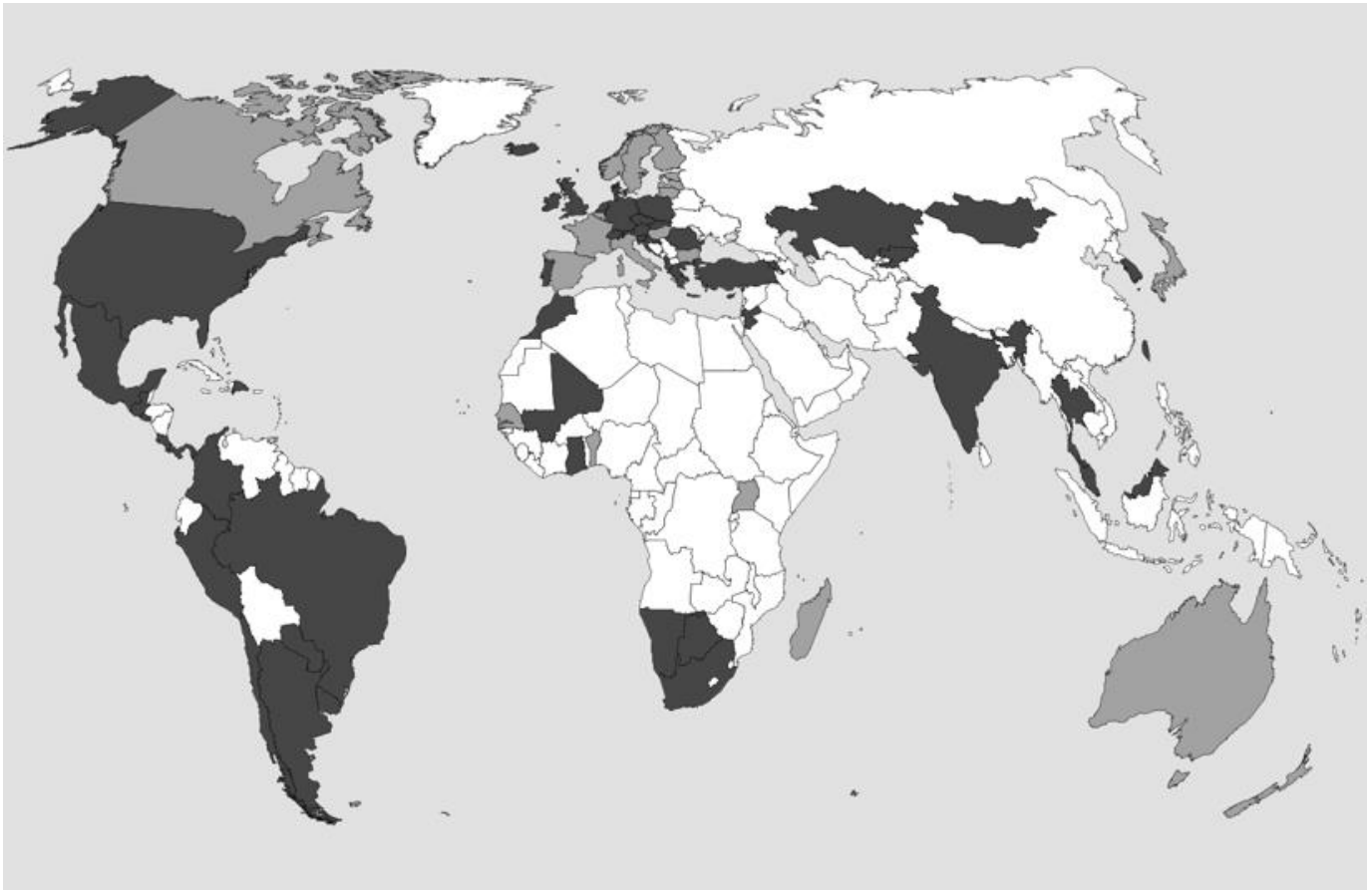

Fig. E3 Coefficients of Variation for Trust in 75 Economies, 1980-2015

Notes: Cv-values from 0 to 10 are depicted in light grey, and cv-values of larger than 10 are depicted in dark grey. *Source*: Unique dataset on trust, compiled by the author from publicly available international data.

