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ECONOMIC GROWTH AND SOCIAL CRISIS: EXPLAINING THE AMERICAN PARADOX

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Economic growth and social crisis: explaining the American paradox

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Abstract

Over the past half century in the US, substantial economic growth coexisted with increasing inequality, and the erosion of social capital and well-being. Currently, no comprehensive explanations is available for such paradoxical mix of brilliant economic performance and social crises. We present a simple endogenous growth model showing that economic growth, the decline of social capital and well-being, and rising well-being inequality can be interconnected, mutually reinforcing phenomena. This type of growth can be described as defensive because it arises from the expenditures of households aimed at defending themselves against growth-related negative externalities, thus fostering economic growth. Defensive growth leads to a loss of well-being in the long run because, beyond a certain level of output, private prosperity is no longer able to compensate for social poverty. Along a defensive growth path, the decline of social capital disproportionately weighs on the well-being of low-income households, because of their relatively lower capacity to finance defensive spending. This prediction is consistent with the evidence showing that over the past 50 years the loser of the "pursuit of happiness" stated in the American Constitution is the working class.

Keywords: Defensive growth, social capital, relative consumption

JEL Classification: O41, I31, D31, Z13

1 Introduction

Across the last half century, the United States exhibited a paradoxical mix of economic dynamism and social crisis, offering support to the arguments of both advocates and opponents of the US socio-economic model. The most brilliant economic growth between big high-income countries coexisted with a worsening of all indicators of citizens' equality, and the erosion of social capital and well-being. The decline of American social connections has become a commonplace in a country in which in which loneliness has turned into a mass problem. As for well-being, multiple data sources of subjective and objective data exhibit a declining long-term trend. Income and wealth inequality skyrocketed, paralleled by soaring subjective well-being inequality.

The long-term coexistence of growth and declining social capital is puzzling for the economic literature on the topic. Both theoretical and empirical research point to a positive role of social capital in promoting growth and provide no explanation for their opposite coevolution. As for subjective well-being, we can find some explanation of its possible long-term decline in the empirical literature showing the strong role of relative income in shaping well-being (Clark and Senik 2010, Luttmer 2005). The drive to keep up with the Joneses thwarts the potential of economic growth to improve well-being because in a positional race anyone's gain is accompanied by another's loss, in a zero-sum game (Easterlin 1974, Easterlin et al. 2010). Furthermore, a large body of research demonstrating the significant contribution of social capital to subjective well-being suggests that the decline of the former in the US has increasingly weighed on the trend of the latter (Bartolini et al. 2013).

We provide a unique explanation of economic success and social failures in the US. We present a simple endogenous growth model that suggests that economic growth, the decline of social capital and well-being, and rising well-being inequality are interconnected, mutually reinforcing phenomena. In our model, the positive trend in GDP and the negative trends in social capital and well-being are connected by two types of growth-related negative externalities. The first are those that affect social capital, which are generated by economic growth. The second are positional externalities: in a positional competition additional winners create additional losers. In this model, negative externalities are a driver of growth because they induce defensive spending, that is, spending that individuals need to defend their absolute and relative position against negative externalities. The growth induced by defensive spending feeds back into negative externalities. This creates a self-reinforcing loop in which negative externalities fuel growth, and growth fuels negative externalities. Economic prosperity is fed by growing social poverty and, in turn, feeds it.

This type of growth can be described as defensive because it arises from the actions of individuals to defend themselves against negative externalities. Rising social poverty increases the need for defensive spending. Defensive growth leads to a loss of well-being in the long-run because, beyond a certain level of output, private prosperity is no longer able to compensate for social poverty.

Along a defensive growth path, the decline in social capital drives the well-being distribution between income groups to become increasingly inequal. The reason is that the decline of social capital disproportionately weighs on the well-being of low-income households. In fact, their welfare is more tightly connected to social capital because of their reduced access to defensive spending. In other words, the decline of social capital increases the extent to which money buys well-being, disproportionately penalizing those who can buy less. Therefore, the extent to which income disparities translate into well-being disparities, grows alongside the decline in social capital. This explanation well mimics the American time series from the last decades, that show rising subjective well-being inequality between income groups.

An alternative explanation is soaring income inequality. Between 1974 and 2024, the US Gini index of the income distribution increased from about 0.39 to around 0.49 (~25%) and it is reasonable to expect that this played a role in widening the subjective well-being difference between income groups. We perform an empirical test that suggests that the erosion of social capital played a more important role than increasing income inequality in

driving the worsening of the well-being distribution.

All in all, the US exhibits the symptoms of defensive growth. The social poverty trap described by defensive growth provides the only available comprehensive explanation for the concurring positive long-term trend of GDP and the negative trends of social capital and subjective well-being in the US. Furthermore, this explanation suggests that defensive growth may be at work in a wide range of high-income countries, although in less extreme forms than in the US, where both economic growth and the decline in social capital and subjective well-being have been relatively remarkable for decades.

The paper is organized as follows. In section 2 we review the evidence we want to explain, i.e. the decline of American social capital and happiness and the worsening of the happiness distribution between income groups. In section 3 we focus on how we want to explain such evidence, by reviewing the theoretical and empirical background of our key assumptions. Sections 4 presents the model, while section 5 discusses its predictions and the related empirical evidence. Section 6 concludes.

2 Background: the evidence to explain

2.1 Declining social capital and subjective well-being

Putnam (2000) first documented the decline in Americans' social capital over the last decades of the twentieth century. Loneliness, an example of missing social relations, has reached epidemic proportions in the US. In 2004, a quarter of Americans reported to have no one they could discuss confidential matters with. This share was 2.5 times lower than 30 years earlier (McPherson et al., 2006). In 1980, one out of five Americans over 44 years old reported to be lonely; in 2010 they were one out of three. Nearly half of them indicated that their loneliness had persisted for 6 years or more (Wilson and Moulton, 2010). As for other age groups, 80% of under 18 years old and 40% of over 65 report feeling lonely (Berguno et al., 2004; Pinquart and Sorensen, 2001; Weeks, 1994).

Increasing divorces, paralleled by declining marriages, interpersonal trust, strength of family and neighborhood ties, associational activity, solidarity, integrity, indicate a decay of social and affective connections among Americans (Gould and Hijzen, 2016; Putnam, 2000; Bartolini et al., 2013). An example of the decline of trust is provided in fig. 1.

Figure 1. Trust in others, US 1973-2013
Source: Gould and Hijzen 2016

As for subjective well-being, the US is a striking example of the Easterlin paradox – the lack of correlation over time between average subjective well-being and gdp p.c. Using data from multiple data sources, figures 2 and 3 exhibit the significant long-term decline of subjective well-being in the US, despite decades of economic growth (Blanchflower and Oswald, 2004; Stevenson and Wolfers, 2008; Sachs et al. 2017). Bartolini et al. (2013) show that declining social capital and strong social comparisons largely predict such decline.

Fig.2. Share of happy respondents, US 1974-2024

Source. US General Social Survey, own calculation

Fig. 3 . Decreasing life evaluation, US 2006-2016.
Source: Sachs 2017, Gallup World Polls.

2.2 Rising well-being inequality

Fig. 4 shows that between mid-1980s and mid-1990s the share of happy respondents began to decline in all income quintiles in the US. The higher a quintile's income, the less pronounced was such decline, and the later it began. Therefore, well-being differences between income quintiles widened over time. At the end of the period (2024), the happiness gap between income quintiles was substantially higher than at the beginning (1974). Over the course of half century, the distribution of happiness strongly worsened.

Fig.4. Share of happy respondents by income quintiles. US 1974-2024.
Source. US General Social Survey, own calculations.

Figure 5 shows the evolution of the happiness difference between the top and bottom income quintiles, a synthetic measure of subjective well-being disparities between income groups shown in fig.4. This measure has widened considerably over the period considered.

Fig.5. Happiness gap between the top and the bottom income quintile: US 1974-2024.
Source. US General Social Survey, own calculations.

In conclusion, data from the US General Social Survey - the most important source of long-term time series of our variables of interest – show widening differences in subjective well-being across income groups. Such differences are a measure of how much money buys happiness. Why did money gradually buy more happiness in the US over the last half-century?

3 Background of the key assumptions

In sections 3 we discuss the theoretical and empirical background of the model's key assumptions. Each subsection is devoted to a different literature related to our paper.

3.1 Endogenous growth

To describe the dynamics of the American economy, we use an AK endogenous growth model. Compared to the traditional version, our AK model presents three changes:

1) Economic growth generates various types of negative externalities that reduce social capital.

2) Individuals can defend their well-being from negative externalities through defensive spending.

3) Drawing on research on subjective well-being and social psychology, we modify households' utility functions (see the next section).

3.2 Utility functions

The literatures on subjective well-being and social psychology are important sources of information on utility functions (Diener et al. 2018, Kasser 2016). Drawing on such studies, we introduce three changes in the utility functions of households, compared to those commonly used in the growth literature:

a) *Social capital is an argument of utility functions.* Social capital is associated with subjective well-being across individuals, communities, countries, and over time (Helliwell and Aknin 2018, Bartolini-Sarracino 2014). The decline of social capital is a major predictor of the long-term decline of subjective well-being in the US (Bartolini et al. 2015, Sachs 2017);

b) *Relative consumption is an argument of utility functions.* The race to keep up with the Joneses plays an important role in shaping individuals subjective well-being (Clark and Senik 2010, Luttmer 2005);

c) *Social capital moderates the impact on utility of both absolute and relative income.* This assumption is based on a social psychology literature (Kasser 2016) that has found quantitative confirmation in economic studies (Barcena-Martın et al., 2017, Bartolini et al. 2023). Figure 6 shows the high correlation between the life satisfaction gap between the top and the bottom income quintiles and the share of people with high social capital in 29 European countries.

