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Long-Term Trends in the Distribution of Wealth and Inheritance

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Long-Term Trends in the Distribution of Wealth and Inheritance

Abstract

This paper examines long-term trends in aggregate wealth and inheritance and in their distributions, focusing on developed economies. A key stylized fact is that wealth is less equally distributed than income. Financial assets predominate among the wealthy, while owner-occupied housing is crucial for middle groups, so higher stock prices raise wealth inequality while house price increases do the opposite. Inheritances exacerbate absolute wealth inequality but reduce relative inequality. Wealth inequality declined in advanced Western countries during the first half of the 20th century, then stabilized or rose. Aggregate wealth-to-income ratios have fluctuated, reflecting both market and policy influences, whereas inherited wealth proportions have declined over the long run. Continued increases in the value of employer-based pensions, housing and social security wealth in recent decades have acted to reduce wealth inequality, offsetting the disequalizing impact of financial asset price increases to a varying extent across countries.

JEL-Codes: E010, H550, D150, D310, E210, G510.

Keywords: wealth, inheritance, inequality, saving, history.

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I. Introduction

Wealth and inheritance have attracted increasing attention in recent years. This appears to be related to at least three trends: aggregate wealth values have risen faster than income in many countries; the distribution of wealth has become more unequal in some countries; and inherited wealth has become relatively more important in some countries. However, different trends were observed in earlier periods. With that in mind, it becomes important to take stock of what we know about long-term trends in the distributions of wealth and inheritance and their underlying forces.

This chapter looks at long-term trends in the distribution of wealth and inheritance and their causes, focusing mainly on developed countries, where wealth data is generally good. Some comments are also made on trends in “emerging market” economies and less developed countries (LDCs), although the wealth data for those countries, where available, is of variable quality. Impacts of globalization on wealth are also discussed.

Our central concern is with wealth of the household sector including unincorporated businesses. Sometimes, the scope includes all private assets. The main addition is the net worth of the corporate sector, which is generally fairly small since it is net of obligations to households in bonds and shares. A country’s wealth is normally seen as that of its *residents*, which includes offshore assets. We follow that convention.

The term “wealth” in this chapter means net worth: the value of assets minus debts. The assets concerned are physical and financial. Following usual practice, we do not include human capital. There are three main alternative concepts of wealth, which include successively larger sets of assets. *Marketable wealth* includes all assets that can be converted into cash. Financial assets include e.g. cash, deposits, stocks, bonds, mutual funds, private retirement savings, and defined contribution (DC) pensions. Non-financial assets include housing, other structures, machinery and equipment and, in principle, consumer durables. Defined benefit (DB) pensions and social security wealth are excluded. Available data often exclude some assets. For example, national accounts treat consumer durables as expenses rather than assets and household surveys tend to omit them, except for vehicles. *Augmented wealth* is defined as marketable wealth plus DB pensions. Finally, *Broad wealth* is augmented wealth plus social security wealth.

A central concern is with the impact of various factors on wealth inequality. Unless otherwise indicated we follow the usual approach of assessing those effects using indicators of relative inequality. Those indicators include the wealth shares of the top 1% or 10%, the bottom 50% and so on. We also use the Gini coefficient, the most popular overall inequality index, which is again an indicator of relative inequality. But sometimes impacts on absolute inequality differ from those on relative inequality, which may affect attitudes toward distributional changes (see e.g. Ravallion, 2021). For example, if wealth rises by the same percent at all levels it will nevertheless rise more in absolute terms for the rich, perhaps raising inequality in some eyes.

A number of important stylized facts come out from examining the wealth data across countries.

1. Wealth is less equally distributed than income. Across countries, Gini coefficients range between about 0.3 and 0.4 for income, but from 0.5 to 0.9 for wealth. And the share of wealth held by the top 1% varies from about 15-35%, whereas their income share is usually less than 10%.

2. Financial assets are relatively most important for the rich, while owner-occupied housing tends to be most important for middle groups. Thus, a rise in stock prices raises top wealth shares, but rising house prices do the opposite.

3. Inheritances are more unequally distributed than total wealth, and increase absolute wealth inequality. However, they reduce relative wealth inequality.

4. Wealth inequality trended downwards in the first six decades of the twentieth century in most advanced Western countries. Since then it has been stable in several of these countries, while in a few, most notably the US, it has risen. The leading emerging market countries, including China, India and Russia have seen rising wealth inequality in the last three decades, before which little evidence is available for them.

5. The ratio of wealth to national income fell from the 1920s to about 1950 in the leading developed countries. After a period of stability in most of these countries it then rose from the 1970s or 1980s to the present.

6. The ratio of inherited wealth to total wealth trended downward in the leading developed countries from the 1920s to about 1970, after which there was a lack of common trend for a while, followed by a general increase after 1990 that was mild, however, in some of these countries

The remainder of the chapter has five main sections, followed by a Conclusion. Section II first discusses the proximate factors that determine wealth: rates of return, saving rates, income and inheritance. It goes on to review briefly theoretical and computational models of wealth and its distribution. In Section III we examine the evidence on aggregate wealth and wealth-income ratios, and consider possible explanations for national differences and time trends. Trends in the distribution of wealth within and across countries over time are discussed in Section IV. Section V reviews evidence on inheritance. Finally, the effects of globalization on the level and distribution of wealth are discussed in Section VI.

II. Models and Hypotheses

II.1 Accounting Relationships

From year to year, the wealth of an individual, family or household at the end of year t , W_t is given by:

$$W_t = (1 + r_t)W_{t-1} + E_t + F_t + I_t - C_t$$

where:

r_t : after-tax rate of return

E_t : after-tax labour income

F : government transfer payments

I_t : inheritance

C_t : consumption

With $W_0 = 0$, current wealth can be expressed as:

$$W_t = \sum_{k=1}^t (E_k + F_k + I_k - C_k) \prod_{j=k+1}^t (1 + r_j) = \sum_{k=1}^t S_k R_k$$

where S_k is saving out of non-investment income and R_k reflects the cumulative return on saving from time k to t . Expressing this relationship in terms of saving rates we have:

$$W_t = \sum_{k=1}^t s_k (E_k + F_k + I_k) R_k$$

Understanding the level and distribution of wealth therefore requires understanding the level and distribution of incomes, inheritance, rates of return and saving rates.