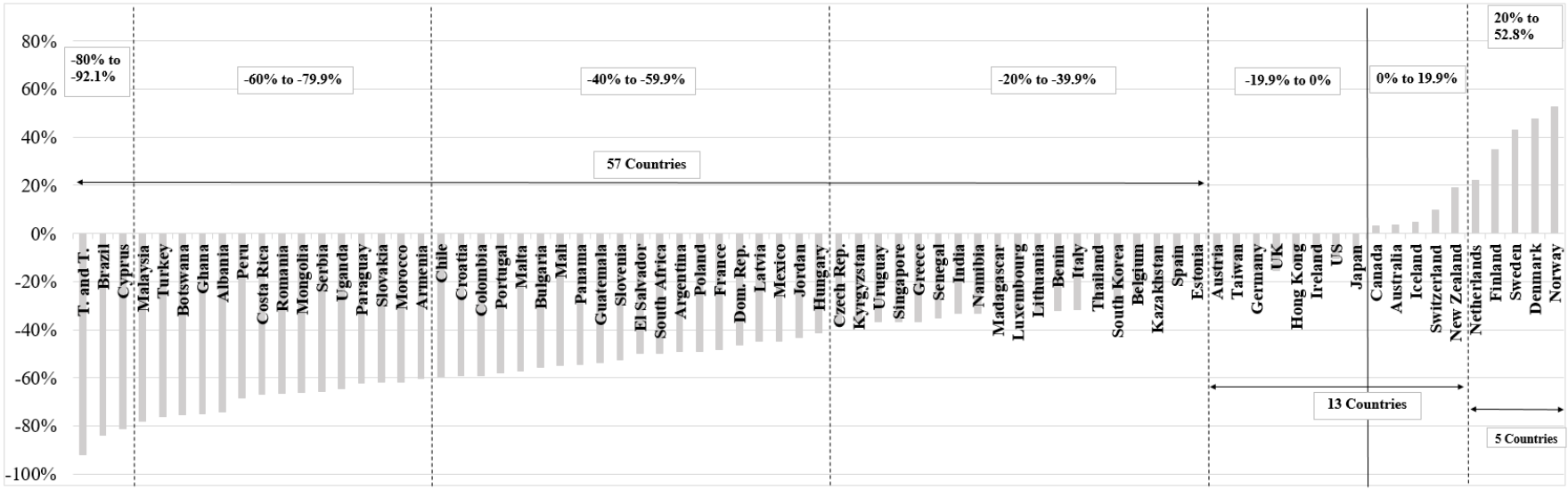

Fig. E4 Trust Thresholds and Distance to the Optimum Levels of Trust in 75 Economies, 1980-2015

Notes: The solid line depicts the optimum trust value of 44.4 percent. The dashed lines represent trust thresholds of consecutive ±20–percent steps from the optimum trust value of 44.4 percent. *Source*: Unique dataset on trust, compiled by the author from publicly available international data.

