# The trust paradox

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## Abstract

Countries where interpersonal trust is higher have, on average, higher gross domestic product (GDP) per capita. Does this mean that economic growth is associated to growing trust over time? We review the literature addressing this question, and provide updated empirical evidence on the effects of economic growth on trust over time, a well-established measure of social capital, widely considered in economic studies. We use country panel data from the Penn World Tables and information on people trusting others from the Survey Data Recycling (SDR) v.2.0 database, the largest source of data on trust currently available. Results confirm the positive cross-sectional relation found in previous studies. However, over time trust decreases when GDP grows. A number of robustness checks and a test of causality support this conclusion. The negative relationship between economic growth and trust over time affects prevalently unequal, rich countries. This is possible because growing income inequality increases the chances for social comparisons, which substitute trust in individuals' utility functions. Additionally, income inequality hampers cooperation and cohesiveness in favour of competition, and increases the probability of social unrest. This suggests that the quality of growth matters: interpersonal trust decreases when economic growth is accompanied by income inequalities.

## Introduction

In this chapter, we test whether economic growth erodes trust in others over time. Trust is one of the most commonly used social capital measures in the economic literature (Fukuyama, 1996). Most economic research sees social capital as a catalyst for economic interactions and for economic and social development. Arrow, for instance, identified in trust one of the elements of every commercial transaction, and partly attributed the ``backwardness'' of the world to the lack of confidence in others (Arrow, 1972). The relationship between social capital and economic growth has a long history in social sciences. Economic research frequently found evidence of a positive cross-sectional correlation between social capital and economic growth (see, among others, Beugelsdijk, 2004; della Giusta, 2010; Whiteley, 2000; Zak and Knack, 2001; Beugelsdijk et al., 2005; Peiró-Palomino and Tortosa-Ausina, 2015; Peiro-Palomino, 2016). For instance, Helliwell and Putnam (1995) found that high trust

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and civic community correlate with high real GDP per capita growth rate after controlling for the initial level of GDP. Knack and Keefer (1997) documented a strong positive correlation between economic performance and trust.

There are various reasons why social capital can enhance and sustain economic growth. For example, social capital, and trust in particular, reduces the possibility of opportunistic behaviour, it increases the effectiveness of economic policies by favouring compliance (Bargain and Aminjonov, 2020; Sarracino et al., 2022), and it makes economic transactions safer and cheaper by discouraging free-riding and attenuating the ``principal-agent'' problem (Whiteley, 2000; Easterly and Levine, 1997). Moreover, low levels of social capital, especially trust, discourage innovation because of higher monitoring costs (Clague, 1993), whereas high social capital facilitates the sharing of information and fosters innovation (Uzzi, 1996; Gulati, 1998). Social capital, in the forms of social and cooperative norms, favours the provision and maintenance of public goods as it solves collective action problems. Cooperative norms, in fact, limit self-interest, and contribute to the public good provision thanks to ostracism and social stigma (Knack and Keefer, 1997). Lastly, social capital in the forms of trust and civicness may improve economic activity indirectly, via political channels, by affecting the level and quality of political participation.

Most of these findings come from cross-sectional studies. What happens when considering social capital and economic growth over time? Some authors contend that over time economic growth can have detrimental effects on social capital (see Polanyi, 1968; Hirsch, 1976; Olson, 1982). They attribute the reason of the decline of social capital to the weakening of the cultural and ethical base of the market economy (Hirsch, 1976), and to the increase in the individualistic and competitive value system that “reduce society to deserts” (Polanyi, 1968). Complementary to this argument is that a more complex and differentiated society deriving from economic development comes with a substitution of interpersonal relations with impersonal ones, undermining the possibility of creating trust (Hardin, 1998). Defensive growth theory provides a third reason to expect a negative relation between economic growth and trust (Bartolini and Bonatti, 2002, 2008). The theory maintains that economic growth can be the result of a self-reinforcing vicious cycle in which growth is the result of its own negative externalities: growth results from individuals’ attempts to protect themselves against the negative externalities of growth itself. For instance, economic growth may require long working hours and reduce individuals’ possibilities to dedicate time to others and build trust. If trust is low, people may hire lawyers to prepare complicated contracts to avoid frauds – people engage in a new layer of expenditures, called defensive expenditures, to defend themselves against a negative externality of growth – the decline in trust. Defensive expenditures contribute to economic growth in a self-reinforcing vicious cycle in which declining free goods (such as trust) become business opportunities.

Empirical evidence, albeit scarce, provides some support to the view that economic growth can be detrimental to social capital. Putnam (2000) documented the puzzling evidence of increasing growth and the concurrent decline in Americans’ social capital over the last decades of the twentieth century in the US. Bartolini and co-authors (2008) explained the flat trends in life satisfaction and increasing GDP in the US with the erosion of social capital over the same period, indicating diverging trends in economic growth and social capital. Helliwell (1996) provided evidence of a negative relationship between trust in others and productivity growth from 1960 to 1992 in 17 developed countries; later, Roth (2009, 2024) documented that the changes in trust over time negatively correlate with economic growth. More recently, Bartolini and Sarracino (2015) further documented the coexistence of economic growth and the erosion of social capital and life satisfaction in China. In 2011, Sarracino documented the paradox of positive cross-sectional correlation, but negative time-series association using aggregate World Values Survey-European Values Study data.