Fig. 6. The life satisfaction gap between rich and poor people is smaller in countries with a rich social life than elsewhere (29 European countries; data EU-SILC 2013.)

Source: Bartolini et al. (2023)

The correlation shown in fig. 6 is robust to the control for the Gini index of the income distribution. Why does income buy more life satisfaction where social capital is scarce?

Micro-findings from the analysis of more than 500.000 interviews from several data sources show that the motivation for this evidence is that income comparisons are related to individuals' poor social experience (Bartolini et al. 2023). The relationship between relative income and subjective well-being weakens when social capital grows. Social isolation promotes income comparisons, suggesting that people engage in the race for position as compensation for poor relationships. Put bluntly, social comparisons and the poverty of social capital appear as two faces of the same coin. This is why social poverty makes relative income more important for well-being. Social capital also moderates the relationship between absolute income and well-being.

The effects found by Bartolini et al. (2023) are large. In most of their regressions, comparing socially isolated individuals with individuals with a rich social life, the relationship between absolute income and subjective well-being is halved, while that between relative income and well-being disappears. People with rich social lives do not care about how much the Joneses earn.

In conclusion, social capital deflates the relationship between absolute and relative income and subjective well-being. This is why the more abundant social capital, the less subjective well-being income buys. These findings support the view that both absolute and relative income substitute for social capital in the utility functions of individuals. This evidence is inconsistent with the hypothesis that income variables and social capital are complements.

3.3 Economic growth and social capital

In this section we review theory and evidence supporting the view that economic growth generates negative externalities that hit social capital. Since the Industrial revolution, nineteenth-century commentators generally viewed the new economic order as having wrought devastation to social bonds. Market relationships were blamed for the decline of the traditional institutions and for the severing of social and affective ties. The romantic and conservative critics of the Industrial Revolution used to describe these effects on traditional societies ranged through 'erosion', 'corrosion', 'contamination', 'penetration', 'intrusion' to 'destruction' (Hirschmann, 1982). At the end of the 19th century sociology described the social impact of the market economy as atomistic and corrosive of social cohesion. One thinks, for example, of Durkheim's anomie or of Georg Simmel's analysis of the alienating properties of money.

Polanyi (1968) described the market economy as tending to invade every sphere of social life and thus to destroy social capital, reducing "society to a desert". This destructive power is greatest when regulations limiting market penetration are weak or absent. In the twentieth-century Hirsch (1976) emphasized that the social virtues of "truth, trust, gratitude" (Hirsch, 1976), seem negatively correlated with growth. "Because the individual behaviour has been increasingly oriented towards individual interest, instincts and habits based on communal attitudes and values has been lost" (Hirsch, 1976). 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).

Empirical evidence lends support to these views. 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. Bartolini et al. (2013) showed the coexistence of declining social capital and growth in the US. Sarracino and Slater (2025) used 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 indicate that over time trust decreases when the economy grows. The size of the effect is large: one percentage point increase in lagged GDP per capita is associated with a decrease of about 0.18% in the share of people who trust others. In other words, 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%.

O'Connor et al. (2025) provide evidence on changes of pro-social behaviors in 50, mostly rich, countries between 2005-06 and 2017-19. Pro-social behaviors include donating money, volunteering and helping unknown others. Over time, engagement in pro-social behaviour decreased in 30 out of the 50 countries considered: the average yearly change of engagement is -0.23 percentage points. Most changes are below 1 percentage point per year in absolute value. The countries where pro-social behaviour decreases at a faster rate are Switzerland, Czech Republic, Belgium and Japan. Pro-social behaviour decreases in most Western European countries, in some Latin American countries, the Philippines and South Korea as well as in North America and Australia.

The decrease is stronger in high Income countries, where engagement decreases by 0.45 percentage points per year, compared to Upper Middle Income countries, where the rate of decrease is -0.14. This decrease concerns both men and women of all ages. This is the result of a generalized decrease in donations, volunteering and helping others primarily among the Upper Middle and High Income countries.

In practice all evidence point to an opposed coevolution of social capital and GDP. This evidence is puzzling for the economic literature on social capital, which currently provides neither empirical evidence nor theoretical explanations for this. By making transactions safer and cheaper, and by improving the performance of local and national governments, social capital, and in particular trust in others, fosters economic growth (Arrow, 1972). Convincing theoretical arguments support this view. Social capital, and trust in particular, reduces the probability 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 mitigating "principal-agent" issues (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.

Robust empirical evidence support this view (Knack and Keefer, 1997; Helliwell and Putnam, 1995; Guiso et al., 2006; Algan and Cahuc, 2013; Alesina and Giuliano, 2015). Studies found positive cross-country correlations between GDP p.c. growth subsequent to the measurement of trust and civic cooperation (e.g. Knack and Keefer, 1997) or correlated period-averages of social capital and GDP per-capita (e.g. Algan and Cahuc, 2013). However, such cross-sectional correlations do not consider how GDP and social capital coevolve over time. Changes over time of social capital are not taken into account, and their relationship with growth remains undetected. The important point is that positive cross-sectional correlations between social capital and GDP coexists with their opposite coevolution over time (Sarracino and Slater 2024). For this coevolution we lack

an explanation.

3.4 Defensive spending

The concept of defensive spending is the key to why negative externalities can foster growth, thus generating the self-reinforcing loop of defensive growth.

According to Hirsch (1976), growth in advanced economies is largely due to an increase in defensive consumption, that is, the consumption induced by the negative externalities produced by growth. Agents compensate for the deterioration in common resources with the wealth of everything that is private, giving rise to the contrast typical of "affluent societies" (Galbraith's 1998).

Polanyi (1968) identified the common features of European industrialization since the second half of the 19th century. The materialistic values generated by the expansion of the market system caused the decline of social capital, undermining the traditional non-market forms of livelihood based on communal values. As a defensive reaction, workers increased their participation in the labor and product markets, further expanding the market economy. In other words, in Polanyi's view, the decline in social capital was both a cause and a consequence of economic growth. In this sense, our model could be defined as Polanyian.

Status-seeking feeds competitive spending. Studies on competitive spending – expenditures generated by the race to keep up with the Joneses - have a long tradition in economic thought dating back to Veblen. Theorethical, experimental and empirical studies documented that competitive spending is an important component of consumption in modern economies (Frank et al. 2014, Bertrand and Morse 2016, Clingingsmith and Sheremeta 2018). Competitive spending can be considered as defensive because its goal is to defend the relative position of individuals, i.e. the defense against positional externalities.

Various forms of decline in social capital may have promoted American GDP. A prominent example is guard labor. It involves the work of supervising workers, and preventing and repressing crime. In practice, it is a society's disciplinary apparatus. Guard labor is a defensive expenditure because it increases as various forms of trust, such as trust in work relationships and in safety, decline. Jayadev and Bowles' (2006) estimates on the growth of guard labor in the United States are impressive. From 1948 to 2002, the share of work supervisors and guards (police, corrections officials, and security personnel) in the total labor force soared from 10.6% to 17.9%. In 1979, guard labor still stood at 13.4%. In 2002, the share of guard labor in the US dwarfed that of any other country except the UK. Petach and Wilson updated methods and estimates of guard labor and found that its share on the workforce rose from about 19.5 percent in 1950 to 29.4 percent in 2017.

Health care spending can also be partly defensive. A vast epidemiological literature shows that both unhappiness, poor relationships, and comparisons are highly significant risk factors for health (Hawkley and Cacioppo, 2010; Kawachi et al., 1997, Wilkinson and Pickett 2009). This suggests that the decline in social capital and happiness and the rise in social comparisons have played a role in the spectacular and unparalleled takeoff of American healthcare spending since the 1980s.

Since the 1980s, American cities have spread enormously by building new suburbs. This

urban expansion underlies the construction industry boom that contributed vigorously to American growth for decades. Suburbs mixing families with different incomes have gradually disappeared from American cities. Indeed, suburbanisation is a model of spatial segregation by income, as suburbs are conceived for families with similar incomes. Segregation has increased at both ends of the income distribution: low- and high-income families are grouped residentially, exacerbating polarisation by income (Reardon and Bischoff 2011).

Insecurity and fear, especially of black criminality, have played a fundamental role in promoting American urban sprawl. Middle-class families seeking refuge in suburbs from unsafe inner city areas aimed to live among people with similar middle-class incomes. They searched for segregation by income because they perceived economic promiscuity as dangerous.

A trust crisis between different income groups and races therefore underlies urban sprawl and is closely linked to the astronomical increase in income inequality. Suburbanisation in turn fuels this crisis because in cities segregated by income, persons with different incomes do not meet and do not know each other. Residential segregation by income also causes segregation by income of services, such as schools, parks, playgrounds and widely used services. Different income groups end up having nothing in common and not knowing each other. The increasing lack of contact fuels diffidence between them. Defensive growth describes a model of urban growth that responds to a crisis in social connections by producing even fewer connections.