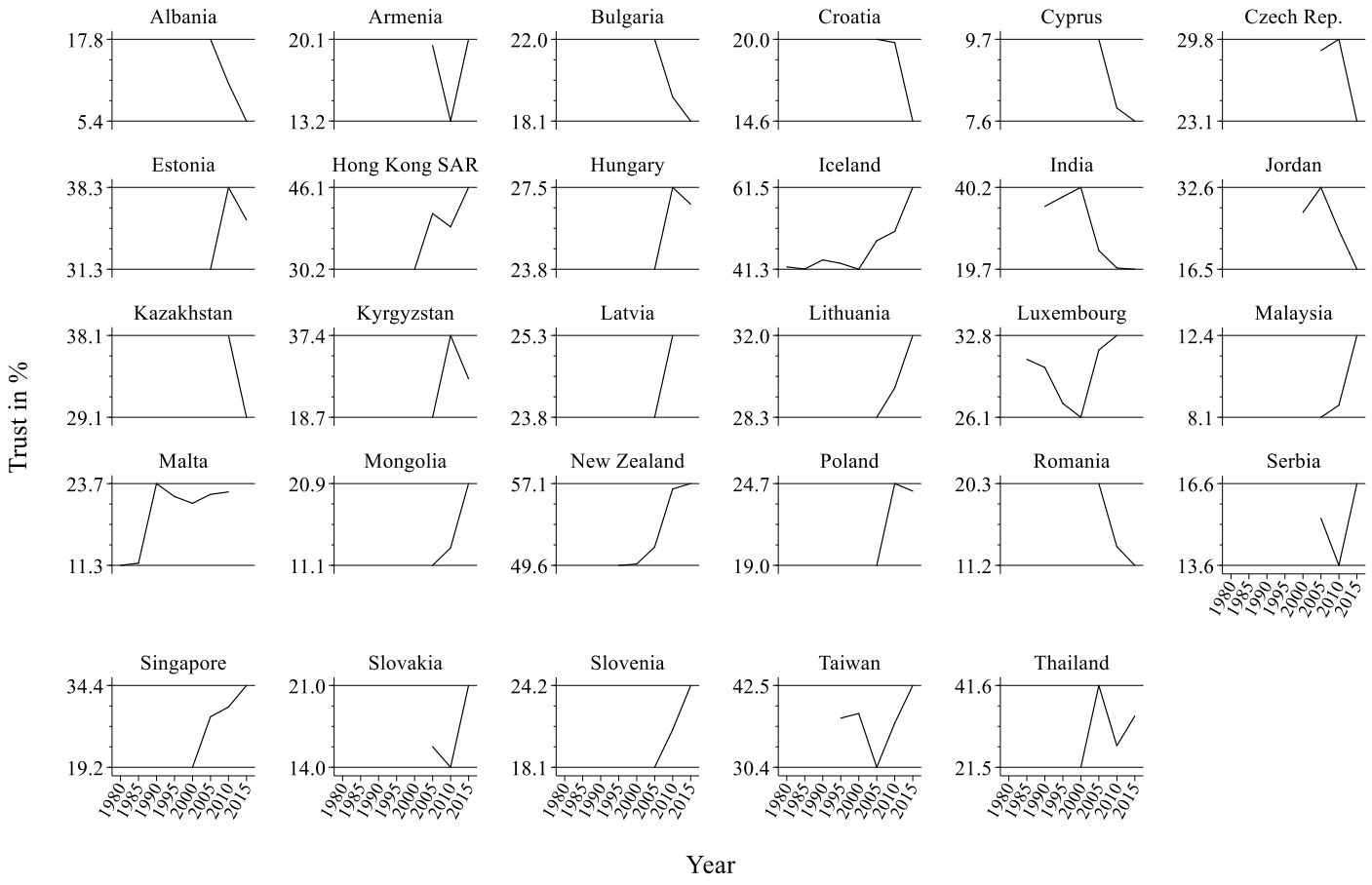

Fig. E5 Trust over Time by Country, in Europe, Asia, and Oceania, 1980-2015

Notes: The Y-axis uses individual scales and depicts minimum and maximum values. *Source:* Unique dataset on trust, compiled by the author from publicly available international data.