II.2 Analyzing Wealth Determinants

II.2.1 Rates of Return

Rates of return differ across assets, for example tending to be higher on stocks than on bonds or deposits. In addition, there is a positive correlation between rates of return and wealth, partly because stocks are more important for the wealthy (Piketty and Zucman, 2015; Wolff, 2017; Fagereng et al., 2020). This correlation tends to lead to higher wealth inequality. Finally, there can be considerable variation in rates of return on most assets. Luck, innovation, and entrepreneurship are all at work.¹

Governments may fight against the disequalizing effect of unequal rates of return through tax measures. That policy direction has attracted increased attention recently (Saez and Zucman, 2019; Advani et al., 2020, Mattauch et al., 2022). Progressive personal income taxes have applied and have become more significant in rich countries since the early twentieth century and annual wealth taxes were common in Europe. However, most wealth taxes have been terminated, personal income taxes have been somewhat flattened, and corporate tax rates have fallen, tending to raise after-tax rates of return for the wealthy (Scheve and Stasavage, 2016). These trends may have tended to raise wealth inequality (Piketty, 2014 – “P”; Nirei and Aoki, 2016; Cao and Luo, 2017).

The *level* of interest rates may also be relevant. İmrohoroğlu and Zhao (2022) conclude that 60% of the rise in the wealth share of the top 1% in the US from 1980 to 2010 can be explained by the decline in interest rates. Lower interest costs raise profits while reducing the return to saving for ordinary people.

II.2.2 Labour Income

It is well known that in Western Europe and North America earnings inequality fell from before to after World War II. It was roughly constant through the 1950s and 1960s, but began to rise later, particularly in the US, from the mid 1970s. A large empirical literature has sought explanations,

¹ The highly variable rates of return to entrepreneurs, their high saving rates, and the implications of both of these factors for the distribution of wealth have received considerable attention, as reviewed in Quadrini and Rios-Rull (2014).

finding them in technological change, education trends, globalization and other factors (Autor et al., 1998, 2006; Heathcote, Perri and Violante, 2010; Helpman, 2018, Heimberger, 2020).

One significant aspect is that rising earnings inequality likely has a delayed effect on wealth inequality. If the earnings of the top 10% rose permanently, for example, the impact on wealth in top groups would take time to build up with the accumulation of the resulting increased savings.

II.2.3 Government Transfers

Government transfers, often targeted at lower income groups, are a cornerstone of the welfare state and generally have an equalizing effect. In the wealth sphere, particular attention focuses on public pensions, which form part of household assets in a broad view. As discussed later, including public pensions in wealth has a strongly equalizing effect

Capital transfers from government are also relevant. Some transfers of this type, for example compensation to indigenous groups for past wrongs, tend to be equalizing, as was generally true of privatization of housing in transition countries. However, other capital transfers can have the opposite effect. Privatization of public assets other than housing in transition countries provides examples. Privatization of industry sometimes had extreme effects on inequality, notably in Russia (Freeland, 2000). Also, a kind of capital transfer occurs when some are given protection from competition, via the creation of rents. Badly designed privatization or the granting of protection could affect not only wealth inequality but also growth.

II.2.4 Inheritance

A popular view is that inheritance is disequalizing because it allows the rich to maintain their position from generation to generation. If inheritance is disequalizing a corollary could be that economic inequality will rise with the aggregate amount of inheritance. This has stimulated interest in estimating not just the flow, but also the stock of inherited wealth, as we discuss later.

Since the 1970s there have been challenges to the conventional view that inheritance is disequalizing. It can serve as a way generations share risk. With parental altruism, in long-run equilibrium inequality in lifetime income can theoretically be less with inheritance than without (Becker and Tomes, 1979; Davies, 1986). Recently, studies have found that inequality of total wealth is less than that of non-inherited wealth, again implying an equalizing effect, as discussed in Section V,

II.2.5 Saving

Saving differs across demographic and income groups. Up to middle age it often takes the form of investment in housing. Subsequently, the focus shifts toward saving for retirement. In the early retirement years, saving tends to continue, with decumulation occurring later. Within age groups higher saving rates are found at higher lifetime incomes (Dynan et al., 2004; Bozio et al., 2017).

Saving motives may vary widely. Saving for retirement was stressed in the life cycle model (LCM), which in its simplest form ignored saving for bequest (Modigliani and Brumberg, 1954; Ando and Modigliani, 1963). In the 1970s, however, it was found that dissaving in retirement is slower than the basic LCM would predict. This led to investigation of other explanations for saving, including a bequest motive and precautionary saving due to uncertain lifetime and medical-expense risk (Davies, 1981; De Nardi and Fella, 2017; Ameriks et al., 2020).

Precautionary motives can explain slow dissaving in retirement if strong risk aversion is assumed. However, a puzzle is posed by retirees' widespread neglect of annuities and long-term care

insurance. Recent research concludes the puzzle can only be solved by a bequest motive alongside life-cycle and precautionary saving (Lockwood, 2018; French, Jones and McGee, 2022).

The two leading models of bequest motives are based alternatively on parental altruism (Becker and Tomes, 1979; Tomes, 1981; Davies, 1982) and exchange for offspring’s services (Kotlikoff and Spivak, 1981; Bernheim, Shleifer and Summers, 1985; Cox, 1987).

Altruistic parents derive utility from their children’s welfare. If that welfare is a normal good for parents, bequests will rise with their lifetime income. There is also a “compensatory” aspect: bequests will be greater the lower the expected lifetime income of the child. One consequence is that bequests will tend to be equalizing across siblings. Another follows from regression to the mean – other things equal, higher earning parents will tend to bequeath a larger fraction of their lifetime income, since on average their children’s ability will be less than their own. Low earning parents will tend to leave small bequests, or none at all, because their children will, on average, earn more than they did.

Exchange models predict a positive correlation between bequests and the services or attention children provide to parents. Exchange could also be strategic. The parent could threaten to disinherit if there was a lack of attention (Bernheim, Shleifer and Summers, 1985). This could help to explain why we observe that not all transfers are made via gifts. While gifts could be more beneficial than future bequest for children when they are young adults or in early middle age, the parent must retain sufficient bequeathable wealth to elicit the desired attention.

Empirical work has shown that both altruism and exchange have some explanatory power. For instance, there is a tendency for gifts and bequests to be larger for lower earning offspring, but there is also evidence of transfers being positively related to attention (Cox and Rank, 1992; Laitner and Juster, 1996; Light and McGarry, 2004; Kopczuk and Lupton, 2007; Erixson and Ohlsson, 2019).

II.3 Models of Wealth Distribution

II.3.1 Stochastic Models

In early modeling of wealth distribution attention focused on univariate stochastic processes. These are still useful in certain ways, although much research now embeds stochastic elements in behavioural models.