The present contribution delves into the relationship between trust and economic growth over time, and provides causal evidence of the negative effect of growth on trust. We document that past increases in GDP per capita reduce the share of people trusting others. We analyse this relationship using various panel regressions techniques. Our baseline result hinges on a standard OLS with fixed effects. We explore the causal relation between growth and trust using Two-Stages Fixed Effects, and we explore the possibility that the negative relationship between growth and trust depends on inequality. Our results suggest that economic growth hampers trust over time when income inequality increases.

In the next section, we briefly discuss the definition of social capital. We then illustrate the data and methods used in present analysis, whereas the results are the subject of section 4. In section 5 we provide some evidence supporting the hypothesis that economic growth erodes trust when income inequality increases. We first provide some theoretical reasons and then we run two simple tests to check whether income inequality mediates the relationship between economic growth and trust over time. The last section summarizes our main results and provides some suggestions for future research.

## Definitions of social capital

Social capital is a much-debated topic on which many definitions and descriptions have been proposed. In a broad sense, social capital may be understood as a set of informal forms of institutions and organisations based on social relations, trust, norms and networks (Durlauf and Fafchamps, 2005). In general, social capital entails the shared norms and values that are available within a society, as well as the emotional support, and material or behavioural assistance between people. The concept has been used to describe several interrelated and overlapping phenomena that are associated with individuals' relationships to resources and people around them.

To give one single definition of social capital is not a simple task. James Coleman (1988) identifies three distinct forms of social capital: obligations and expectations, information channels, and social norms, stating that “social capital is the set of resources that inhere in family relations and in community social organization and that are useful for the cognitive or social development of a child or a young person.” Putnam later provided one of the most modern definitions of social capital as the “features of social life – such as networks, norms, and trust – that enable participants to act together more effectively towards shared objectives, and that can improve the efficiency of society by facilitating coordinated actions” (Putnam et al., 1993). Throughout his work, Putnam broadly defined social capital as the interpersonal relations which provide benefits and create value for the people who are connected, and for the bystanders as well (Puntam, 2001; Putnam, 2000; Putnam, 1995).

Building on his definition, social capital can be understood as comprising the social networks and norms of reciprocity and trustworthiness that arise from interpersonal relations and that create value for the individuals and communities. Accordingly, the OECD defines social capital as ``the networks, together with the shared norms, values and understandings that facilitate cooperation within and among groups" (Healy, 2001). Similarly, the World Bank refers to social capital as norms and networks that enable collective action (Grootaert, 1998).

Notwithstanding the various distinctions, there is some agreement on the fact that social capital is characterized by three main features: networks, norms and trust (Paxton, 1999; Costa and Kahn, 2003; Van Schaik, 2002). Whiteley and Fukuyama are among the authors who define social capital as the willingness of citizens to trust others including members of their own family, fellow citizens, and people in general (Whiteley, 2000; Fukuyama, 1996). In this chapter, we focus on trust as our main social capital variable of interests. There is a theoretical and practical reason for this choice. Theoretically, most of the economic literature refers to trust as the main reason for the positive

contribution of social capital to economic growth. The practical reason is that interpersonal trust is a widely available measure of social capital.

# Data and methods

## Data

The availability of comparable time-series of trust data across countries is key, given the centrality of trust in present study. We source information on the share of people trusting others, by country and year, from the Survey Data Recycling (SDR) v.2.0 database. This is a new harmonized dataset providing individual-level harmonized data from various surveys covering several countries and years. The SDR 2.0 is the result of a multi-annual cooperation between the Sociology Department of the Ohio State University, and the Institute of Philosophy and Sociology of the Polish Academy of Science, and it is financed by the US National Science Foundation (NSF). The database integrates the information from various datasets to ensure the comparability of respondents' answers over time and across countries. The database also provides a number of quality control tools to keep track of survey quality, and to ensure the transparency of the harmonization process. Specifically, the database contains information from 3329 national surveys from 23 international survey projects, for a total of 174 project waves, covering 156 countries from 1966 to 2017 for a total of over 4 million observations. It provides harmonized measures of political participation, social capital and socio-demographics, along with control indicators for source data quality and harmonization procedures. The SDR 2.0 includes all the cross-national survey projects that are multi wave. This includes survey projects such as the Barometer series, the European Social Survey, the European Quality of Life Survey, and European Values Study and the World Values Survey, to mention a few. The result is a database that covers many countries worldwide. However, it is important to clarify that not all world regions are equally represented in the harmonized database, as inclusion depends on data availability.

In the dataset, interpersonal trust is harmonized to have the same dichotomous answer scale of 0-1, where 1 indicates that the respondent trusts others and 0 otherwise. To compute the share of people who trust others, we average individual scores by country and year using sampling weights. We then multiply the final score by 100, so that our trust variable ranges from 0 to 100. We merge this information with macro-economic variables such as real GDP per capita, capital stock, labour force participation, the volume of real exports of each country and the Gini index of inequality from the Penn World Tables 10.01. After merging, we are left with an unbalanced panel of 135 countries that covers the period between 1981 and 2017. Since the trust question was not asked in each original survey at constant time intervals, we created a time variable that homogenises the time dimension of the panel to have constant time intervals.