Estimates of the impact of defense spending on GDP and consumption suggest high figures. Defensive spending may reach 23% of consumption and 50% of GDP in high-income countries (Sarracino and Slater 2025).

3.5 Defensive growth models

There is a small literature on defensive growth, which has been modelled using endogenous and exogenous growth models as well as evolutionary games (Bartolini and Bonatti 2008, 2003A and 2003B, Antoci and Bartolini 2004). Compared to others, this defensive growth model contains four key variations: 1) households have different endowments; 2) positional externalities are present; 3) there is no labor-leisure choice; 4) costly policies for social capital are possible.

4 An AK growth model with social capital and relative income

4.1 Utility with social capital and relative income

We consider an economy where households differ in their endowments but their preferences are identical. The population mass is normalized to one. Households are indexed by

$i \in [0,1]$. $c_i \geq 0$ denotes household i's consumption. The total consumption is given by:

$$C := \int_0^1 c_i di. \tag{1}$$

The stock of social capital is denoted by S, the aggregate private capital stock by K, household i's initial endowment by k_{0i}, and aggregate endowment K_0 is given by:

$$K_0 := \int_0^1 k_{0i} di. \tag{2}$$

Denote the share of the initial endowment of household i by:

$$\kappa_i := k_{i0}/K_0. \tag{3}$$

The utility function $u : \mathbb{R}^3_+ \to \mathbb{R}$ is assumed to be twice continuously differentiable in c_i, $\bar{c}$ and S, where $\bar{c}$ is the highest consumption defined by

$$\bar{c} := \sup_i c_i.$$

We assume that the utility function satisfies:

$$\frac{\partial u}{\partial c_i} > 0, \quad \frac{\partial u}{\partial (\bar{c}/c_i)} < 0, \quad \frac{\partial^2 u}{\partial S \partial c_i} < 0, \text{and } \frac{\partial^2 u}{\partial S \partial (\bar{c}/c_i)} > 0. \tag{4}$$

Here, the relative consumption ratio $\bar{c}/c_i$ captures the social comparison faced by household i. We interpret $\bar{c}$ as the reference consumption level in society, reflecting status concerns driven by top consumption. The first two conditions imply that utility increases with own consumption but decreases with a deterioration in relative consumption status.

The cross-partial conditions imply that social capital moderates these marginal effects: as social capital increases, the marginal utility of private consumption declines, and the disutility arising from unfavorable social comparison is attenuated. These interaction effects are consistent with the empirical findings of Bartolini et al. (2023), who show that the association of absolute and relative income with subjective well-being weakens for individuals with high social capital.

We specify the utility function as

$$u(c_i, \bar{c}, S) = \varepsilon(S) \ln \left((1-\beta) c_i \left(\frac{\bar{c}}{c_i} \right)^{-\theta} \right) + E(S), \tag{5}$$

where $\beta \in (0,1)$, $\theta > 0$, $\varepsilon : \mathbb{R}_+ \to \mathbb{R}_+$, and $E : \mathbb{R}_+ \to \mathbb{R}_+$. The fraction βc_i can be interpreted as the consumption tax aimed at financing public policies supporting social capital. Effective consumption is therefore given by $(1-\beta)c_i$. The parameter θ represents the strength of the relative consumption effect. An increase in θ reduces the utility of households. $\varepsilon(S)$ is a coefficient that captures the effect of social capital on the utility derived from consumption. $E(S)$ represents the direct effect of social capital on utility. We assume that:

Assumption 1: $\varepsilon(S)$ is a strictly decreasing and strictly convex C^2 function.
Assumption 2: $E(S)$ is a strictly increasing and strictly concave C^2 function.

Under Assumption 1, the cross derivatives in (4) are satisfied.

Social capital affects utility with three channels of absolute consumption, relative consumption and the direct effect as seen:

$$\frac{\partial u}{\partial S} = \varepsilon'(S)\ln\left((1-\beta)c_i\right) - \theta\varepsilon'(S)\ln\left(\frac{\bar{c}}{c_i}\right) + E'(S). \tag{6}$$

The marginal utility of social capital strictly decreases with the household's level of consumption:

$$\frac{\partial}{\partial c_i}\left(\frac{\partial u}{\partial S}\right) = \frac{\varepsilon'(S)\left(1+\theta\right)}{c_i} < 0. \tag{7}$$

This implies that social capital becomes particularly important for poorer households.

For simplicity, we assume that $\varepsilon(S)$ is an isoelastic function:

$$\varepsilon(S) = \epsilon S^{-\eta}, \quad \epsilon > 0, \eta > 0. \tag{8}$$

It seems reasonable to assume that an increase in social capital reduces its marginal utility. Accordingly, we assume that η is sufficiently small so that the curvature of ε is smaller than that of E. Formally, we impose the following assumption:

Assumption 3: The parameter η is sufficiently small such that

$$\frac{-SE''(S)}{E'(S)} - (1+\eta) > 0$$

holds for all $S > 0$.

This assumption also imposes $-SE''(S)/E'(S) > 1$ on the direct utility of social capital. Economically, this curvature condition captures the idea that extremely low levels of social capital correspond to severe social isolation. In such situations, marginal losses of social capital translate into disproportionately large welfare losses. In the limit as $S \to 0$, utility diverges to $-\infty$, reflecting the idea that extreme social isolation entails arbitrarily severe welfare losses.

Remark 1 *Assumption 3 also plays a technical role in the analysis. It ensures that the welfare losses induced by declining social capital eventually dominate the direct gains from economic growth, thereby generating the divergence result under defensive growth. The functional form introduced in Proposition 5 satisfies this condition.*

4.2 Intertemporal competitive equilibrium

We now embed the instantaneous utility specification introduced above into a continuous-time intertemporal economy and characterize its competitive equilibrium.

Time is continuous and denoted by $t \geq 0$. Let $\rho > 0$ denote the common time discount rate across all households. A household's lifetime utility is given by

$$\int_0^\infty u(c_i(t), \bar{c}(t), S(t))e^{-\rho t}dt, \tag{9}$$

where $u(\cdot)$ is given in the previous subsection.

The productive capacity of the economy is modeled as follows. Production is of the AK type, with total factor productivity exceeding the discount rate ensuring positive growth in the absence of social capital dynamics:

$$\dot{K}(t) = AK(t) - C(t), \quad A > \rho. \tag{10}$$

Social capital evolves according to the following state equation:

$$\dot{S}(t) = \left(\frac{\beta C(t)}{\alpha K(t)} - \delta\right) S(t), \quad \alpha, \delta > 0, \tag{11}$$

This equation implies that a fraction of consumption is devoted to maintaining social capital, while market expansion—captured by the accumulation of private capital stock—is assumed to generate negative externalities that erode it. The effect of market expansion is scaled by $\alpha K(t)$. Hence, the evolution of social capital depends on the ratio of maintenance effort to market size. The parameter δ represents a critical threshold level of the maintenance-to-market ratio: when this ratio falls below δ, social capital declines.

With the specification of the instantaneous utility function in the previous subsection, the objective functional for household i can be rewritten as

$$\int_0^\infty \left\{\epsilon S(t)^{-\eta} \left(\ln(1-\beta) + (1+\theta)\ln c_i(t) - \theta \ln \bar{c}(t)\right) + E(S(t))\right\} e^{-\rho t}dt. \tag{12}$$

In the decentralized economy, each household takes the paths $S(\cdot)$ and $\bar{c}(\cdot)$ as given. Constants independent of c_i can be omitted from the objective. Household i therefore solves:

$$\begin{aligned} &\max_{c_i(\cdot)\geq 0} \int_0^\infty S(t)^{-\eta} \ln c_i(t) e^{-\rho t}dt \\ &\text{subject to } \dot{k}_i(t) = Ak_i(t) - c_i(t), \\ &\qquad k_i(0) = k_{i0} > 0,\ S(\cdot) \text{ given}, \\ &\qquad \text{and } \lim_{t\to\infty} e^{-At}k_i(t) \geq 0, \end{aligned} \tag{13}$$

where the last condition is the no-Ponzi-game condition.

We now define a competitive equilibrium for this economy.

Definition 1 *Given initial endowments* $(\{k_{i0}\}_{i\in[0,1]}, S_0)$*, a competitive equilibrium consists of household paths*

$$\{(c_i^*(t), k_i^*(t))\}_{i\in[0,1]}$$

and aggregate paths

$$(C^*(t) = \int_0^1 c_i^*(t)di, K^*(t) = \int_0^1 k_i^*(t)di, S^*(t)), \tag{14}$$

such that

1. *For each i, taking $S^*(t)$ as given, the pair $(c_i^*(t), k_i^*(t))$ solves the household problem (13) with initial condition $k_i(0) = k_{i0}$.*
2. *$S^*(t)$ satisfies (11) with initial condition $S^*(0) = S_0$.*
3. *$K^*(t)$ satisfies (10) with initial condition*

$$K^*(0) = \int_0^1 k_{i0}di. \tag{15}$$

The Hamiltonian associated with (13) is defined as

$$H(c_i, k_i, \lambda, t) := S(t)^{-\eta} \ln c_i + \lambda(Ak_i - c_i). \tag{16}$$

The solution $(c_i^*(t), k_i^*(t))$, if it exists, is unique because the Hamiltonian is concave in (c_i, k_i) and concave in c_i. The solution is interior in consumption since $\lim_{c_i\to 0} \partial u/\partial c_i = \infty$.