The upper tails of both income and wealth distributions are commonly found to follow approximately a Pareto distribution. If W is wealth, $N = N(W)$ is the number of people who have wealth greater than W , and there is a strictly positive lower bound on wealth, the Pareto distribution says that $\ln N$ is linear in $\ln W$:

$$\ln N = \beta - \alpha \ln W$$

where the thickness of the upper tail and the degree of inequality are inversely related to α .

Models with multiplicative random shocks in the following form generate a Pareto distribution:

$$W_{it} = \omega_{it} W_{t-1} + u_{it}, 0 < \omega_{it},$$

where ω_{it} is an iid multiplicative shock, u_{it} is an error term and $0 < E(\omega_{it}) < 1$ must be assumed to obtain a stable distribution (Piketty and Zucman, 2015).²

Early work due to Champernowne (1953), with later contributions summarized by Shorrocks (1975), embodied processes of the above form but had little economic content. Progress was made in “Bewley models”, endogenizing saving behaviour in economies with infinitely lived consumers (Bewley, 1986; Aiyagari, 1994; Quadrini and Rios-Rull 1997). These models can incorporate several sources of inequality, including capital income risk and entrepreneurship. Realistic wealth inequality and upper tails can be obtained (Nirei and Aoki, 2016); Benhabib, Bisin and Zhu, 2015; Hubmer, Krusell and Smith, 2020; and Achdou et al., 2022). Insights are obtained about a range of factors, including borrowing constraints, uninsurable risk, correlation of rates of return and wealth, and entrepreneurship. However, the assumption of infinite lives means that these “dynastic” models abstract from bequests. In order to model the latter it is necessary to use intergenerational models.

A positive rate of return on wealth, r , magnifies the impact of multiplicative shocks. With economic growth at rate g , wealth inequality in these models is increasing in $r - g$. Empirically, Piketty (2014) found that g varied less than r , which was found to average about 5% over time. Piketty suggested that in periods of low population growth or technical change, which yield low g , wealth inequality would tend to be high, as observed in pre-industrial societies and as found currently in advanced economies. Piketty also suggested that increasing international competition could raise r in coming years, which combined with low g , could increase wealth inequality. Some later authors have investigated the relationship between $r - g$ and wealth inequality empirically without finding a significant effect, but this could be due to data limitations (Acemoglu and Robinson, 2015; Weil, 2015).

II.3.2 Early Intergenerational Models

The need for intergenerational models of wealth distribution was pointed out by Atkinson (1971), who responded to claims that most wealth inequality was age-related by computing the distribution of wealth in the simple LCM. With only age differences, the share of the top 1% in wealth was 2% at the most, in contrast to the 20 to 30% commonly observed. Davies (1982) extended the calculations, introducing earnings inequality and differences in saving rates and rates of return, finding that these factors could, at most, raise the share of the top 1% to about 10%.

Initial intergenerational modeling focused on the impacts of alternative patterns of estate division, and marriage (Blinder, 1973; Pryor, 1973; Atkinson 1980). These studies found that high levels of wealth inequality could be preserved over generations, without stochastic shocks, under primogeniture or perfect positive sorting of spouses by wealth. But if estates were divided more equally or marital sorting was imperfect, wealth inequality would tend to fall over time. However, Atkinson (1980) pointed out that wealth inequality can rise over time with primogeniture if population is growing. This may also happen even if there is some sharing of bequests among siblings, if the wealthiest have fewer children and highly assortative mating. These results would suggest that the more equal estate division seen in the twentieth century, e.g. in the UK, could have contributed to the decline in wealth inequality seen up to about the 1970s.

² Processes of this form are said to follow the law of proportionate effect. See Davies and Shorrocks (2000).

Blinder (1974) introduced optimizing behaviour in a partial equilibrium intergenerational simulation model. Working with “warm glow” bequests, under which parents’ utility depends on the size of bequest, independent of children’s characteristics. Becker and Tomes (1979) pushed the analysis further by modeling parental altruism, which generates compensatory bequests, as discussed earlier here. In their model inheritance has an equalizing effect in long-run equilibrium. Davies (1982) did simulations using a similar model, but disallowing negative bequests (which had implicitly been allowed by Becker and Tomes). He found that inheritance had a disequalizing effect on equilibrium inequality. Davies (1986) found the same in theoretical modeling.

This partial equilibrium literature had several limitations. Of course it took wages and interest rates as exogenous. Perhaps more seriously it also neglected uncertain lifetime and uncertain health care expenses in retirement, which, when combined with imperfect annuity markets, alter optimal saving and generate “accidental” bequests.

II.4 Macroeconomic Models

II.4.1 The Life-Cycle Model

The first formal analysis of the relationship between the macroeconomy and personal wealth came with the life-cycle model. The simplest version neglects uncertainty and has perfect capital markets. Suppose that intertemporal preferences and the ages of starting work and retiring plus the length of life, L , are constant. Assume also that growth rates of both labour earnings per person and population, u and p , are constant, and that, for the moment, the real rate of return on savings r is zero. Then, mean wealth w would be determined by u , p , L , and mean earnings, e . In balanced growth, as explained for example by Modigliani (1988c) we have:

$$w = f(u, p, L)e$$

and aggregate wealth, W , grows at the rate $u + p$. Government can be brought in by redefining r and e as net of taxes and transfers.

In the basic LCM the length of retirement which may rise with the lifespan, has a positive effect on mean wealth. The growth rates u and p have a mild negative effect. Aggregate saving will increase with both u and p , but the wealth to income ratio (W/e) tends to decline mildly with these parameters. Higher p increases the population share of younger people, reducing W/e . Higher u reduces the need to save for future consumption, and thus also W/e .³

Allowing a positive rate of return one finds theoretically complex and ambiguous effects of r on wealth. Also, empirical work finds conflicting, and often insignificant effects (Modigliani, 1988c). If funded public pensions earning the rate of return r they substitute one-for-one with private saving, up to the point where the latter are crowded out completely. Unfunded pensions, in contrast, would tend to earn a rate of return equal to g , normally expected to be less than r . The theoretical result is a larger decline in private saving than with funded pensions, since lifetime income is depressed. If retirement age does not change, there is a negative impact on wealth, a prediction that is confirmed empirically (Gale, 1998, Attanasio and Brugiavini, 2003, Attanasio and Rohwedder, 2003).

³ For an exposition of the effects mentioned in this paragraph see Modigliani (1986).

As described above, early modeling suggested that in order to generate realistic levels of wealth inequality a bequest motive would need to be added to the LCM. A similar result was initially found when dynamic general equilibrium (GE) models were introduced in an overlapping generations (OLG) framework. With earnings differences but no other source of inequality, aside from age, Huggett (1996) obtained a wealth share of the top 1% less than 10%.