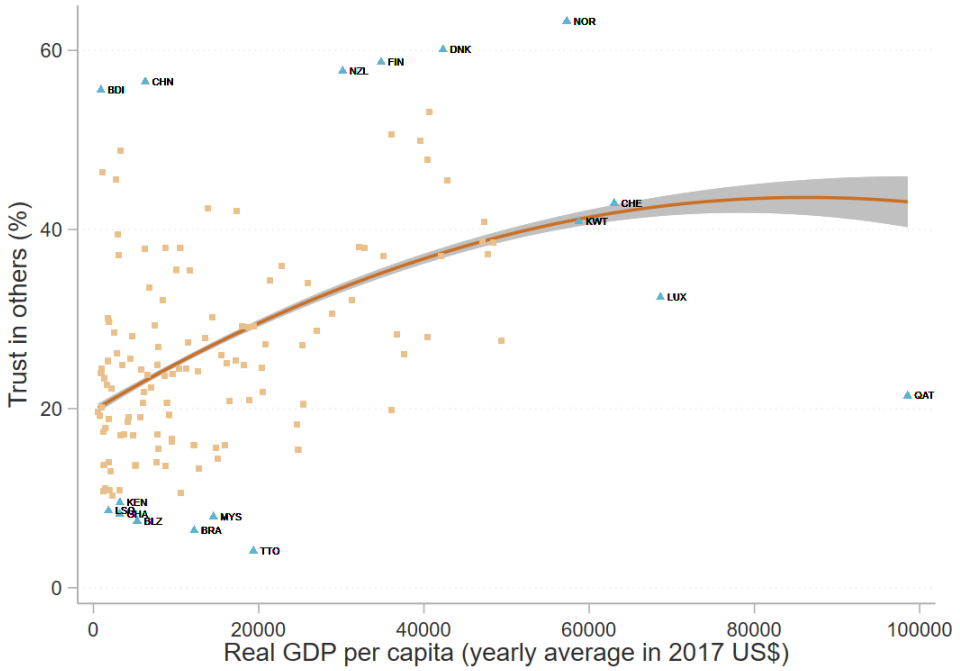
We use real GDP at constant 2017 international dollars divided by population size to obtain GDP per capita. Data on capital stock and exports also come from the Penn World Tables. In the analysis, capital stock is divided by the number of persons engaged, that is, labour force participation. The volume of real exports, which we use to instrument GDP per capita in the causal analysis, is based on the share of output-based real GDP per capita that is represented by merchandise exports, at current purchasing power parities (PPPs). We multiply this variable by output-side real GDP, and then adjust for purchasing power parity by dividing it by the price level of exports at US$ 2017 prices.

Lastly, data on the Gini index of income inequality come from the World Development Indicators database of the World Bank. For the years in which the Gini index is not available, data are linearly interpolated.

## Methods

Previous research found that higher levels of GDP positively correlate with interpersonal trust. In a purely cross-sectional setting, our data confirm this result. Figure 1 shows that countries with a higher GDP per capita also display higher levels of trust in others. This is equivalent to analysing the bivariate relationship between trust and GDP as follows: $GDP_c = \alpha + \beta_1 Trust_c + u_c$, which estimates the cross-sectional relationship between trust and GDP across countries.

*Figure 1: countries with higher GDP per capita have higher interpersonal trust.*




*Note: The figure shows the scatterplot of the relationship between average GDP per capita and the share of people trusting others. Each dot on the scatterplot is the within-country average over time.*

Our aim is, instead, to analyse the relationship between economic growth and trust over time. To do so, we exploit the longitudinal nature of the data and panel regression techniques to estimate the within-country relationship between economic growth and changes in trust over time. In particular, we use an Ordinary Least Square (OLS) fixed effects model to take into account any country-specific unobserved characteristics that may affect the variations in our variables of interest. One might consider, for example, some countries' population responses to the trust question to be less truthful because of the more autocratic nature of the country; alternatively, fixed effects may capture systematic differences in the levels of trust between countries, such as those between East and West Europe. Our regression model is as follows:

$$1) \qquad Trust_{c,t} = \alpha + \beta_1 Log\left(GDPpc_{c,t-1}\right) + \lambda_t + \mu_c + u_{c,t}$$

where $Trust_{c,t}$ is interpersonal trust in each country $c$ and year $t$. Similarly, $Log\left(GDPpc_{c,t-1}\right)$ is the log of the GDP per capita in each country-year, measured at time $t-1$. $\lambda_t$ denotes the yearly time dummies, $\mu_c$ are unobserved country-fixed effects, and $u_{c,t}$ is the idiosyncratic error term, which we cluster at the country level.

Estimating a fixed effects model is equivalent to running a regression in which each variable is subtracted its within-country mean. In the case of the logarithm of GDP this is equivalent to subtracting two logarithms (the actual value minus the average of the log of GDP over time within

country). This difference can be interpreted as an approximation of growth in year *t* with respect to the long-term average. This allows us to interpret the coefficients of log GDP per capita as a within-country increase, or an approximation of economic growth. There are two reasons why we use lag GDP per capita: first, it allows us to account for the possible delay of trust to adjust to economic growth; secondly, even if some cointegration may exist, the use of a lagged variable provides some preliminary indication on the direction of causality in the relationship, as it temporarily precedes the changes in trust.