A solution $(c_i^*(t), k_i^*(t))$ with associated costate variable $\lambda(t)$ satisfies

$$\frac{S^*(t)^{-\eta}}{c_i^*(t)} - \lambda(t) = 0, \tag{17}$$

$$\dot{\lambda}(t) = -\lambda(t)(A - \rho), \tag{18}$$

together with the transversality condition[1]

$$\lim_{t\to\infty} e^{-\rho t}\lambda(t)k_i^*(t) = 0. \tag{19}$$

Substituting the solution to (18) into the transversality condition (19) yields

$$\lim_{t\to\infty} e^{-At}k_i^*(t) = 0. \tag{20}$$

so the no-Ponzi-game condition in (13) holds with equality. These conditions are also sufficient for optimality by Mangasarian's sufficiency theorem.

Denote by $g_c(t)$ the growth rate of consumption. From the first-order conditions (17) and (18), we obtain

$$g_c(t) = \frac{\dot{c}_i^*(t)}{c_i^*(t)} = A - \rho - \eta\frac{\dot{S}^*(t)}{S^*(t)}. \tag{21}$$

[1]For the necessity of the transversality condition, see Kamihigashi (2000).

The right-hand side does not depend on i. Hence, the growth rate $g_c(t)$ is common across households, and all households' consumption grows at the same rate.

From (10), (11), and (21), the decentralized equilibrium dynamics can be summarized by a closed system of differential equations in the aggregate variables. A competitive equilibrium in the aggregate is therefore characterized by the following system, given initial endowments K_0 and S_0:

$$\dot{C}^*(t) = \left(A - \rho - \eta \frac{\dot{S}^*(t)}{S^*(t)} \right) C^*(t), \tag{22}$$

$$\dot{K}^*(t) = AK^*(t) - C^*(t), \tag{23}$$

$$\dot{S}^*(t) = \left(\frac{\beta C^*(t)}{\alpha K^*(t)} - \delta \right) S^*(t), \tag{24}$$

We now state the equilibrium characterization in terms of aggregate variables.

Proposition 1 *(i) $(C^*(t), K^*(t), S^*(t))$ is a competitive equilibriumin in the aggregate if and only if it solves (22)-(24) with initial values $K_0 > 0$ and $S_0 > 0$, and satisfies the transversality condition*

$$\lim_{t \to \infty} e^{-At} K^*(t) = 0. \tag{25}$$

(ii) The consumption growth rate is identical across all households and therefore coincides with the growth rate of aggregate consumption.

Proof. See Appendix. ■

Proposition 1 shows that the heterogeneous-household economy admits a sharp aggregate representation: once aggregated, the equilibrium dynamics are fully characterized by the three-dimensional system in $(C^*(t), K^*(t), S^*(t))$. Importantly, although households differ in their initial wealth, the equilibrium growth rate of consumption is common across households and coincides with the aggregate growth rate. Thus, heterogeneity affects levels but not growth rates.

This property has two immediate implications. First, disparities between rich and poor do not shrink. Since consumption and private capital growth rates are identical across households, the Gini coefficients of consumption and wealth distribution remain constant. Second, as long as consumption grows at a positive rate, absolute differences in consumption levels continue to widen. Hence, economic growth does not eliminate disparities, even though it leaves their relative structure unchanged.

A further implication concerns relative consumption. Along the equilibrium path, the effect of relative consumption on utility depends on the level of social capital. As social capital declines, the effect of relative consumption becomes stronger.

4.3 Dynamics

In this subsection, we analyze the dynamics of the competitive equilibrium in the aggregate. The system (22)–(24) can be rewritten as:

$$\frac{\dot{C}^*(t)}{C^*(t)} = \left(A - \rho - \eta \left(\frac{\beta C^*(t)}{\alpha K^*(t)} - \delta \right) \right), \tag{26}$$

$$\frac{\dot{K}^*(t)}{K^*(t)} = A - \frac{C^*(t)}{K^*(t)}. \tag{27}$$

We introduce the state variable

$$\chi(t) := \frac{C^*(t)}{K^*(t)}. \tag{28}$$

The aggregate dynamics can be reduced to the evolution of the consumption-capital ratio $\chi(t)$:

$$\dot{\chi}(t) = \chi(t) \left(q\chi(t) - p \right), \tag{29}$$

where

$$p = \rho - \eta\delta, \quad q = 1 - \eta\beta/\alpha. \tag{30}$$

The differential equation (29) admits the explicit solution

$$\chi(t) = \frac{\chi_{ss}}{1 - \left(1 - \chi_{ss}/\chi(0)\right) e^{pt}}, \tag{31}$$

where

$$\chi_{ss} := \frac{p}{q} = \frac{\rho - \eta\delta}{1 - \eta\beta/\alpha}. \tag{32}$$

The differential equation (29) admits two stationary points: 0 and $\chi_{ss} = p/q$, where the latter is defined purely as a mathematical stationary solution and may, in principle, take negative values. However, not all stationary points correspond to admissible competitive equilibria. As shown in the proof of Proposition 2, the case $\chi_{ss} < 0$ violates the transversality condition or leads to finite-time capital exhaustion. Hence any admissible equilibrium requires $\chi_{ss} > 0$. We now state the following result:

Proposition 2 *Any competitive equilibrium path converges to the interior steady state* $\chi_{ss} > 0$.

Proof. See Appendix. ■

Proposition 2 implies that $pq > 0$, which ensures that the interior steady state is strictly positive. The steady state χ_{ss} is unstable when $p > 0$ and $q > 0$, whereas it is stable when $p < 0$ and $q < 0$. In the former case, the competitive equilibrium is unique. Although the equilibrium is indeterminate in the latter case, the long-run outcome coincides with that in the former case. We therefore focus on the former case. Formally, we impose the following assumption, which is consistent with Assumption 3.

Assumption 4: The parameter η is sufficiently small such that

$$p = \rho - \eta\delta > 0 \text{ and } q = 1 - \eta\beta/\alpha > 0. \tag{33}$$

Under Assumption 4, combining (26), (27), and (32), we obtain the following result.

Proposition 3 *(i) The equilibrium path is a balanced growth path along which*

$$\frac{C^*(t)}{K^*(t)} = \frac{c_i(t)}{k_i(t)} = \frac{c_{i0}}{k_{i0}} = \chi_{ss}. \tag{34}$$

(ii) The equilibrium growth rates are given by

$$g_K = g_C = A - \rho\frac{1 - \eta\delta/\rho}{1 - \eta\beta/\alpha}, \tag{35}$$

which are common across all households and independent of the initial endowments $(K_0, \{k_{i0}\}_{i\in[0,1]}, S_0)$. *Moreover,*

$$g_S = -\rho\frac{\delta/\rho - \beta/\alpha}{1 - \eta\beta/\alpha}. \tag{36}$$

As seen from (35), the economic growth rate may be either positive or negative. Empirically, however, all countries exhibit positive long-run growth. We therefore impose the following assumption for the subsequent analysis.

Assumption 5: The final-good sector is sufficiently productive such that

$$A - \rho\frac{1 - \eta\delta/\rho}{1 - \eta\beta/\alpha} > 0. \tag{37}$$

We now state one of the main results of this section.

Proposition 4 *There are two types of equilibrium economic growth: fast economic growth and slow economic growth.*

If

$$\frac{\beta}{\alpha} < \frac{\delta}{\rho}, \tag{38}$$

then fast economic growth constitutes a competitive equilibrium, in which social capital declines. We define such growth path as defensive growth.

By contrast, if

$$\frac{\beta}{\alpha} > \frac{\delta}{\rho}, \tag{39}$$

slow economic growth constitutes a competitive equilibrium, in which social capital increases.

Proof. From (35) and (36), the equilibrium growth rate satisfies

$$g_K = g_C = A - \rho - \eta g_S. \tag{40}$$

From (36), we have

$$g_S \lessgtr 0 \text{ if } \frac{\beta}{\alpha} \lessgtr \frac{\delta}{\rho}. \tag{41}$$

■

To clarify the role of social capital, we compare these results with the standard AK model without social capital:

$$\max_{C(\cdot)\geq 0} \int_0^\infty \ln C(t) e^{-\rho t} dt \text{ subject to } \dot{K}(t) = AK(t) - C(t),\ K(t) \geq 0,\ K(0) = K_0. \tag{42}$$

As is well known, the associated competitive equilibrium path satisfies

$$C^*(t) = \rho K^*(t) \text{ and } g_K = g_C = A - \rho. \tag{43}$$

Introducing social capital into the standard AK framework therefore alters the equilibrium growth rate, which can now be either higher or lower than $A - \rho$. A higher growth rate is associated with declining social capital, whereas a lower growth rate is associated with increasing social capital.

Faster growth is driven by the following effect of social capital. When households anticipate a decline in social capital, they attempt to offset the resulting future loss in utility by increasing their ability to finance future consumption. To this goal, they accumulate more private capital, which leads to a higher economic growth rate. The resulting market expansion proceeds at a pace that feeds the erosion of social capital, thereby making its anticipated decline self-fulfilling. Along such growth path, households resort to defensive consumption, i.e. they use consumption as a defense against the damage brought by negative externalities to both their absolute and relative position. This is why we term this path defensive growth. Public policies have a role: the greater the societal investment in social capital, the lowest the probability and the strength of defensive growth.