Gokhale et al. (2001) simulated a distribution of wealth for the United States with a share of the top 1% equal to 31.6% using an OLG model in which bequests were “accidental”. That is, there was no bequest motive. The model incorporated uncertain lifetime, fertility differences, a realistic distribution of labour earnings, intergenerational correlation of earnings, assortative mating, heterogeneous rates of return, social security and progressive income taxation. The most important factors in generating high wealth inequality were earnings differences and an accurate top-tail of earnings, assortative mating, and social security. The social security system increased wealth inequality by reducing the need for life-cycle saving, an effect which is stronger for lower income people.

There has now been much work that adds voluntary bequests to life cycle models incorporating, at a minimum, uncertain lifetime and therefore accidental bequests, as well as uncertain earnings (Heer, 2001; De Nardi, 2004; Cagetti and De Nardi, 2006, 2009; Hendricks, 2007; Benhabib, Bisin and Zhu, 2011, 2016; De Nardi and Yang, 2016). This work has been reviewed by De Nardi and Fella (2017), who find that the following factors are important empirically and also improve the fit of the models’ predicted distribution of wealth: “the transmission of bequests and human capital across generations, heterogeneity in preferences, richer earnings processes, medical expense risk, heterogeneity in rates of return, and entrepreneurship”. However, De Nardi and Fella also indicated that determining the relative importance of these factors with confidence would require further research. Further work has been done in this area without casting doubt on these conclusions (Benhabib, Bisin and Luo, 2019; İmrohoroğlu and Zhao, 2022).

II.5.2 Saving, Capital Gains and the Capital-Output Ratio

Some insights regarding wealth in the macroeconomy can be found without limiting the discussion to a single model of saving.

The change in national wealth between t and $t + 1$ can be decomposed into savings (volume) or capital gains (relative price effect). The dynamics of aggregate wealth are given by:

$$W_{t+1} = W_t + S_t + KG_t$$

where S_t is saving and KG_t is capital gains. A critical variable is β_t , the ratio of wealth to income Y_t :

$$\beta_t = \frac{W_t}{Y_t}$$

In the one-good model there is no relative price effect, so $KG_t = 0$, and wealth grows at the rate

$$g_t^W = \frac{S_t}{W_t} = \frac{S_t Y_t}{Y_t W_t} = \frac{s_t}{\beta_t}$$

If the wealth level is initially low, β_t is small and wealth can grow at a high rate with even moderate saving. The growth rate of wealth may exceed that of national income, g_t . However, with s_t and g_t

constant at s and g , as β_t rises, g_t^W falls and the steady-state is approached, where $g = g_t^W = \frac{s}{\beta}$ and

$$\beta = \frac{s}{g}$$

which is the famous Harrod-Domar-Solow formula. Piketty referred to this relationship as the “second fundamental law of capitalism”.

The rate of income growth, g , has two components – productivity growth, u , and population or labour force growth, p . As is well-known, productivity growth has been low since 1970s and then remained low in the leading developed nations. Population growth also slowed significantly in Europe and Japan. The result of these trends has been a fall in g .

Moving beyond the one-good model we can consider capital gains (or losses). That is, we can take into account changes in asset prices relative to consumer prices so the growth rate of wealth becomes:

$$g_t^W = q_t + \frac{s_t}{\beta_t}$$

Capital gains raise the growth rate of wealth and therefore also the wealth-to-income ratio.

Piketty and Zucman (2015) use this general framework to discuss the evolution of the aggregate wealth-to-income ratio in eight leading developed countries: the G7 plus Australia. They treat wealth as the value of the capital stock, K , so $\beta = K/Y$, where we omit t subscripts for convenience. Piketty and Zucman found data available from 1700 for France and the UK, 1770 for the US, 1870 for Germany, the 1960s in Italy and Japan, and 1970 in Australia and Canada. They reported that up to about 1900, K/Y was 6 – 7 in the European countries, but was lower in the US, ranging from 4 to 5.⁴ By 1950 the estimated ratio fell to an average of 2.3 in 1950 in Germany, France and the UK, while dropping to 3.6 in the US. In later years K/Y rebounded. By 2010 it had reached 4 – 6 in Germany, France and the UK, but had risen to just to 4.1 in the USA. When data became available, Australia, Canada, Italy and Japan all showed substantial increases in K/Y , from an average of 3.1 in 1970 to 5.5 in 2010.

Piketty and Zucman explored how the long-term changes in K/Y they had found might be explained. They suggested that the high K/Y ratio they had found in Europe prior to 1900 could potentially be explained by relatively low g , while the lower ratio in the USA might be due to higher g caused by quicker population growth. The reduction in K/Y in Europe up to about 1950 could be partly due to war damage and partly to increased tax, and institutional changes that reduced saving, with the rise in K/Y in later years perhaps due to a drop in g . However, these trends were also partly attributed to asset price changes after 1950, particularly in housing (see also Weil, 2015).

Piketty and Zucman suggested that K/Y will likely continue to rise in the future, assuming asset prices do not drop, since population growth appears likely to continue low. They also suggested that higher K/Y leads to higher income inequality because it tends to raise capital’s share of national

⁴ More recent work by other authors indicates that the K/Y ratio in Europe was lower than Piketty and Zucman believed. See Section III below.

income. Capital's share α equals $r\beta$, where r is the average rate of return so the relationship between β and r determines how β affects α . This in turn depends on the elasticity of substitution between capital and labour. With a Cobb-Douglas production function that elasticity equals 1, and any given percent change in K/L yields an equal but opposite percent change in r . Hence capital's share is not affected by K/L . However, theoretical arguments and empirical evidence suggest that the elasticity of substitution is generally greater than 1 in developed countries (Piketty and Saez, 2014; Gomez, 2021). With an elasticity of substitution above 1, a rise in K/L increases capital's share.

Piketty's analysis of the "second fundamental law of capitalism" was swiftly criticized by Krusell and Smith (2015) – "KS". In considering the effects of a reduction in g , Piketty had assumed that the net rate of saving would be unchanged. KS pointed out that, given that steady-state K/Y rises when g falls, depreciation increases as well. Thus, the gross saving rate increases. If one assumes, instead, that the gross saving rate is fixed, then the net saving rate declines and the rise of K/Y is reduced. KS found this effect was large, arguing that was important because a constant gross saving rate is more consistent with modern macroeconomic theory and evidence.