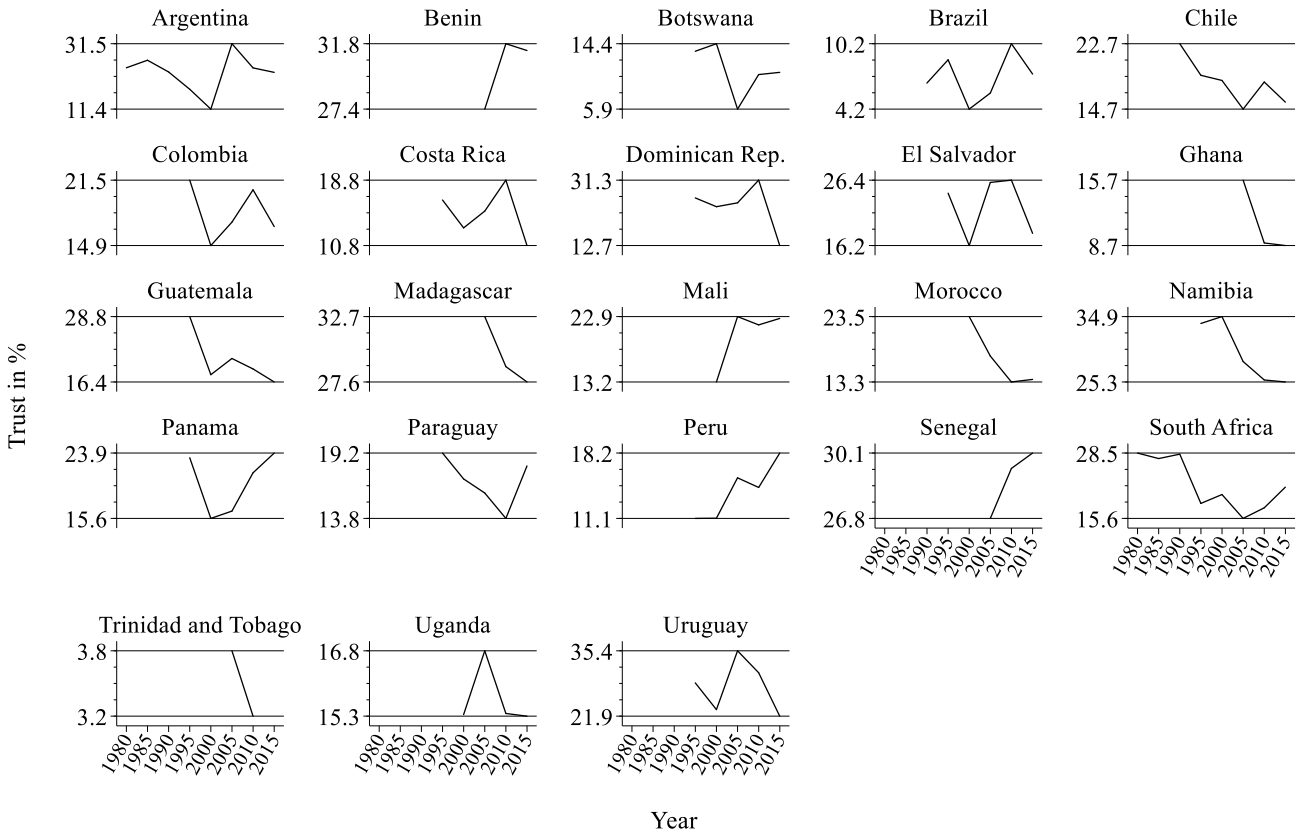

Fig. E6 Trust over Time in Countries across South and Central America, the Caribbean and Africa, 1980-2015

Notes: Y-axis uses individual scales and depicts minimum and maximum values. *Source:* Unique dataset on trust, compiled by the author from publicly available international data.

Table E2 Correlation Coefficients of Trust across Eight Individual Panel Waves

75 Countries with 392 Observations								
Year	1980	1985	1990	1995	2000	2005	2010	2015
1980	1.00 (22)	0.95 (22)	0.92 (22)	0.86 (22)	0.85 (22)	0.87 (22)	0.86 (22)	0.90 (19)
1985		1.00 (26)	0.92 (26)	0.87 (26)	0.86 (26)	0.85 (26)	0.85 (26)	0.82 (22)
1990			1.00 (31)	0.94 (31)	0.91 (31)	0.88 (31)	0.87 (31)	0.82 (27)
1995				1.00 (44)	0.97 (44)	0.94 (44)	0.94 (44)	0.90 (40)
2000					1.00 (51)	0.90 (51)	0.93 (51)	0.89 (47)
2005						1.00 (74)	0.95 (74)	0.92 (68)
2010							1.00 (75)	0.95 (69)
2015								1.00 (69)

29 European and Asian Countries with 108 Observations								
Year	1980	1985	1990	1995	2000	2005	2010	2015
1980	1.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	i
1985		1.00 (3)	0.93 (3)	0.91 (3)	0.91 (3)	0.95 (3)	0.95 (3)	i
1990			1.00 (4)	0.98 (4)	0.93 (4)	0.83 (4)	0.73 (4)	1.00 (2)
1995				1.00 (6)	0.99 (6)	0.80 (6)	0.76 (6)	0.69 (4)
2000					1.00 (10)	0.52 (10)	0.67 (10)	0.49 (8)
2005						1.00 (28)	0.86 (28)	0.85 (25)
2010							1.00 (29)	0.91 (26)
2015								1.00 (26)