Omitted variables, as well as reverse causality, may bias the relationship between trust and GDP over time. To test whether economic growth affects trust, we use a two-stages fixed effects (2SFE) instrumental variable approach. In particular, we regress trust on instrumented lag GDP per capita. We instrument GDP per capita with capital stock per employee (one of the canonical input to economic growth (Solow, 1956; Swan 1956)) both at time t-1 and t-2, and real exports. The system of the two stage least squares estimation approach reads as follows:

2) $$Log\left(GDPpc_{c,t-1}\right) = \alpha + \beta_1 Log(K_{c,t-1}) + \beta_2 Log\left(K_{c,t-2}\right) + \beta_3 Log(Exports_{c,t-1}) + \lambda_t + + u_{c,t}$$

3) $$Trust_{c,t} = \alpha + \gamma_1 Log\left(\widehat{GDPpc}_{c,t-1}\right) + \mu_c + \lambda_t + \varepsilon_{c,t}$$

We chose to use capital stock and real exports as instruments because they are determinants of economic growth, but they should have no direct correlation with interpersonal trust, if not through growth, making them relevant and excludable. Moreover, as we show in the results, the Hansen J-test provides support to the exclusion restriction. To account for the possible autocorrelation of trust over time, we perform a robustness test in which we implement a two-stages first differences (2SFD) (Anderson and Hsiao, 1982), in which we account for the possibility that GDP and current levels of trust are both affected by previous levels of interpersonal trust. In this case, we instrument both the lagged first difference of GDP and the lagged first difference of trust. The instruments we use are the log of capital stock, the log of real exports, and the two previous lags of interpersonal trust (that is, trust measured at time $t-2$ and $t-3$).

As in our baseline model (equation 1), we include yearly time dummies also in these two sets of regressions.

## Results

Table 1 presents the results from the OLS with fixed effects (columns 1 and 2), the 2SFE (columns 3 and 4) and the 2SFD (columns 5, 6 and 7). The results from column 1 indicate that Lag GDP per capita attracts a negative and statistically significant coefficient, suggesting that within countries economic growth at time *t - 1* is associated with decreasing trust over time. This finding is robust to the inclusion of the yearly time dummies, as shown in column 2, which is our baseline model specification.

The results from the 2SFE, columns 3 and 4 of Table 1, allow us to check whether our relationship of interest is affected by possible omitted variables, such as the quality of institutions or reverse causality. In the first stage, reported in column 3, capital stock per employee and real exports positively and significantly predict GDP per capita, whereas the second lag of capital stock has a negative effect on GDP. The first stage diagnostics suggest that our instruments are valid and excludable (see the F-statistics at the bottom of column 3). Predicted GDP attracts a negative and

statistically significant coefficient of -18.21 (column 4), indicating a negative, causal relationship between economic growth and interpersonal trust over time.

Table 1 Regression results from fixed effects, two-stages fixed effects and two-stages first differenced models. Independently from the specification, economic growth reduces trust in others.

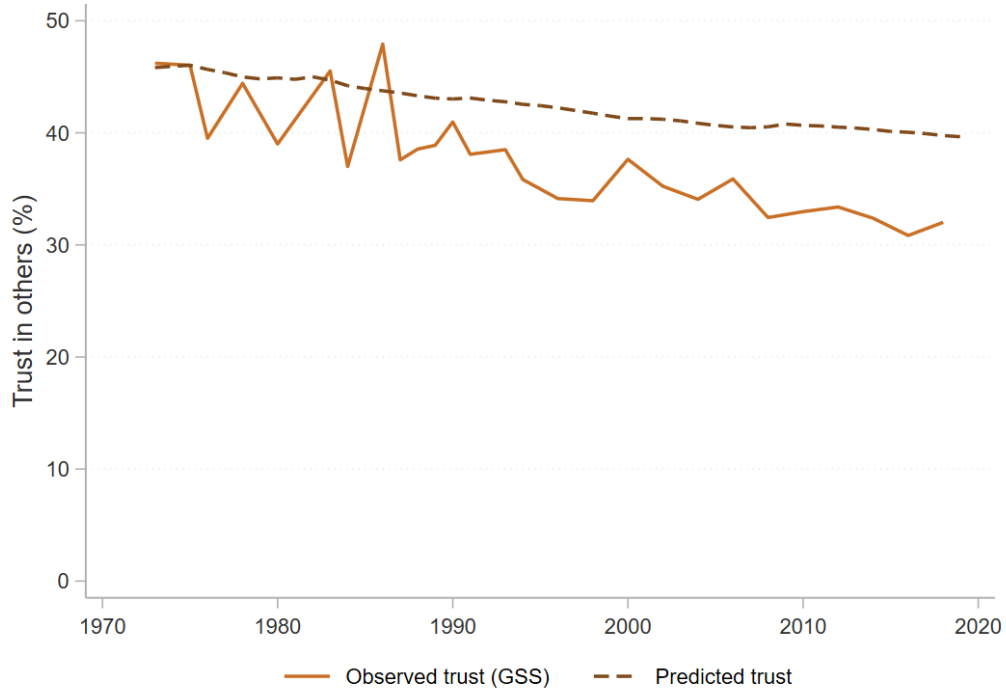
| | Fixed Effects | | 2SFE | | 2SFD | | |
|---|---|---|---|---|---|---|---|
| | Trust | Trust | GDP pc | Trust | GDP pc | Lag Trust | Trust |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Lag GDP per capita (log) | -8.719*** | -10.03*** | | -18.21** | | | |
| | (-3.47) | (-2.63) | | (-2.41) | | | |
| Lag Exports (log) | | | 0.179*** | | 0.0558*** | -0.0103 | |
| | | | (3.76) | | (-3.55) | (-0.76) | |
| Lag Capital stock (log) | | | 0.553*** | | 0.227** | -0.061 | |
| | | | (4.80) | | (2.33) | (0.82) | |
| Lag2 Capital stock (log) | | | -0.194** | | -0.352*** | -0.0187 | |
| | | | (-2.23) | | (-4.30) | (-0.23) | |
| Lag2 People trusting others (%) | | | | | 0.00243 | -0.0109*** | |
| | | | | | (-0.09) | (-28.81) | |
| Lag3 People trusting others (%) | | | | | 0.00023 | 0.008** | |
| | | | | | (-0.91) | (2.50) | |
| Lag D. People trusting others (%) | | | | | | | -17.30*** |
| | | | | | | | (-3.80) |
| Lag D. GDP per capita | | | | | | | -30.21*** |
| | | | | | | | (-2.28) |
| Constant | 113.80*** | 137.2*** | | | | | |
| | (4.61) | (-3.58) | | | | | |
| Year dummies | no | yes | yes | yes | yes | yes | yes |
| Observations | 926 | 926 | 920 | 920 | 920 | 920 | 920 |
| Number of countries | 94 | 94 | 88 | 88 | 88 | 88 | 88 |
| Kleibergen-Paap underidentification test | | | | 34.75 | | | 31.14 |
| p-value | | | | 0.000 | | | 0.000 |
| Kleibergen-Paap weak identification test | | | | 41.44 | | | 14.79 |
| Hansen J statistic | | | | 0.0391 | | | 2.512 |
| p-value | | | | 0.981 | | | 0.474 |
| Sanderson-Windmeijer test of underidentification: | | | 128.82 | | 75.26 | 788.43 | |
| P-value | | | 0.000 | | 0.000 | 0.000 | |
| Sanderson-Windmeijer test of weak identification: | | | 41.48 | | 18.13 | 189.99 | |
| P-value | | | 0.000 | | 0.000 | 0.000 | |