II.5.3 The Role of Inheritance

In order to analyze the role of inheritance in aggregate wealth, following Piketty and Zucman, define φ_t , the ratio of inherited wealth to aggregate wealth, \bar{r} , the net-of-tax rate of return, B_t , the flow of inheritance including gifts and bequests and $b_{yt} = \frac{B_t}{Y_t} \cdot B_t$, as a fraction of national income.

Piketty and Zucman (2015) say that the wealth-income ratio β_t and the share of inherited wealth φ_t are higher the greater the net-of-tax rate of return \bar{r} and the lower is g .⁵ While g is exogenous in the models they consider, \bar{r} is endogenous. Leaving aside tax rates, \bar{r} depends on the marginal product of capital, which is determined by technology and the capital-income ratio. It might therefore appear circular to say that the wealth-income, or capital-income ratio depends on \bar{r} . The explanation is that such a statement refers to the consequence of differences in the marginal product due to differences in technology.

The annual flow of inherited wealth can be analyzed using the relationship:

$$B_t = (1 + v_t) \mu_t m_t W_t$$

where m_t is the mortality rate, μ_t is the ratio between average wealth at death and average wealth for the whole population, and v_t is the ratio of gifts to bequests. Then, the inheritance flow as a fraction of income is:

$$b_{yt} = \frac{B_t}{Y_t} = (1 + v_t) \mu_t m_t \beta_t = \mu_t^* m_t \beta_t$$

where μ_t^* is "gift-adjusted" μ_t . Dividing by W_t instead of Y_t we have the ratio of inheritance flow to aggregate wealth:

⁵ Piketty and Zucman (2015, p. 1306) states "...under plausible assumptions, our three interrelated sets of ratios—the wealth-income ratio, the concentration of wealth, and the share of inherited wealth—all tend to take higher steady-state values when the long-run growth rate is lower or when the net-of-tax rate of return is higher. In particular, a higher $\bar{r} - g$ tends to magnify steady-state wealth inequalities."

$$b_{wt} = \frac{B_t}{W_t} = \mu_t^* m_t$$

Insight into how φ_t is determined can be found in a simplified scenario. If all individuals died the same number of years, H , after inheriting, the current amount of inherited wealth would equal the sum of whatever is left from flows $B_{t-H}, B_{t-H+1}, \dots, B_{t-1}$:

$$I_t = \sum_{i=1}^{i=H} B_{t-i} [1 + (1 - c)\bar{r}]^i$$

where c is the fraction of the return to inherited wealth that is consumed.

If the economy is in balanced growth, B_t will grow at rate g . A benchmark case is where $(1 - c)\bar{r} = g$. In that case $B_{t-i} = \frac{B_t}{(1+g)^{t-i}}$ and therefore:

$$I_t = HB_t = H\mu_t^* m_t W_t$$

which gives:

$$\varphi_t = H\mu_t^* m_t$$

In his studies for France, Piketty (2011, 2014) finds a fairly stable period in the late 19th century in which μ_t^* averaged around 1.6 and m_t was about 0.022. Taking these as illustrative possible steady-state values and setting H at 30 years, we find $\varphi = 30 \times 1.6 \times 0.022 = 1.056$. This is close to, but a little above, the average value of φ_t for France in the late 1800s found by PZ, which is about 0.85. That could perhaps be taken as suggesting moderate consumption of the return to inherited wealth.

This simple framework can be used to analyze the impacts of parameter changes on φ . Fundamental variables include r , the before-tax rate of return, and τ , the average tax rate on capital income, which determine \bar{r} ; and u and p which determine g . Higher r or lower τ produce higher \bar{r} and a greater present value of inherited wealth, and likely also higher relative wealth of decedents, μ . These effects tend to increase φ . Higher productivity growth, u , increases the relative incomes and wealth of younger cohorts, reducing both μ and φ . Higher p , while reducing m , increases μ since it generates a younger population with lower mean wealth. Piketty and Zucman (2015) argue that the latter effects are approximately offsetting. This means that changes in g due to changing productivity growth are likely to impact φ while those due to changes in population growth may have little impact.

Piketty and Zucman (2015) suggests that higher r may be seen in advanced economies in future due to greater international competition for capital. That would tend to raise φ . If productivity growth remains low, that will also make for high φ . Hence their forecast is that the share of wealth inherited is unlikely to fall in the near future and may well increase.

III. Wealth Levels – Trends and Explanations

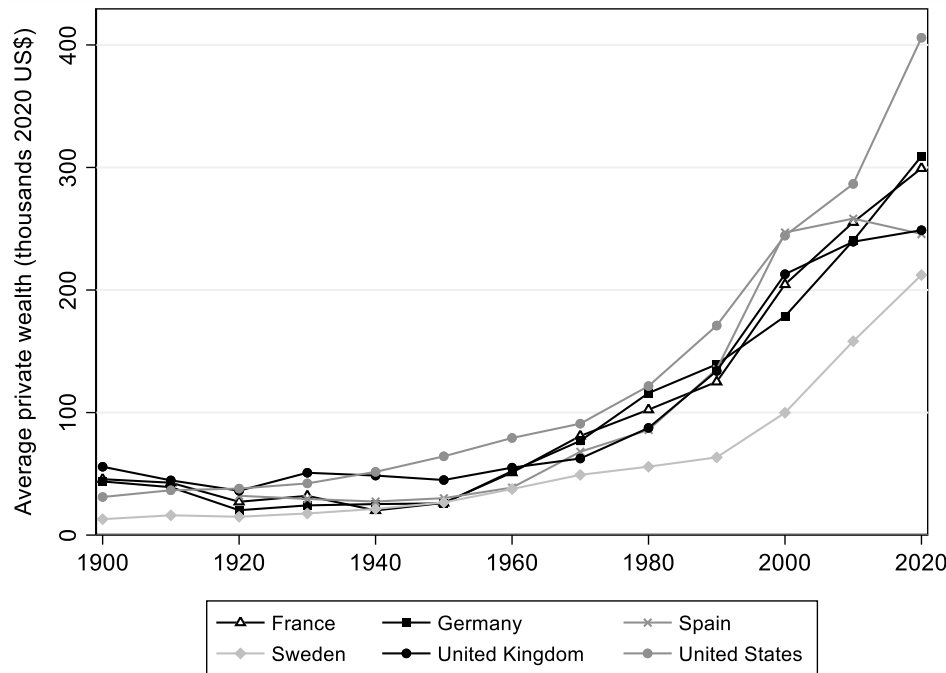
III.1 Private Wealth

This section looks at the evolution of household and private wealth over both extended historical periods and more recent years. We have traced the average wealth levels of a few Western economies back to the early twentieth century. This provides a span of up to 120 years. For the two most recent decades, we have data covering wealth levels and trends worldwide. We look at both real wealth per capita and wealth-income ratios.