Conversely, when households anticipate an increase in social capital, the motive for defensive saving disappears. Households then raise current consumption and accept a lower growth rate that allows social capital to accumulate. In this case, expectations of rising social capital also become self-fulfilling.

Finally, in the present model, the strength of relative consumption does not affect the equilibrium growth rates. However, it plays a non-trivial role in shaping welfare outcomes along the defensive growth path, as shown in the next subsection.

This neutrality result reflects the additively separable specification of instantaneous utility. In more general environments allowing for richer interaction channels, relative consumption may affect equilibrium growth rates.

4.4 Welfare analysis

We now turn to the welfare consequences of the equilibrium paths.

Denote by $v_i(t)$ household i's instantaneous utility at time t along an equilibrium path:

$$v_i(t) := \epsilon S^*(t)^{-\eta} \left\{(1+\theta)\ln c_i^*(t) - \theta \ln \bar{c}^*(t) + \ln(1-\beta)\right\} + E(S^*(t)). \tag{44}$$

We first show that, under a curvature condition, defensive economic growth eventually leads instantaneous utility to diverge to $-\infty$. The curvature condition $\sigma > \eta$ below is consistent with Assumptions 3 and 4 in the previous subsections.

Proposition 5 *Assume that*

$$E(S) = -h_1 S^{-\sigma} + h_2, \quad \sigma > \eta,\ h_1 > 0,\ h_2 \in \mathbb{R}. \tag{45}$$

Then, along a defensive growth path (i.e., $g_K > A - \rho$ and $g_S < 0$), there exist $t^* \geq 0$ such that $v_i(t)$ attains a maximum on $[0, \infty)$ at t^*, is strictly decreasing on (t^*, ∞), and satisfies

$$\lim_{t \to \infty} v_i(t) = -\infty. \tag{46}$$

Proof. See Appendix. ■

Proposition 5 implies that defensive economic growth is ultimately harmful to well-being. Although economic expansion may initially raise utility, the persistent erosion of social capital eventually dominates, driving instantaneous utility to negative infinity.

Remark 2 *It is worth noting that the time t^* characterized in Proposition 5 need not correspond to a global maximum of instantaneous utility. In particular, it is theoretically possible that $v_i(t)$ initially decreases from $t = 0$, subsequently increases, and attains a local maximum at t^*, before eventually declining toward $-\infty$.*

In such a case, although instantaneous utility rises over some interval prior to t^*, it may remain below its initial level. This configuration may be interpreted as capturing situations in which individuals experience temporary improvements in well-being, yet, when reflecting on the distant past, perceive themselves as having been better off previously.

Proposition 5 establishes the result under a specific functional form for $E(S)$. The next proposition shows that a similar qualitative outcome holds under a more general curvature condition imposed only locally for sufficiently small values of social capital.

Proposition 6 *Assume that $E(S)$ is strictly increasing and that there exists $\bar{S} > 0$ such that $E(S)$ on $(0, \bar{S})$ satisfies*

$$\inf_{0 < S < \bar{S}} \left(-\frac{SE''(S)}{E'(S)} \right) > 1 + \eta. \tag{47}$$

Then, for each household i, along a defensive growth path, there exists a time

$$\tau := \inf\{t \geq 0 : S^*(t) < \bar{S}\}, \tag{48}$$

such that for all $t \geq \tau$,

$$v_i(t) \leq \bar{v}_i(t), \tag{49}$$

where $\bar{v}_i(t)$ is a strictly decreasing function with

$$\lim_{t\to\infty} \bar{v}_i(t) = -\infty. \tag{50}$$

Consequently,

$$\lim_{t\to\infty} v_i(t) = -\infty. \tag{51}$$

Proof. See Appendix. ■

Proposition 6 shows that the divergence result does not rely on the specific isoelastic specification in (**??**), but follows from a local curvature condition imposed only for sufficiently small values of social capital.

We next characterize how income levels, as captured by the initial endowment share κ_i, affect the tipping time t^*.

Proposition 7 *Let households i and j satisfy $\kappa_i < \kappa_j$. Suppose they have tipping times $t^*(i)$ and $t^*(j)$ along a defensive growth path. Then*

$$t^*(i) < t^*(j).$$

Proof. See Appendix. ■

Proposition 7 indicates that utility losses driven by declining social capital emerge earlier for poorer households. During the period in which wealthier households continue to experience utility gains from economic growth, poorer households already face declining utility. This intertemporal asymmetry is a distinctive feature of defensive growth, under which economic expansion coincides with social capital erosion.

Proposition 8 *Let households i and j satisfy $\kappa_i < \kappa_j$. Define*

$$D(t) := v_j(t) - v_i(t).$$

Then, along a defensive growth path,

$$\frac{dD(t)}{dt} > 0.$$

Proof. See Appendix. ■

Proposition 8 concerns inequality in utility rather than inequality in consumption. Along the equilibrium path, all households share the same consumption growth rate. Consequently, as long as economic growth persists, consumption inequality expands mechanically over time.

By contrast, utility inequality depends critically on the evolution of social capital. The widening of utility inequality characterized in Proposition 8 arises specifically under defensive growth, when economic expansion is accompanied by declining social capital.

If instead social capital accumulates, utility inequality narrows.[2] This result reflects two mechanisms. First, the transmission of consumption inequality into utility inequality, mediated by relative consumption, weakens as social capital increases. Second, although rising social capital generates utility gains for all households, its marginal utility is larger for poorer households. As a result, increases in social capital compress utility inequality.

Finally, we examine how the strength of relative consumption affects welfare outcomes. Although θ does not alter the equilibrium growth path, it may influence the timing and magnitude of welfare losses under defensive growth.

The following proposition formalizes this effect. Define household i's total lifetime utility along the equilibrium path as

$$V_i(\theta) := \int_0^\infty v_i(t;\theta)e^{-\rho t}dt. \tag{52}$$

Proposition 9 *Consider two economies that are identical except for the strength of relative consumption, indexed by θ. Let $\theta_1 < \theta_2$. Then the following statements hold along the associated defensive growth paths.*

(i) For any household i, provided that tipping points $t^*(i;\theta_k)$, $k = 1, 2$, exist,

$$t^*(i;\theta_1) \geq t^*(i;\theta_2), \tag{53}$$

with strict inequality whenever $\kappa_i < \bar{\kappa}$.

(ii) For any household i such that $\kappa_i < \bar{\kappa}$,

$$V_i(\theta_1) > V_i(\theta_2). \tag{54}$$

Proof. See Appendix. ■

Proposition 9 shows that stronger relative consumption accelerates the onset of welfare decline under defensive growth. While aggregate growth remains unchanged, higher θ shifts the tipping time forward and reduces lifetime utility for all households except the richest. In this sense, relative consumption concerns magnify the welfare costs of social capital erosion without affecting aggregate growth.

[2] This follows from the sign of $dD(t)/dt$ when $g_S > 0$; see Equation (A18) in the Appendix.

5 Discussion

5.1 Predictions

In our model, the economy may exhibit two possible patterns:

a) a positive economic growth rate and a positive social capital growth rate;

b) a positive economic growth rate and a negative social capital growth rate

We define pattern b) as defensive growth. A defensive growth dynamics exhibits 4 testable predictions:

1) shrinking social capital

2) after a certain threshold, the well-being of agents declines

3) The economy is driven into defensive growth by the scarcity of its investment in social capital (α) and by the strength of negative externalities affecting social capital (β). Holding all else constant, the smaller the investment in social capital and the stronger negative externalities, the greater the probability of the economy falling into a defensive growth trap.

4) Well-being disparities between income groups rise, despite the stability of the income distribution (all agents accumulate private capital at the same rate). The reason for such worsening of the well-being distribution is that the lower the income, the more the loss of social capital weighs on well-being. In fact, the erosion of social capital increases the marginal utility of both absolute and relative income because both types of income allow individuals to finance defensive spending. However, low-income individuals can afford a relatively lower amount of such spending. As a result, the extent to which income disparities translate into well-being disparities increases with the erosion of social capital.

5.2 Evidence

We have already seen that the first two predictions are consistent with the evidence from American time series.

Regarding prediction 3), among industrial countries, the United States is the nation most shaped by neoliberal ideas that became dominant since the 1980s. Margaret Thatcher summarized the neoliberal view on social capital thus: "there is no such thing as society; there are only individuals." Predictably, the decisions of a political system influenced by the idea that society does not matter—like the American one—have paid little attention to social capital. If such little attention is a condition for a country to remain trapped in defensive growth, then there is no more plausible candidate than the United States.

As for prediction 4), it is compatible with the data on the worsening distribution of well-being in the United States presented in Section 2. Obviously, there is at least another intuitive explanation: the distribution of well-being has worsened because the distribution of income has worsened. Therefore, we check to what extent the evolution over time of various measures of the happiness gap between rich and poor people is predicted by the evolution of trust and income inequality, controlling for GDP p.c. In tab. 1 we report the findings from regressions of the time series of the happiness gap between the top and

the bottom income quintiles (or deciles) on the time series of trust, the Gini index of the income distribution, and GDP p.c.

Tab. 1. Social degradation or income inequality? Predictors of the increase in the rich/poor happiness gap in the US.