*Notes*: T-statistics in parentheses.
*p<0.10, ** p<0.05, *** p<0.01.
Columns 1-2 are fixed effects regressions of trust on the lag of log GDP pc, at first with no controls, and then adding year dummies. Columns 3 and 4 are the results of the first and second stages of a 2SFE estimation in which we instrument the lag of log GDP pc with log real exports and log capital stock per employee, measured in the same period as GDP pc. Columns 5 and 6 are the first stages of the 2SFD in which we instrument both the lagged first difference of GDP (column 5) and trust (column 6). Column 7 is the second stage.

The last three columns on Table 1 report the results of the 2SFD model to account for the fact that past levels of interpersonal trust may be affecting both GDP and current trust levels. In this case, we

treat both the lags of the first difference in GDP per capita and of the first difference in trust (that is, the difference between trust at time $t-1$ and $t-2$) as endogenous, and we instrument them with the lag of the logarithms of real exports and capital stock per employees, plus two previous lags of trust, measured at $t-2$ and $t-3$. The results of the two first stages are reported in columns 5 and 6, respectively for the lagged first difference in GDP pc and the lagged first difference in trust, whereas the second stage results are in column 7. First stage F-statistics suggest that our chosen instruments work well in both first stages, that is, they are relevant and excludable. The results from the second stage confirm the negative effect of previous-period increases in economic growth on current interpersonal trust.

Figure 2 Predicted vs Observed trust in US.



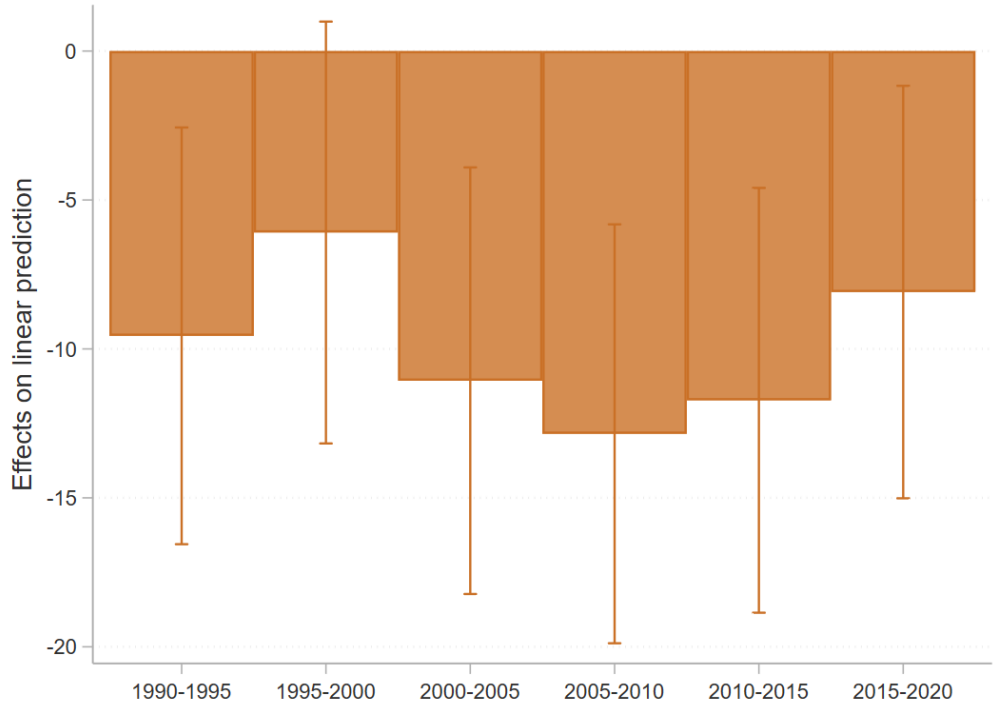

*Note: The figure shows the predicted decrease in trust using our estimates paired with observed GDP growth in the US between 1973 and 2017, and the observed decrease in trust.*