Juxtaposing real wealth per capita with wealth-income ratios enhances our comprehension of wealth distribution dynamics and the economic status of individuals within a nation. This methodology affords a holistic view of the historical trajectory of wealth, offering insights into the determinants of historical shifts in wealth distribution.

Figure 3.1 depicts the trajectory of real wealth per adult in six Western nations. From 1890 to 1950, per capita wealth in Europe maintained relative stability, with no marked secular trends evident in the nations under scrutiny. Meanwhile, the US witnessed a twofold increase in wealth per capita, transitioning from a position below that of Continental Europe in 1900 to surpassing it by 1950.

Figure 3.1: Real Per Capita Wealth in Six Western Countries, 1900–2020.



Source: The WID.world database and Waldenström (2024).

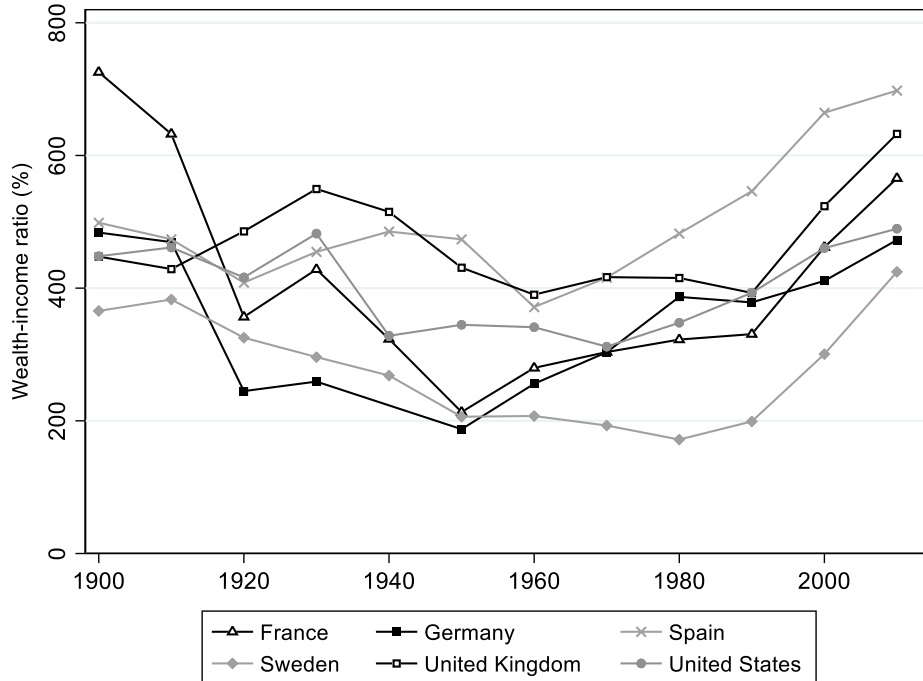
The postwar era saw an exceptional upsurge in real wealth across Western countries. Per capita wealth swelled by 6-8 times in real terms. A range of factors contributed to the rise in wealth. These included deregulation of product and financial markets, technological innovations, and amplified international integration—essentially, economic globalization.

III.2 Wealth-Income Ratios

Wealth research frequently examines the wealth-income ratio, that is a country’s total stock of wealth (W) divided by its flow of national income (Y). This ratio offers a gauge of the relative magnitude of the capital stock that can be observed across extensive historical periods. Here, W refers to private marketable net worth, that is the value of both non-financial and financial assets belonging to households or corporations after deducting liabilities. National income is found by subtracting capital depreciation from GDP and then adding net foreign income.

The evolution of Western wealth-income ratios is shown in Figure 3.2. In the early research series provided by Piketty and Zucman (2014, 2015), Europe’s wealth-income ratios were portrayed as historically high in the years prior to the First World War, ranging between 600–800 percent of national income. These ratios fell during the world wars and initially remained low during the postwar period. It was not until the 1980s that they began to climb, nearing the levels observed almost a century prior.

Figure 3.2: Wealth-Income Ratios in Six Western Countries.



Source: See Figure 3.1.

However, some recent research has shown that wealth-income ratios before 1914 were probably not fully as high as Piketty and Zucman (2014) thought. There was a range of measurement difficulties, leading to an overestimation of wealth holdings of primarily business assets and an underestimation of national income.⁶ Figure 3.2 is based on the most recent estimates.

⁶ For example, Madsen (2019) shows how UK pre-1914 wealth estimates included double-counting of government securities holdings, capitalized capital gains among business owners, and excluded parts of national income. Albers et al. (2022) presents another revision for Germany leading to a lower wealth-income ratio.

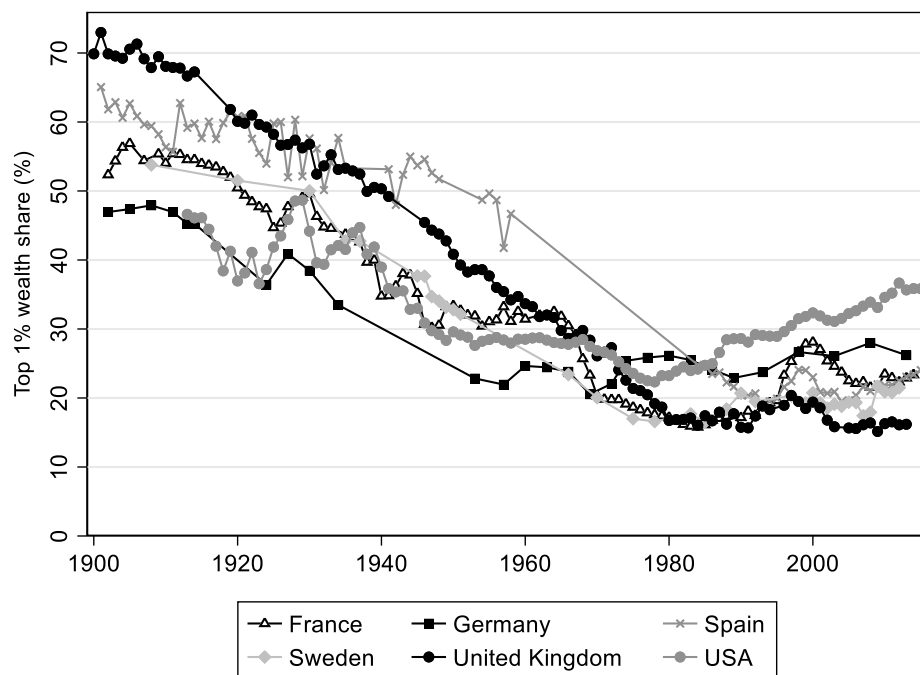
The trajectory of wealth-income ratios over time is not similar across all countries. While the much-discussed U-shaped trend is certainly present, it is neither ubiquitous nor as definitive as once believed. Three nations showing the U-shaped trend are France, Germany, and Sweden (Figure 3.2). In these countries, the wealth-income ratios were elevated in the 1800s, declined during the mid-twentieth century, and have risen in the twenty-first century. The US also had a U-shaped trend, but with distinct timings: it had high ratios leading up to the 1940s, a decline to lower levels lasting until the 1980s, and a resurgence in the 2000s. In contrast, Spain and the UK do not have a U-shaped trend. For these countries, the series remain relatively stable up to the 1990s, after which there is an ascent.