Table 1: Regression Results

	Gap D10-D1		Gap Q5-Q1	
	(1)	(2)	(3)	(4)
GDP per capita (constant 2015 US$)	3.415***	1.541	2.450***	2.635**
	(3.59)	(0.66)	(3.61)	(2.73)
Generalized Trust (%)	-1.691***	-1.657***	-1.075***	-1.079***
	(-2.83)	(-2.97)	(-4.08)	(-4.02)
Gini Index		1.880		-0.186
		(0.91)		(-0.19)
Constant	19.630***	19.590***	17.050***	17.060***
	(18.93)	(19.25)	(21.10)	(20.86)
Observations	32	32	32	32
R-squared	0.454	0.443	0.429	0.429

Note: t-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Note:

1. The dependent variable of regressions 1 and 2 is the happiness gap between the top and the bottom income decile. In regressions 3 and 4 the dependent variable is the happiness gap between the top and the bottom income quintile.

2. The trust variable is the share of high trusting individuals over the total population. Three forms of trust are considered: general trust in others, trust in others' fairness, trust in others' solidarity

3. All variables have been standardized to ease comparisons among coefficients. T-statistics in parentheses. * p<0.10, ** p<0.05, *** p<0.01

The coefficient of trust is negative, big and highly significant in all regressions, whereas the coefficient of the Gini index is always non-significant. The hypothesis that the worsening of happiness distribution may depend on the worsening of the income distribution is inconsistent with these estimates. This result suggests that the decline in trust played a much bigger role than increasing income inequality in driving the worsening of the well-being distribution in the US. GDP and trust seem to be the only things that matter to how much money buys happiness.

The significance and substantial size of the GDP coefficient are compatible with the idea that growth was associated in the US with the reduction of other common goods, beyond

social capital. These reductions could have played a role in amplifying differences in well-being between income groups, independent of the drop in social capital. For example, one could think of negative environmental externalities or the reduction of public safety nets. There are other commons beyond social capital that have been shrinking along American growth, as the environment and the welfare state.

Further favorable evidence to a social capital-based explanation of the worsening distribution of happiness is suggested by the test in fig. 7. It compares, for each income quintile, the average happiness levels of individuals with low trust and high trust.

Fig. 7. How much do differences in trust matter for the well-being of individuals with different incomes? Micro analysis using interaction between trust and quintiles.

Source. Own calculation, GSS data

In every income quintile in fig. 7, high trusting individuals are happier than low trusting ones. However, the poorer the quintile, the greater the happiness gap between high and low trust individuals. In other words, social capital matters more for low-income people than others. Its importance in determining the difference in happiness between people with low or high trust increases as their incomes decrease.

All in all, empirical findings from this section suggest a strong role for the erosion of social capital in determining the widening happiness gap between American income groups.

6 Conclusion: Our message

In our AK model the economy can grow faster than in the standard model, because negative externalities stimulate defensive consumption. The stronger the negative externalities and the weaker the policies that protect social capital, the more likely an economy will be trapped into defensive growth.

This has an implication for growth theory: positive externalities - which in AK models off-set diminishing returns to capital - are not the only source of perpetual growth in our model. Negative externalities are an engine of growth as well. Indeed, our modifications to the AK model generate a self-reinforcing mechanism in which growth generates negative externalities and negative externalities generate growth.

Several signs from the last half-century suggest that the United States may be in a defensive growth trap. The American conflict between economic dynamism and social crises may be only apparently paradoxical because it may reflect coherent aspects of defensive growth. Part of the American economic growth may not be a sign of economic health but a cause and a consequence of social distress. To what extent is an open question. Estimates for the US economy of the crucial parameters of our model are lacking. At present, a substantial role for defensive growth in the American GDP dynamics over the past half century is just a hypothesis, supported by some evidence. However, it may be worthy of further study. To the best of our knowledge, defensive growth is the only approach able to explain the concurrent trends of GDP, social capital, subjective well-being and well-being

inequality between income groups. Importantly, it is the only available explanation for the negative relationship between social capital and GDP over time.

We provide evidence that the decline in social capital contributed to the worsening of the distribution of subjective well-being across income groups. This is consistent with a defensive growth pattern, in which the decline in social capital increases the extent to which money buys well-being, because income provides access to defensive spending. As a result, the well-being gap between income groups increases.

This is consistent with the evidence from the US time series on subjective well-being. Against a background of general decline in happiness, low-income groups experienced not only absolute losses of happiness but also relative losses. Low-income people have not only become unhappier, like anyone else, but they are also increasingly unhappier than everyone else. In other words, the true loser of the "pursuit of happiness" stated in the American Constitution is the working class.

This conclusion is consistent with a literature that highlights the sharp deterioration of the health and quality of life of the American working class - especially the white one (Case and Deaton 2025, Graham and Pinto 2018). We contribute to this literature by emphasizing the key role of declining social capital in shaping the absolute and relative loss of subjective well-being by low-income groups.

Our findings suggest that policies for social capital may complement income redistribution, moderating the impact of income inequality on the well-being distribution. This view echoes the widespread argument that public schooling and healthcare have a redistributive impact. Social capital, similar to public healthcare and schooling, is a common and expanding any common has an equalizing impact on well-being because the access to common goods is independent of income. For this reason, the impact of income inequality on well-being is influenced by the commons that individuals share. The scarcity of common goods makes money very important because it enhances its role as a source of well-being.

The decline in social capital makes both absolute and relative income more important for well-being because they allow access to defensive spending that protects both the absolute and relative positions of agents from negative externalities. Due to its reduced ability to finance defensive spending, the American working class ended up paying the highest price for the decline of social capital. These results are consistent with those obtained by Bartolini et al. (2023) in a cross-countries analysis.

Our estimates do not support a strong role for growing income inequality in shaping the rise of well-being inequality. Our findings suggest that a loss in the well-being of working-class Americans relative to higher income groups may have occurred even if income inequality had not skyrocketed. Overall, our paper indicates that the hypothesis that the crisis of social capital is a key to the dissatisfaction of the working class in the US should be taken seriously and deserve further investigation.

Several scholars point to the crisis of dissatisfaction of the white working class as a driving force of its MAGA support. By suggesting that the degradation of social capital lies at the core of crisis of the working class, our paper is consistent with studies finding that lower levels of social relatedness fostered Trump's vote in 2016 presidential vote (Fabian et al. 2023).

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A Appendix

A.1 Proof of Proposition 1

(i) (Necessity) Assume that $(C^*(t), K^*(t), S^*(t))$ is a competitive equilibrium in the aggregate. This implies that (22) – (24) are satisfied. Moreover, from (20), we have the transversality condition (25):

$$\lim_{t\to\infty} e^{-At}K^*(t) = \lim_{t\to\infty} \int_0^1 e^{-At}k_i^*(t)di = 0. \tag{A1}$$

(Sufficiency) Assume that (22) – (25) hold. Then the second condition in Definition 1 (the state equation for $S(t)$ in (11)) is satisfied. Define

$$(c_i^*(t), k_i^*(t)) = \kappa_i(C^*(t), K^*(t)) \tag{A2}$$

for each $i \in [0, 1]$. Conditions (22) – (25) then imply, by Mangasarian's sufficiency theorem, that $(c_i^*(t), k_i^*(t))$ solves problem (13) for each i, which establishes the first condition in Definition 1.

(ii) It follows from (21).

A.2 Proof of Proposition 2

Since a solution to (29) is monotonic, there are three cases: $\chi(t)$ diverges monotonically to $+\infty$, converges monotonically to 0, or converges monotonically to a finite number. The last case corresponds to $\lim_{t\to\infty}\chi(t) = \chi_{ss} > 0$. Therefore, the statement is proved if we show that the former two cases are ruled out.

First consider the case in which $\chi(t)$ diverges to $+\infty$. From (29), this requires $q > 0$. If $p > 0$, then $\chi_{ss} > 0$ and divergence occurs in a finite time

$$\bar{t} = \frac{1}{p}\ln\frac{1}{1-\chi_{ss}/\chi(0)} < \infty, \tag{A3}$$

with the initial value $\chi(0) > \chi_{ss}$. If $p < 0$, then $\chi_{ss} < 0$ and divergence again occurs at a finite time such that

$$\bar{t} = \frac{1}{-p}\ln\left(1-\chi_{ss}/\chi(0)\right) < \infty, \tag{A4}$$

with initial value $\chi(0) > 0$. In either case, divergence occurs in finite time. This implies both $K^*(t)$ and $C^*(t)$ collapse to zero after $\bar{t}$, which is incompatible with the household's problem (13). This contradiction rules out the possibility of finite-time divergence.