23 OECD Countries with 175 Observations								
Year	1980	1985	1990	1995	2000	2005	2010	2015
1980	1.00 (18)	0.93 (18)	0.91 (18)	0.85 (18)	0.83 (18)	0.88 (18)	0.85 (18)	0.90 (16)
1985		1.00 (21)	0.91 (21)	0.86 (21)	0.85 (21)	0.87 (21)	0.84 (21)	0.81 (19)
1990			1.00 (23)	0.92 (23)	0.88 (23)	0.87 (23)	0.85 (23)	0.79 (21)
1995				1.00 (23)	0.97 (23)	0.95 (23)	0.95 (23)	0.90 (21)
2000					1.00 (23)	0.96 (23)	0.97 (23)	0.93 (21)
2005						1.00 (23)	0.97 (23)	0.95 (21)
2010							1.00 (23)	0.97 (21)
2015								1.00 (21)

23 Central and South American and African countries with 109 Observations								
Year	1980	1985	1990	1995	2000	2005	2010	2015
1980	1.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	-1.00 (2)	-1.00 (2)	-1.00 (2)
1985		1.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	-1.00 (2)	-1.00 (2)	-1.00 (2)
1990			1.00 (4)	0.96 (4)	0.92 (4)	0.58 (4)	0.75 (4)	0.91 (4)
1995				1.00 (15)	0.85 (15)	0.73 (15)	0.77 (15)	0.56 (15)
2000					1.00 (18)	0.51 (18)	0.50 (18)	0.42 (18)
2005						1.00 (23)	0.89 (23)	0.70 (22)
2010							1.00 (23)	0.72 (22)
2015								1.00 (22)

Notes: i = insufficient observations (only 1 observation). *Source*: Unique dataset on trust, compiled by the author from publicly available international data.

Table E3 Trust and Economic Growth – Replication of Table 5 with Linear Estimations

Dependent Variable	Growth	Growth	Growth	Growth	Growth
Estimation Method	FE	DIFFGMM	DIFFGMM	SYSGMM	SYSGMM
Equation	1	2	3	4	5
$Trust_{i,t-1}$	-0.003	0.002	-0.032	0.009	0.013
	(-0.20)	(0.05)	(-0.53)	(-0.64)	(1.09)
$Income_{i,t-1}$	-3.96***	-4.21***	-4.99***	-1.26**	-1.13***
	(-6.92)	(-.426)	(-3.62)	(-2.62)	(-2.91)
$Education_{i,t-1}$	-0.64	0.13	-1.06	1.52**	1.45***
	(-0.80)	(0.10)	(-0.36)	(2.52)	(3.21)
$PI_{i,t-1}$	-0.02***	-0.02***	-0.02**	-0.02**	-0.03***
	(-2.88)	(-3.08)	(-2.32)	(-2.27)	(-2.72)
Constant	41.54***	-	-	10.57***	9.55***
	(8.75)	-	-	(3.24)	(3.24)
N° of Instruments	-	85	28	106	66
Specification	RO	FI	CI	FI	2nd-3rd
AB Test AR(2)	-	0.09	0.09	0.06	0.07
AB Test AR(3)	-	0.09	0.06	0.12	0.14
Hansen Test	-	0.61	0.10	0.98	0.39
R-Squared	0.33	-	-	-	-
Optimum Point	-	-	-	-	-
Countries	75	75	75	75	75
Waves	8	8	8	8	8
Observations	392	317	317	392	392
Period	1980-2019	1980-2020	1980-2019	1980-2019	1980-2019

Notes: ***p < 0.01, **p < 0.05, *p < 0.1. AB Test=Arellano-Bond test for autocorrelation in differences (*p*-value). Hansen Test=Hansen test of joint validity of instruments (*p*-value). FE=Fixed-Effects. DIFF- and SYSGMM=Differenced and System Generalized Method of Moments. RO=Robust. FI=Full Instruments. CI=Collapsed Instruments. 2nd-3rd=Only 2nd and 3rd lags are used. Numbers in parentheses are t-values. Time dummies are included in every specification. All specifications include orthogonal deviations, small-sample corrections, two-step estimation, and Windmeijr-corrected cluster-robust errors. In specifications 2-4, $Income_{i,t-1}$ was treated as endogenous. $Trust_{i,t-1}$, Trust, $Squared_{i,t-1}$ and $Education_{i,t-1}$ were treated as predetermined. $PI_{i,t-1}$ was treated as exogenous. *Sources*: Unique dataset on trust, compiled by the author from publicly available international data and Penn World Tables 10.0 (Feenstra et al., 2015).