IV. Wealth Distributions

IV.1 Long-run Trends in Wealth Inequality

A select number of nations, primarily in Europe and North America, have wealth inequality time series spanning over a century. Figure 4.1 showcases fluctuations in the top 1% wealth shares—a benchmark measure for wealth inequality in historical studies—for six Western countries with comparable data.

Figure 4.1: Long-Run Trends in Top 1% Wealth Shares, 1890-2020.



Source: France: Garbinti, Goupille-Lebret and Piketty (2021), Piketty, Postel-Vinay and Rosenthal (2006); Germany: Albers, Bartels and Schularick (2022); Spain: Alvaredo and Artola Blanco (2023) for 1901–58, Martínez-Toledano (2020) for 1984–2015; Sweden: Roine and Waldenström (2009), Lundberg and Waldenström (2018); UK: Alvaredo et al. (2018); US: Saez and Zucman (2016, 2020) up until 1960 and Smith, Zidar and Zwick (2023) thereafter.

There was pronounced concentration of wealth a century ago. In Europe, the top 1% controlled between 50 and 70 percent of total wealth, whereas in the US this figure ranged from 40 to 50

percent. Between the 1920s and 1970s, there was a substantial decline in wealth disparity. By 1970, all the top 1% wealth shares in Figure 4.1 were between 15 and 25 percent. Since that period, Europe's top wealth shares have largely remained consistent, maintaining their historically low levels. In contrast, the concentration of wealth in the US has surged, although the extent of this increase remains under discussion.

The pronounced and synchronized trend of wealth equalization across European countries during the twentieth century is striking, especially given the varied political developments during this era. The influence of wars on wealth equalization naturally comes into question. During the First and Second World Wars, the participating nations had varied outcomes—some emerged victorious, one faced significant defeat, while two did not participate. Yet, despite these differences, all these countries witnessed a marked equalization in wealth ownership, with remarkable alignment in both levels and timing.

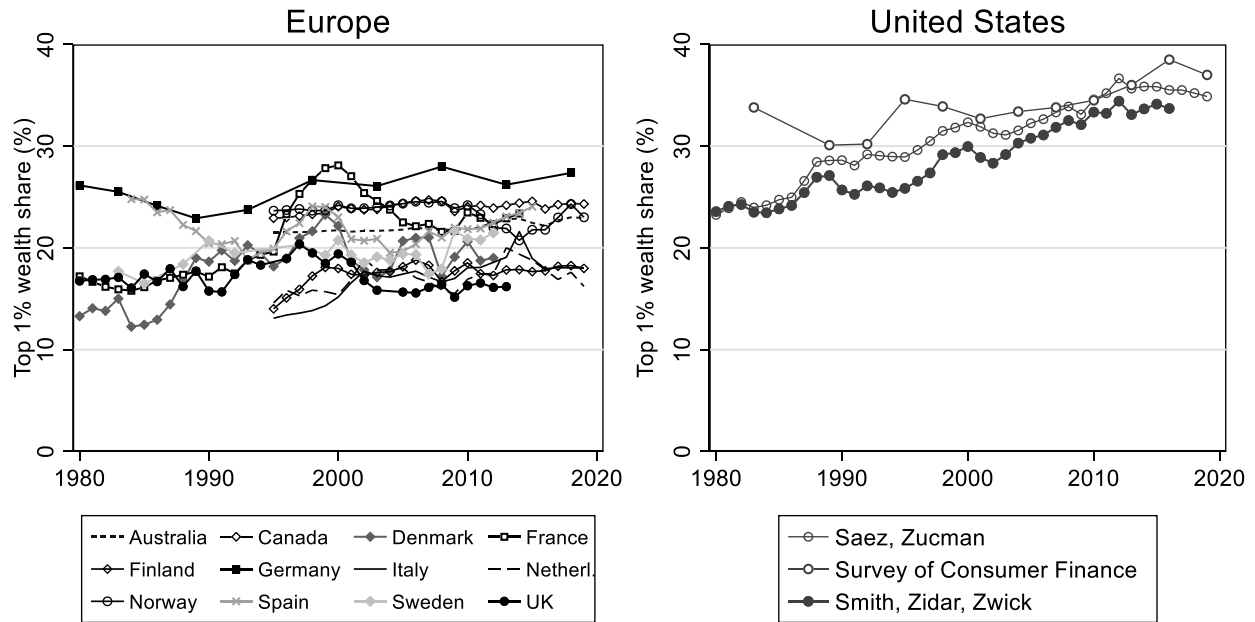
The relatively modest war-induced shifts in wealth inequality, due directly to tangible destruction of capital but also indirectly due to taxes and regulations, challenge some of the conclusions most emphasized in prior literature about the forces behind wealth equalization (Piketty 2014, Scheidel 2018).

IV.2 Wealth Inequality Since the 1980s

From the early 1980s up to the most recent data in the late 2010s, there was modest movement in wealth inequality in European countries. Figure 4.2 shows that the share of the top one percent in France edged up from 17 to 18 percent; Germany saw a marginal rise from 26 to 27 percent; Spain experienced a slight drop from 25 to 24 percent, and the UK's share contracted from 17 to 16 percent. This sustained stability over nearly four decades is indeed noteworthy. It counters the widely-held notion that Europe has been grappling with expanding wealth disparities in contemporary times.

While the most common trend in wealth concentration since the 1980s in advanced countries has been stability, some countries have witnessed significant upward shifts in top wealth shares. For instance, in Canada, the wealth share of the top percentile rose from 24 percent in 1984 to 29 percent in 2012. Similarly, in Italy, this metric increased from 16 percent in 1995 to 23 percent in 2015 and Sweden's share climbed from 18 to 24 percent. In the US, the top percentile's share rose from 25 percent in 1980 to around 35 percent in 2015.