Next, consider the case in which $\chi(t)$ converges monotonically to 0. We show that the transversality condition (25) cannot be satisfied along such a path. From (27) and (28), we obtain

$$e^{-At}K^*(t) = K_0 e^{-\int_0^t \chi(s)ds}. \tag{A5}$$

The integral on the right-hand side can be computed explicitly as

$$\begin{aligned}\int_0^t \chi(s)ds &= \int_0^\infty \frac{\chi_{ss}}{1-(1-\chi_{ss}/\chi(0))\,e^{ps}}ds \\ &= \chi_{ss}t - \frac{\chi_{ss}}{p}\ln\left|1-\left(1-\frac{\chi_{ss}}{\chi(0)}\right)e^{pt}\right| + \frac{\chi_{ss}}{p}\ln\left|\frac{\chi_{ss}}{\chi(0)}\right|. \end{aligned} \tag{A6}$$

Taking the limit as $t \to \infty$, we obtain

$$\begin{aligned}&\int_0^\infty \chi(s)ds \\ &= \lim_{t\to\infty}\left(\chi t - \frac{\chi_{ss}}{p}\ln\left|1-\left(1-\frac{\chi_{ss}}{\chi(0)}\right)e^{pt}\right|\right) + \frac{\chi_{ss}}{p}\ln\left|\frac{\chi_{ss}}{\chi(0)}\right| \\ &= \lim_{t\to\infty}\left(\chi_{ss}t - \chi_{ss}t - \frac{\chi_{ss}}{p}\ln\left|1-\frac{\chi_{ss}}{\chi(0)}\right|\right) + \frac{\chi_{ss}}{p}\ln\left|\frac{\chi_{ss}}{\chi(0)}\right| \\ &= -\frac{\chi_{ss}}{p}\ln\left|1-\frac{\chi_{ss}}{\chi(0)}\right| + \frac{\chi_{ss}}{p}\ln\left|\frac{\chi_{ss}}{\chi(0)}\right| < \infty. \end{aligned} \tag{A7}$$

Hence, $\lim_{t\to\infty} e^{-At}K^*(t) \neq 0$, violating the transversality condition. This completes the proof.

A.3 Proof of Proposition 5

For the proof, we prepare the following lemma.

Lemma 10 *Let $a \in \mathbb{R}$, $b > 0$, $\gamma > 0$, and $\xi > 0$. Define $f : \mathbb{R}_+ \to \mathbb{R}$ by*

$$f(t) := a + bt - e^{\gamma t} \tag{A8}$$

and $g : \mathbb{R}_+ \to \mathbb{R}$ by

$$g(t) := f(t)e^{\xi t}. \tag{A9}$$

Then there exists $t^* \geq 0$ at which g attains its maximum. Moreover, g is strictly decreasing on (t^*, ∞) and satisfies

$$\lim_{t\to\infty} g(t) = -\infty. \tag{A10}$$

Proof. We first show (A10). Since the exponential term dominates the linear term, we have $\lim_{t\to\infty} f(t) = -\infty$. Because $e^{\xi t} > 0$, it follows immediately that $\lim_{t\to\infty} g(t) = -\infty$.

Next, we establish the existence of t^* at which g attains its maximum and show that g is strictly decreasing on (t^*, ∞). Define

$$h(t) := f'(t) + \xi f(t) = b - \gamma e^{\gamma t} + \xi(a + bt - e^{\gamma t}). \tag{A11}$$

Then

$$g'(t) = h(t)e^{\xi t}. \tag{A12}$$

Since $e^{\xi t} > 0$, the sign of $g'(t)$ coincides with the sign of $h(t)$. Differentiating, we obtain

$$h'(t) = -\gamma^2 e^{\gamma t} + \xi(b - \gamma e^{\gamma t}),$$
$$h''(t) = -\gamma^2(\gamma + \xi)e^{\gamma t} < 0.$$

Hence h is strictly concave and therefore attains a unique maximum at

$$t_M = \frac{1}{\gamma} \ln \frac{b\xi}{\gamma(\gamma + \xi)}.$$

If the maximal value $M := h(t_M) \leq 0$, then $h(t) \leq 0$ for all t, so $g'(t) \leq 0$ for all t, with strict inequality except possibly at t_M. In this case g is strictly decreasing on $(0, \infty)$, and we set $t^* = 0$.

If $M > 0$, then h has exactly two zeros $t_1 < t_M < t_2$. Since $h(t) < 0$ for $t > t_2$, we have $g'(t) < 0$ for all $t > t_2$. Thus g attains its maximum at $t^* := \max\{0, t_2\}$ and is strictly decreasing on (t^*, ∞). This completes the proof. ■

Proof of Proposition 5

Let $\bar{\kappa} := \sup_i \kappa_i$. (44) is rewritten as

$$\begin{aligned} v_i(t) &= \epsilon(S_0)^{-\eta} e^{-\eta g_S t} \left\{\ln(1-\beta) + (1+\theta)\ln\kappa_i - \theta \ln\bar{\kappa} + \ln(\chi_{ss}K_0) + g_K t\right\} + E(S_0 e^{g_S t}) \\ &= h_1 S_0^{-\sigma} \left(a + bt - e^{\gamma t}\right) e^{\xi t} + h_2, \end{aligned} \tag{A13}$$

where

$$\begin{aligned} a &= \epsilon(S_0)^{\sigma-\eta} \left\{\ln(1-\beta) + (1+\theta)\ln\kappa_i - \theta\ln\bar{\kappa} + \ln(\chi_{ss}K_0)\right\}/h_1, \\ b &= \epsilon(S_0)^{\sigma-\eta} g_K/h_1 > 0, \\ \gamma &= (\eta - \sigma)\, g_S > 0, \end{aligned}$$

and

$$\xi = -\eta g_S > 0.$$

Since $b > 0$, $\gamma > 0$, and $\xi > 0$, Lemma 10 applies directly. Hence, $v_i(t)$ attains a maximum at some $t^* \geq 0$, is strictly decreasing on (t^*, ∞), and satisfies

$$\lim_{t\to\infty} v_i(t) = -\infty.$$

A.4 Proof of Proposition 6

Along a defensive economic growth path, social capital decreases continuously. Let

$$\tau := \inf\{t \geq 0 : S^*(t) < \bar{S}\}.$$

Let $\bar{S}_0 := \min\{S_0, \bar{S}\}$. We may now consider a competitive equilibrium path with the initial endowment of social capital $\bar{S}_0$. Let

$$1 + \sigma = \inf_{0<S<\bar{S}} \left(-SE''(S)/E'(S)\right).$$

Then, we have for $S \in (0, \bar{S})$,

$$\begin{aligned}
&-\int \frac{d\ln E'(S)}{dS} dS \geq \int \frac{1+\sigma}{S} dS \\
\Leftrightarrow &-\ln E'(S) + C_1 \geq (1+\sigma)\ln S + C_1' \\
\Leftrightarrow &e^{-C_1} E'(S) \leq e^{-C_1'} S^{-(1+\sigma)} \\
\Leftrightarrow &\int E'(S) dS \leq e^{C_1 - C_1'} \int S^{-(1+\sigma)} dS \\
\Leftrightarrow &E(S) \leq -e^{C_1 - C_1'} \frac{S^{-\sigma}}{\sigma} + C_2' - C_2, \qquad \text{(A14)}
\end{aligned}$$

where C_1, C_1', C_2, and C_2', are integral constants. Set $h_1 = e^{C_1 - C_1'}/\sigma$ and $h_2 = C_2' - C_2$. Define

$$\bar{E}(S) := -h_1 S^{-\sigma} + h_2, \quad \sigma > \eta.$$

and denote by $\bar{v}_i(t)$ the path of instantaneous utility with $\bar{E}(S)$, instead of $E(S)$. From (A14), $\bar{v}_i(t) \geq v_i(t)$.

Since $\bar{E}(S)$ satisfies the assumptions of Proposition 5, the corresponding utility path $\bar{v}_i(t)$ is strictly decreasing for sufficiently large t and diverges to $-\infty$. From (A14), we have $\bar{v}_i(t) \geq v_i(t)$ for all sufficiently large t. Hence, $v_i(t)$ also diverges to $-\infty$.

A.5

A.6 Proof of Proposition 7

Observe that

$$\frac{\partial}{\partial \kappa}\left(\frac{\partial v_i(t)}{\partial t}\right) = \frac{\partial}{\partial t}\left(\frac{\partial v_i(t)}{\partial \kappa}\right) = -\eta g_S \left(\epsilon (S_0)^{-\eta} e^{-\eta g_S t} \frac{1+\theta}{\kappa}\right) > 0, \qquad \text{(A15)}$$

since a defensive growth path implies $g_s < 0$. This inequality implies

$$0 = \frac{\partial v_i(t^*(i))}{\partial t} < \frac{\partial v_j(t^*(i))}{\partial t}. \qquad \text{(A16)}$$

Note that $\partial v_j(t^*(i))/\partial t > 0$ implies $t^*(j) > t^*(i)$.

A.7 Proof of Proposition 8

We have

$$D(t) = \epsilon (S_0)^{-\eta} e^{-\eta g_S t} \left\{(1+\theta)\left(\ln \kappa_j - \ln \kappa_i\right)\right\}, \qquad \text{(A17)}$$

and hence

$$\frac{dD(t)}{dt} = -\eta g_S \epsilon (S_0)^{-\eta} e^{-\eta g_S t} \left\{ (1+\theta) \left(\ln \kappa_j - \ln \kappa_i \right) \right\} > 0, \tag{A18}$$

since a defensive growth path implies $g_s < 0$ and $\ln \kappa_j - \ln \kappa_i > 0$ by assumption.