The size of the effect that we document is large: the 2SFE model indicates that one percentage point increase in lagged GDP per capita is associated to a decrease of about 0.18% in the share of people who trust others. This coefficient ranges between -0.10% and -0.30% depending on the model specification. If we accept a coefficient of 0.18 as conservative value in between the two extreme estimates, then one percentage point increase in economic growth each year, for a period of ten years, would decrease trust by 1%, and a 2.5 percent increase in economic growth for the same period would reduce trust by 2%. As a test, we predicted the decrease in the share of people trusting others in US over the same period of our analysis using observed economic growth data. Figure 2 shows that our estimated coefficient predicts a reduction of trust from 44% to about 40%. The observed decrease in trust in US was somewhat starker in the same period, as the share of people trusting others in 2017 was 33% - indicating that our estimates are conservative. We emphasize, however, that predicted trust is based on the sole causal effect of GDP, whereas the observed decrease is likely the result of various compounding effects.

Our results also confirm previous findings that trust changes over time, as its decline is – at least in part - due to economic growth (Robinson and Jackson, 2001; Algan et al., 2017; Sarracino and Mikucka, 2017). This is in contrast to some of the literature that posited that trust is instead stable over time (Uslaner, 2008; Nunn and Wantchekon, 2011; Buggle and Durante, 2021). While it is possible that trust reflects the social structure of pre-industrial societies, its levels can change as a consequence of economic, social and political factors. Our work demonstrates that economic growth has a large potential to shape societies' characteristics such as trust over time.

The effect that we document in Table 1 is consistent over time. Independently from the historical period, we observe a negative relation between GDP pc and trust within countries. Figure 3 shows that, for each 5-year period, the relationship between economic growth and interpersonal trust is negative.

### Figure 3 Heterogeneous effect of economic growth on trust over time.




*Note: marginal effects of a fixed effects regression equation of trust on the interaction between lag of log GDP per capita and time dummies.*

## A possible explanation of the paradox

In sum, available evidence points to a paradox: GDP per capita correlates positively with trust in others across countries, but over time growth in GDP per capita reduces interpersonal trust. The relation over time is robust to possible endogeneity concerns, and to the autocorrelation of trust. Is it possible that some features of economic growth, such as increasing income inequality, bear consequences on the social fabric of societies? For instance, Costa and Kahn (2003) suggest that an increase in economic inequality over time can explain the negative relationship between trust and GDP over time. There are at least a few reasons for which this can be the case. Firstly, in highly unequal societies people

tend to compete against each other for resources and opportunities; and competition reduces incentives to collaborate and trust others (Fehr and Schmidt, 1999; Brandts and Riedl, 2020). Essentially, competition and rivalry crowd-out cooperation and erode feelings of solidarity, thus reducing trust. Moreover, when the benefits of economic growth are enjoyed by a small segment of the population, that is when societies grow polarized, opportunities to enjoy shared experiences and common understandings among social strata diminish, thus harming the development of trust and social cohesion (Kanitsar, 2022).

Defensive growth theory (Bartolini and Bonatti, 2008) provides an additional reason to believe that inequality may drive the negative effect of growth on trust. Increasing income inequality expands the visibility of alternative lifestyles thus increasing the possibility to establish social comparisons. Since income and social comparisons are substitutes of social capital in individuals' utility function (Bartolini et al., 2023), people disinvest in trust when the economy grows and the possibilities of social comparisons expand, that is in the context of increasing inequality.

Table 2. Income inequality moderates the relationship between GDP per capita and trust in others.

| | Inequality below average | | Inequality above average | |
|---|---|---|---|---|
| Lag Real GDP per capita (log) | -5.32 | (-0.54) | -11.79** | (-2.17) |
| Year dummies | yes | | yes | |
| Constant | 84.32 | (0.85) | 165.51*** | (3.04) |
| Observations | 389 | | 522 | |
| Number of countries | 70 | | 86 | |
| R2 within | 0.0842 | | 0.114 | |
| R2 between | 0.287 | | 0.242 | |
| R2 overall | 0.164 | | 0.124 | |