Table E4 Trust and Economic Growth – Replication of Table 6 with Linear Estimations

Row	S. Change	Trust C.	t-Value	Cs	Obs.	Instr.	AB	H.	S.
1	None	0.013	1.09	75	392	66	0.07	0.39	1 2
Influential Cases									
2	NO	0.015	1.29	74	384	66	0.07	0.39	1 2
3	TT	0.014	1.13	74	390	66	0.08	0.39	1 2
4	NO+TT	0.014	1.22	73	382	66	0.07	0.40	1 2
5	HTVs	0.035**	2.05	70	326	66	0.07	0.65	1 2
Regional Groups									
6	Exc. Africa	0.011	0.81	65	350	66	0.08	0.65	1 2
7	Exc. SA	0.000	0.02	68	352	66	0.07	0.32	1 2
8	Exc. CAA	0.023*	1.86	69	365	66	0.10	0.45	1 2
9	Exc. Asian	0.015	1.29	64	351	66	0.06	0.46	1 2
10	Exc. EE	0.012	0.93	62	354	66	0.74	0.59	1 2
Influential Panel Waves									
11	1980-2015	0.014	1.09	75	323	63	0.07	0.32	1 2
12	1985-2019	0.012	0.98	75	370	63	0.07	0.42	1 2
13	1985-2015	0.013	1.09	75	301	60	0.07	0.34	1 2
Specifications									
14	Openness, R.	0.014	1.30	73	385	66	0.07	0.43	1 2
15	Openness, I.	0.014	1.31	73	385	86	0.74	0.89	1 2
16	Investment, R.	0.021*	1.98	69	370	66	0.11	0.45	1 2
17	Investment, I.	0.006	0.43	69	370	86	0.76	0.83	1 2
18	KOF-Economics, I	0.015	1.34	73	384	66	0.07	0.43	1 2
19	KOF-Economics, I	0.004	0.40	73	384	86	0.11	0.91	1 2
20	KOF-Finance, R.	0.015	1.34	73	384	66	0.07	0.43	1 2
21	KOF-Finance, I.	0.008	0.80	73	384	86	0.12	0.89	1 2
Case Study Specifications									
22	All	0.026	1.50	110	580	66	0.01	0.09	1 2
23	All-Oil	0.029	1.71	106	566	66	0.01	0.14	1 2
24	All-Oil-Unfree	0.031*	1.78	75	435	66	0.05	0.34	1 2
25	All-Oil-Unfree-Tr	0.013	1.09	75	392	66	0.07	0.39	1 2

Notes: S.=Specification. C.=Coefficient. Sq.=Square. Cs.=Countries. Obs.=Observations. Instr.=Instruments. AB= Arellano-Bond test for autocorrelation in differences (*p*-value). Hansen=Hansen test of joint validity of instruments (*p*-value). OP=Optimum Point. NO=Norway. TT=Trinidad and Tobago. HTVs=High Trust Values. SA=South America. CAA= Central America and Caribbean. EE=Eastern-Europe. Oil=Oil Producing Countries. Unfree= Countries characterized by "Unfreedom". Tr=Observations form Transition countries before 2005. ***p < 0.01, **p < 0.05, *p < 0.1. Time dummies are included in every specification. System Generalized Method of Moments estimations include orthogonal deviations, small-sample corrections, two-step estimation, and Windmeijr-corrected cluster-robust errors. In all specifications, $\text{Income}_{i,t-1}$ was treated as endogenous, $\text{Trust}_{i,t-1}$, Trust, $\text{Squared}_{i,t-1}$ and $\text{Education}_{i,t-1}$ were treated as predetermined and $\text{PI}_{i,t-1}$ was treated as exogenous. In correspondence the specification in Regression 5 in Table 5, all regressions only use the 2nd and 3rd lag as instruments and use a benchmark *p*-value of 0.05 for our Arellano-Bond test for autocorrelation. *Sources*: Unique dataset on interpersonal trust, compiled by the author from publicly available international data and PWT 10.0 (Feenstra et al. 2015).