A.8 Proof of Proposition9

(i) Since $g_S < 0$ and $\kappa_i / \bar{\kappa} \leq 1$, we obtain

$$\frac{\partial^2 v_i(t)}{\partial \theta \partial t} = -\eta g_S \epsilon (S_0)^{-\eta} e^{-\eta g_S t} \ln \left(\kappa_i / \bar{\kappa} \right) \leq 0, \tag{A19}$$

where equality holds if and only if $\kappa_i = \bar{\kappa}$. Thus, an increase in θ weakly decreases $\partial v_i(t)/\partial t$ at every t, with a strict effect for all households except the richest. It follows that $\theta_1 < \theta_2$ implies

$$t^*(i; \theta_1) \geq t^*(i; \theta_2). \tag{A20}$$

(ii) $V_i(\theta)$ is given by

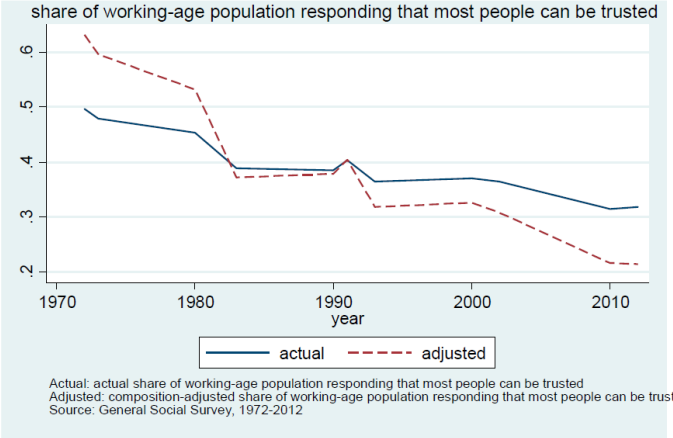
$$\begin{aligned} V_i(\theta) = \epsilon (S_0)^{-\eta} & \left\{ \frac{\ln(1-\beta) + (1+\theta) \ln \kappa_i - \theta \ln \bar{\kappa} + \ln \left(\chi_{ss} K_0 \right)}{\chi_{ss}} + \frac{g_K}{\chi_{ss}^2} \right\} \\ & + \int_0^\infty E(S_0 e^{g_S t}) e^{-\rho t} dt. \end{aligned} \tag{A21}$$

The statement follows from

$$\frac{\partial V_i}{\partial \theta} = \frac{\epsilon (S_0)^{-\eta} \ln \left(\kappa_i / \bar{\kappa} \right)}{\chi_{ss}} < 0, \tag{A22}$$

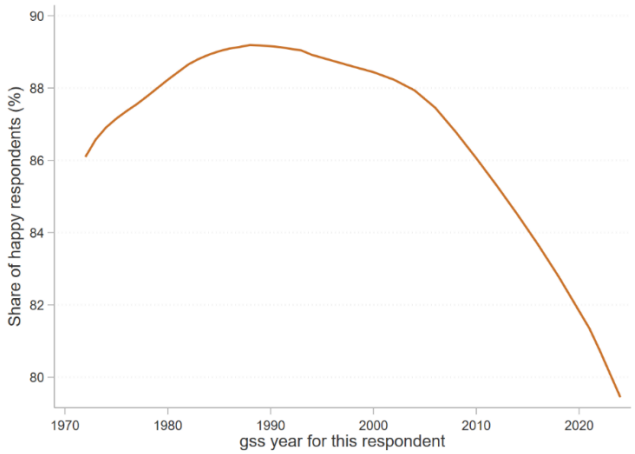
for all i such that $\kappa_i < \bar{\kappa}$.

Figure 1. Trust in others, US 1973-2013



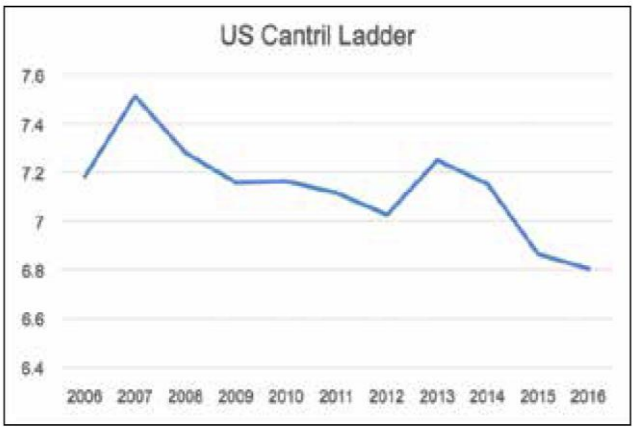
Source: Gould and Hijzen 2016

Fig.2. Share of happy respondents, US 1974-2024



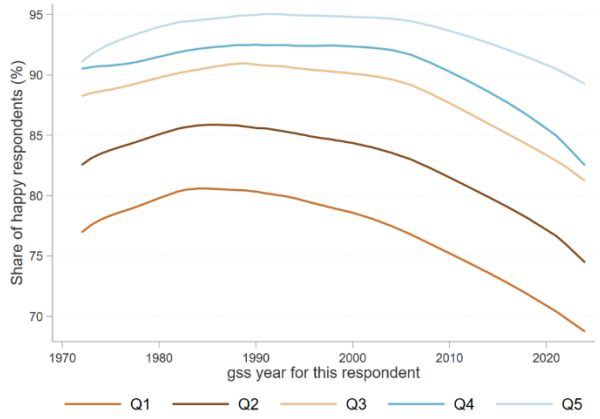
Source. US General Social Survey, own calculation

Fig. 3 . Decreasing life evaluation, US 2006-2016.



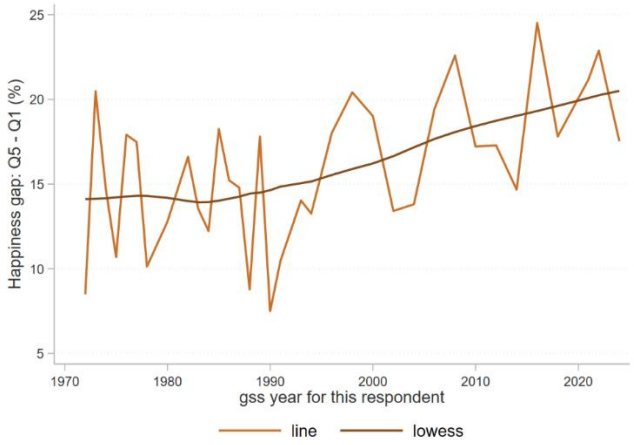
Source: Sachs 2017, Gallup World Polls.

Fig.4. Share of happy respondents by income quintiles. US 1974-2024.



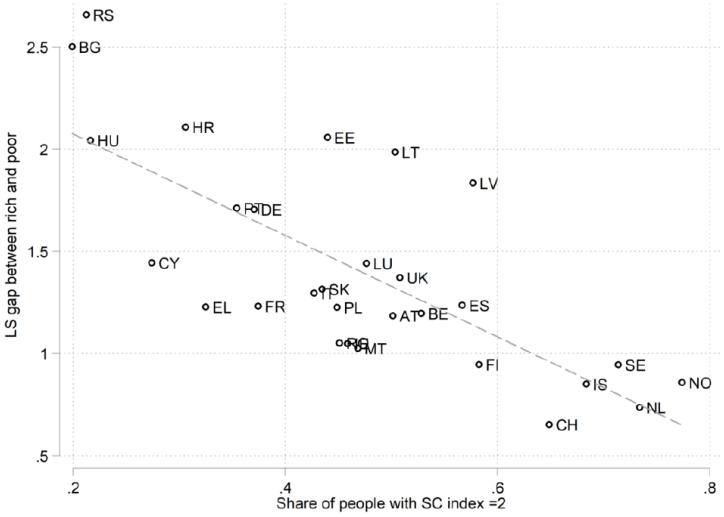
Source. US General Social Survey, own calculations.

Fig.5. Happiness gap between the top and the bottom income quintile: US 1974-2024.



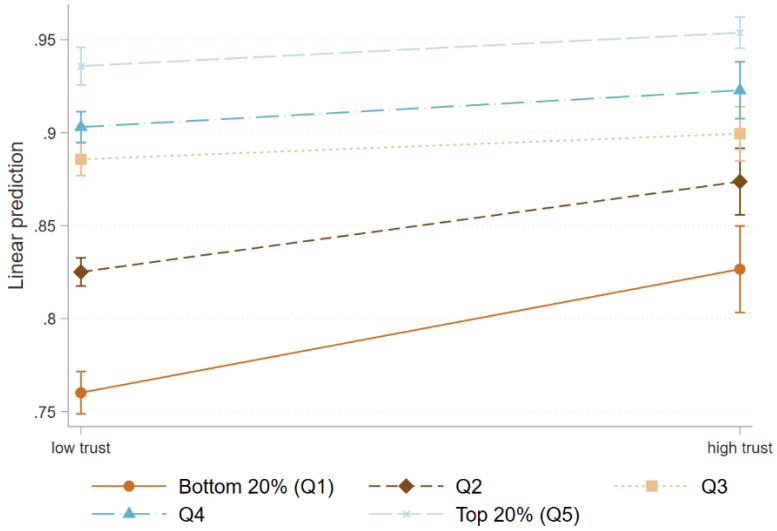
Source. US General Social Survey, own calculations.

Fig. 6. The life satisfaction gap between rich and poor people is smaller in countries with a rich social life than elsewhere (29 European countries; data EU-SILC 2013.)



Source: Bartolini et al. (2023)

Fig. 7. How much do differences in trust matter for the well-being of individuals with different incomes? Micro analysis using interaction between trust and quintiles.



Source. Own calculation, GSS data