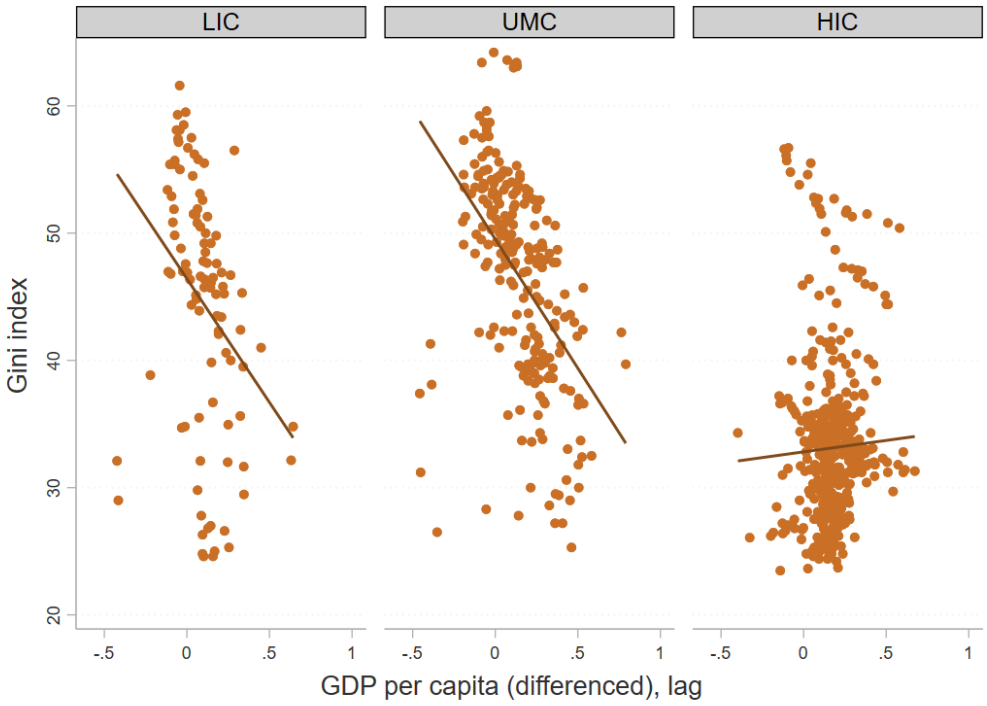
*Notes:* T-statistics in parentheses. * p<0.10, ** p<0.05, *** p<0.01. Regressions are estimated with fixed effects. Inequality is measured with the Gini index (source: World Development Indicators). Above and below average refer to the Gini index being higher or lower than the country's average over time. GDP pc is real GDP pc in 2017 US dollars.

These three explanations are not mutually exclusive, and can reinforce each other. Together, they provide reasons to expect that economic growth might erode trust in others when income inequality increases. To test this hypothesis we run our baseline fixed effects regression as specified in Equation 1 on two samples of countries, one in which inequality is higher and one in which it is lower than its within-country average. We measure inequality with the Gini index, sourced from the World Development Indicators. Results, reported in table 2, show that the negative effect of economic growth on trust over time is only statistically significant in countries in which income inequality increases more than the average (-11.79). In countries in which income inequality decreases (compared to the within-country average), the relationship is closer to zero (-0.053), and not statistically significant.

If inequality moderates the relationship between GDP per capita growth and trust, it is possible that such relationship is not homogeneous within countries. For instance, evidence indicates that GDP per capita and income inequality are positively related in rich countries, but negatively in others (see figure 4). This is possible because increasing salaries, technological progress, unionization and expansion of the welfare state could accompany the early stages of economic growth. Hence, economic growth could be negatively related to trust in others in rich countries, but such a relationship could vanish or even turn positive in low and middle-income countries. We test this possibility by expanding our

baseline regression model (equation 1) with a two-way interaction between lagged economic growth and a categorical variable indicating the development level of countries (and their respective main effects). We categorize the development levels as countries belonging to low, upper-middle or high-income groups.

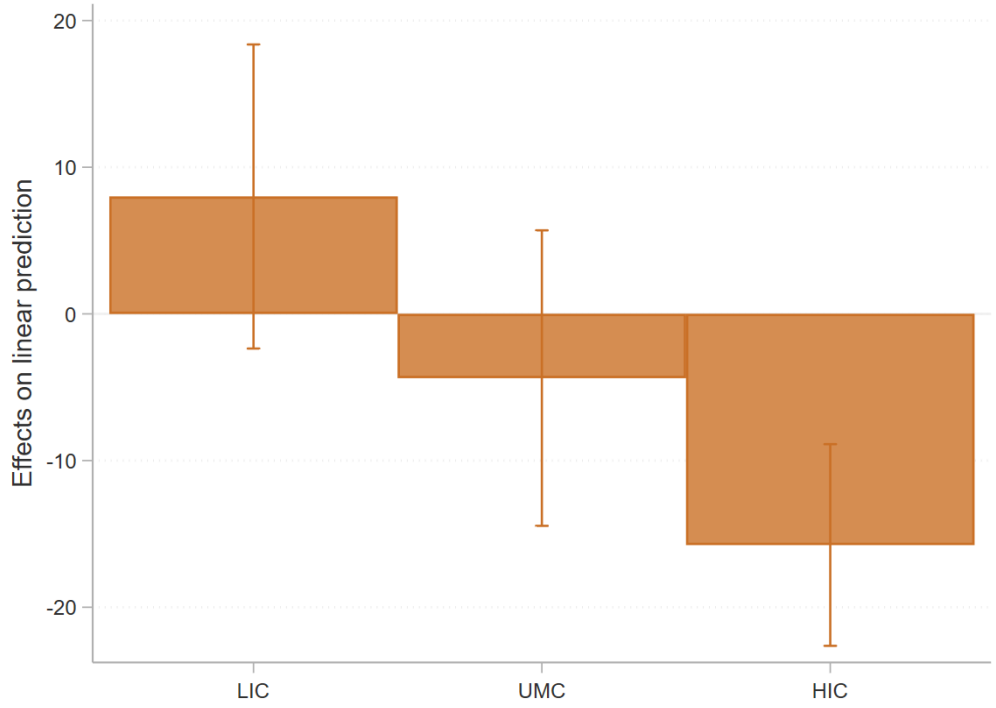
Figure 4 Correlation between economic growth and inequality across different levels of country development.