Table E5 Trust and Economic Growth - Difference GMM Estimation

Dependent Variable	Growth	Growth	Growth
Estimation Method	DIFFGMM	DIFFGMM	DIFFGMM
Equation	1	2	3
$Trust_{i,t-1}$	0.128**	0.205**	0.297**
	(2.31)	(2.19)	(2.17)
$Trust, Squared_{i,t-1}$	-0.00197***	-0.00306**	-0.00364**
	(-2.76)	(-2.59)	(-2.17)
$Income_{i,t-1}$	-5.17***	-6.80***	-7.46***
	(-5.16)	(-2.34)	(-3.38)
$Education_{i,t-1}$	-0.15	-2.32	1.83
	(-0.11)	(-0.83)	(0.49
$PI_{i,t-1}$	-0.02*	-0.01	0.001
	(-1.91)	(-1.27)	0.05
Constant	-	-	-
	-	-	-
N° of Instruments	113	35	39
Specification	FI	CI	CI
AB Test AR(2)	0.10	0.17	0.21
AB Test AR(3)	0.09	0.09	0.20
Hansen Test	1.00	0.13	0.15
R-Squared	-	-	-
Optimum Point	32.5	33.5	40.8
Countries	75	75	75
Waves	8	8	8
Observations	317	317	317
Period	1980-2020	1980-2019	1980-2019

Notes: ***p < 0.01, **p < 0.05, *p < 0.1. AB Test=Arellano-Bond test for autocorrelation in differences (*p*-value). Hansen Test=Hansen test of joint validity of instruments (*p*-value). FE=Fixed-Effects. DIFF- and SYSGMM=Differenced and System Generalized Method of Moments. RO=Robust. FI=Full Instruments. CI=Collapsed Instruments. 2nd-3rd=Only 2nd and 3rd lags are used. Numbers in parentheses are t-values. Time dummies are included in every specification. All specifications include orthogonal deviations, small-sample corrections, two-step estimation, and Windmeijr-corrected cluster-robust errors. While in regressions 1 and 2 $Trust_{i,t-1}$, Trust, $Squared_{i,t-1}$ and $Education_{i,t-1}$ were treated as predetermined and $PI_{i,t-1}$ as exogenous, in regression 3, $Trust_{i,t-1}$ and Trust, $Squared_{i,t-}$ were treated as endogenous and $Education_{i,t-1}$ and $PI_{i,t-1}$ as predetermined. *Sources*: Unique dataset on trust, compiled by the author from publicly available international data and Penn World Tables 10.0 (Feenstra et al., 2015.

Appendix F. Survey Questions on Trust

The precise wording used in the questionnaires on interpersonal trust varies slightly over the seven (i-v) international surveys examined in this study. The questions posed are reproduced below:

i+ii) Integrated Value Study (IVS) (Haerpfer et al. 2021 and EVS 2021) reads: "*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?*".
iii) Latinobarómetro (Latinobarómetro Data 2018) reads: "*Generally speaking, would you say that you can trust most people, or that you can never be too careful when dealing with others?"* from 1998 until 2018 and "*Generally speaking, would you say that people can be trusted or that you can't be too careful in dealing with people?"* from 1996 until 1997.
iv) Arabbarometer (Arabbarometer Data 2019) reads: "*Generally speaking, would you say that most people can be trusted?"* in wave 1 and "*Generally speaking, do you think most people are trustworthy or not?"* from wave 2 to 4. In wave 5, the question reads: "*Generally speaking, would you say that "Most people can be trusted" or "that you must be very careful in dealing with people"?*".
v) Asianbarometer (Asianbarometer 2016) reads: "*General speaking, would you say that "Most people can be trusted" or "you can´t be too careful in dealing with them"?*" in wave 1 and "*General speaking, would you say that "Most people can be trusted" or "that you must be very careful in dealing with people"?"* from waves 2 to 4.
vi) Afrobarometer (Afrobarometer Data 2015) reads: "*Generally speaking, would you say that <u>most people can be trusted</u> or that <u>you can't be too careful in dealing with people?"</u>* in wave 1 and "*Generally speaking, would you say that most people can be trusted or that you must be very careful in dealing with people?"* in waves 3 and 5.
vii) Eurobarometer (Rabier et al. 1986) reads: "*Generally speaking, would you say that most people could be trusted or that one could not be too careful in dealing with people?"* in wave 25.

Although the trust questions differ slightly across the various surveys, their content and meaning remain essentially the same.

Appendix G. Overview of Country Sample

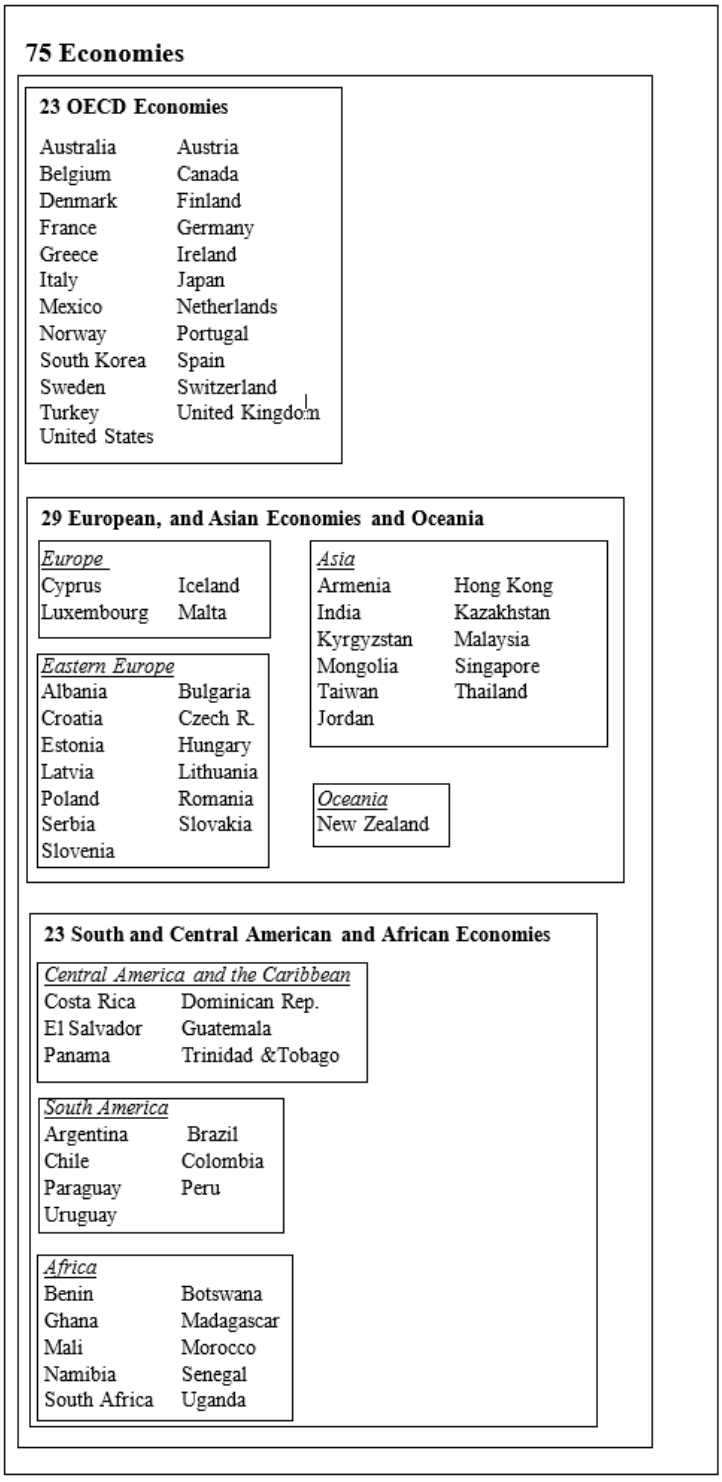

Fig. G1 Overview of Country Sample for 75 Economies

Source: Unique dataset on trust, compiled by the author from publicly available international data.