*Note: The figure shows the scatterplot of the relationship between lagged yearly economic growth (the difference of GDP per capita at time t minus GDP per capita at t-1) and the level of the Gini index. The regression line represents the linear relationship between the variables. Legend: LIC: Low Income Countries; UMC: Upper Middle income countries; HIC: High income countries. Low and low-middle income countries have been merged to keep a sufficient number of observations in the group.*

Figure 5 shows the marginal effects after the OLS with fixed effects. The coefficients indicate that the association between economic growth and trust in others over time is positive, although not statistically significant, in low-income countries. The relationship, instead, turns negative for upper-middle and high-income countries. In the first case, the marginal effect is small and not statistically significant. In the case of high-income countries, we find the expected negative and statistically significant coefficient identified in previous tests. In this case, an increase of 1% in GDP per capita correlates with a decrease of -0.16% in trust – an estimate which is very close to the one previously estimated using instrumental variables (-0.18%, see column 4 in table 1).

## Figure 5 The effect of economic growth across different levels of development




*Note: The figure shows the marginal effects from a fixed effects regression of interpersonal trust on the interaction of lagged economic growth, and a categorical variable of the development levels of countries in Low, upper middle and high income countries.*
*Legend: LIC: Low Income Countries; UMC: Upper Middle income countries; HIC: High income countries. Low and Low-middle income countries have been merged in a single category because of too little observations available for the first income group.*

## Conclusions

There are little doubts that, by creating an environment favourable to business, trust in others contributes to economic growth. However, there are reasons to believe that economic growth, especially when associated to income inequality, may decrease social capital and, as Karl Polanyi put it, reduce societies to a desert. In this chapter, we explore this possibility empirically using the largest panel dataset currently available.

Using data on the share of people who trust others from the SDR 2.0 dataset and macro-economic data from the Penn World Tables 10.01, we test whether economic growth undermines trust in others over time. We find that in a sample of 135 countries, observed between 1981 and 2017, increases in GDP per capita are associated to decreases in the share of people who trust others. Using a Two-Stages Fixed Effects (2SFE) instrumental variable approach, we additionally find causal evidence that increasing GDP per capita at time $t-1$ decreases interpersonal trust at time $t$.

The conflict between the positive cross-sectional association between GDP and trust, and their negative association over time is paradoxical. We explored the possibility that income inequality, a feature of many growing economies, might contribute to explaining the paradox. There are three possible reasons to expect a mediating role of income inequality. First, it can lead to a negative relationship between trust and GDP over time because heightened competition diminishes collaboration and trust. Secondly, when economic benefits disproportionately favour a small portion of the population, societies become polarized, reducing opportunities for shared experiences and common understandings, thus harming trust and social cohesion. Finally, income inequality fosters the possibility to establish social comparisons, which are substitutes of trust in individuals' utility function. Hence, expanding inequality during economic growth pushes people to disinvest in trust. To test the hypothesis that income inequality moderates the relation between economic growth and trust over time, we repeat our baseline analysis for the sample of countries in which income inequality increases (decreases) more than the within-country average.

Results confirm that the negative association between GDP growth and trust is a feature of countries in which economic growth is associated to increasing income inequality. Evidence indicates also that economic growth is associated to high inequality in high-income countries, whereas this is not the case in lower income countries. Hence, we further test our relationship of interest by expanding the baseline regression to include an interaction term between GDP per capita and a variable indicating the income level of countries. We found that the relationship between growth and trust is positive but not statistically significant in low-income countries where income inequality decreases with growth. However, in upper-middle and high-income countries, the association becomes negative, but significant only among rich countries: a 1% increase in GDP per capita in high-income countries correlates with a -0.16% decrease in trust, which is very close to the estimated coefficient using 2SFE. We conclude that economic growth hampers trust over time when income inequality increases.

We believe that the analysis of the relationship between economic growth and trust over time is just starting. The existence of a trust paradox calls for a better understanding of the paths of causality between the two variables, and of the conditions under which economic growth and trust can be compatible over time. For instance, the empirical evidence on the relationship between inequality and trust is not unanimous. Indeed, some authors do not find evidence of a causal relation between inequality and trust (Bergh and Bjornskov, 2014; Bergh and Ohrvall, 2018; Fairbrother and Martin, 2013). Future research should identify the features of growth that hamper trust, and provide a more thorough analysis of the individual, as well as societal pathways, via which this happens. Moreover, a

thorough investigation of the heterogeneous effects of growth on trust across countries is in order. We investigated the joint role of countries' growth and inequality, but other factors could affect the relationship between economic growth and trust. A few come to mind, such as the quality of institutions, education and government policies. The interrelation between these factors, economic growth and trust is multifaceted, and future research should tackle the conditions under which economic growth can increase trust rather than decrease it.

An implication of our results is that less developed countries who wish to grow, should be mindful of the potential negative consequences of growth on trust. Present results suggests that limiting income inequality while promoting economic growth could prevent the erosion of trust over time. It will be up to research and policy to understand how to pair sustained economic growth with trust, so that fast development does not come at the expense of having cohesive and collaborative societies.

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