Figure 4.2: Top 1% Wealth Shares in Western Countries since 1980.

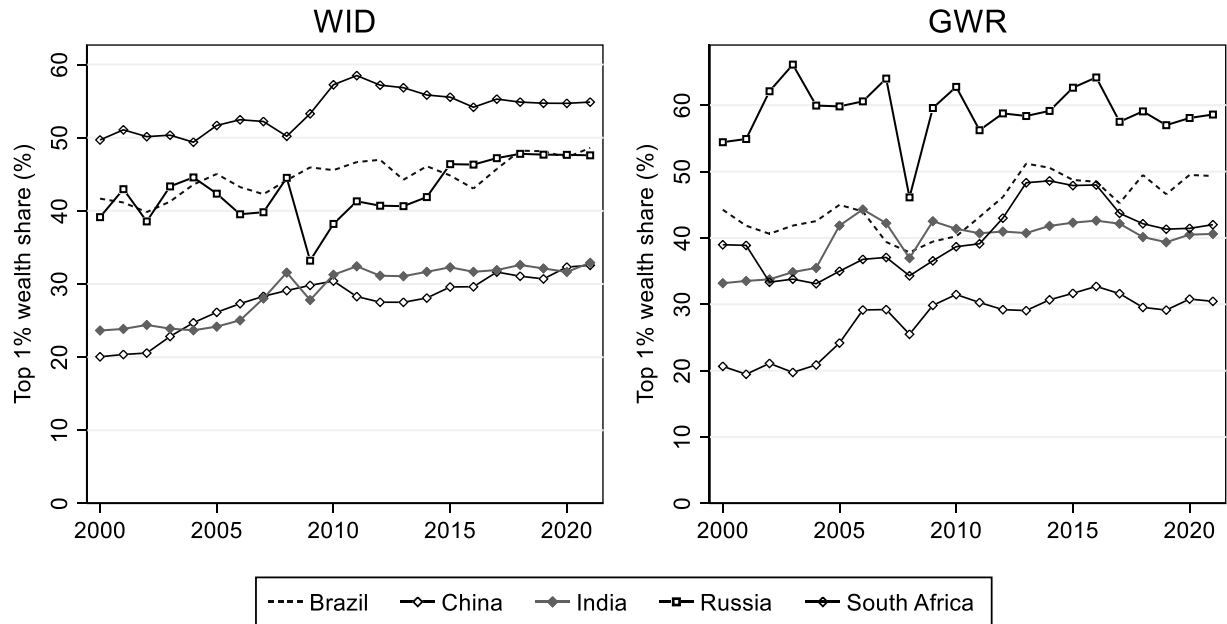


Source: Same as figure 4.1 with addition from Davies and Di Matteo (2021) for Canada, Jakobsen et al. (2020) for Denmark, and Acciari, Alvaredo and Morelli (2024) for Italy and World Inequality Database (2024) for Finland, the Netherlands and Norway. US: “Saez,Zucman” is Saez and Zucman (2016, 2020), “Smith, Zidar, Zwick” is Smith, Zidar and Zwick (2023), “SCF” (Survey of Consumer Finances) is Wolff and Marley (1989), Sabelhaus and Henriques Volz (2020). See Waldenström (2024) for a detailed description of data.

In recent years some time series have become available for a wider range of countries from the Credit Suisse Global Wealth Report GWR⁷ and the World Inequality Database (WID). Figure 4.3 charts their estimates of the wealth share of the top 1% in the BRICS group of emerging market countries. The WID estimates show a rising trend for the share of the top 1% in each of the BRICS countries over the period 1995–2022, as do the GWR estimates over 2000 to 2022 except for Russia which has a high but fluctuating share. The two sources agree that the largest increases were in China, followed by India. Looking at the WID data we see relatively low top 1% shares for China, India and Russia in 1995, with an average of just 20.4%. By 2022 this average had risen to 37.8% according to the WID and 42.7% according to the GWR. The low estimated initial top wealth shares in China and Russia are no doubt partly related to the fact that they were still in transition from a socialist to a market economy. The low share in India may reflect underdevelopment of finance and industry due to regulation and protection. Brazil and South Africa had high initial inequality, followed by significant increases; their average top 1% share rose from 44.6% in 1995 to 51.8% in 2022 according to the WID, but to just 45.3% in 2022 according to the GWR.

⁷ The Credit Suisse Research Institute published the GWR annually from 2010 to 2022. The Union Bank of Switzerland published the GWR in 2023. The data used here are from the 2022 GWR database.

Figure 4.3: Top 1% Wealth Shares in BRICS Countries, 2000 - 2022



Sources: WID, World Inequality Database (2024); GWR, Shorrocks, Davies and Luberas (2022).

IV.4 Wealth Inequality Trends - Summary

What do these wealth inequality trends tell us? First, over the long run, as Western countries continued to develop top wealth concentration dropped substantially. Research indicates that the wealth shares of lower groups rose due to the spread of popular wealth, for example in the form of owner-occupied houses and pensions (Atkinson and Harrison, 1978, Waldenström, 2024). That trend was complemented by a loss of wealth share among top groups due to such factors as wartime and depression-era losses and heavier taxes on income and inheritances.

More recent trends include stability of wealth inequality in most of Western Europe, but rising inequality in the US and the leading emerging market countries. Some of these changes reflect the contrasting behaviour of asset prices, with the stock market boom since 2010 in the United States for example boosting top fortunes. Others have been associated with the transition of some countries to a market economy or globalization, as discussed in Section VI below.

IV.5 Trends in Broader Wealth Inequality

We broaden our discussion by considering the implications of expanding the definition of wealth to include assets that are typically overlooked: concealed offshore assets and transfer wealth. The former usually reside in tax havens; the latter primarily represent the value of unfunded public pensions, often referred to as social security wealth. While prior research has identified the static influence of these assets on wealth inequality, it remains to investigate the possible effect on the trends highlighted above. Both of these assets are linked to institutional shifts over time, including deregulation of cross-country capital flows, and the continued rise of welfare states. We aim to discern whether inclusion of these assets has a substantial impact on long-term wealth concentration trajectories.

Offshore assets are often stored in jurisdictions with low or non-existent taxes. Their primary purpose is tax avoidance or evasion. These assets are generally concealed from authorities, creating challenges for estimation. Excluding offshore assets creates a risk of underestimating wealth inequality since a high proportion of offshore wealth is held by affluent families in high-income countries (Alstadsæter, Johannesen, and Zucman, 2018 – “AJZ”).

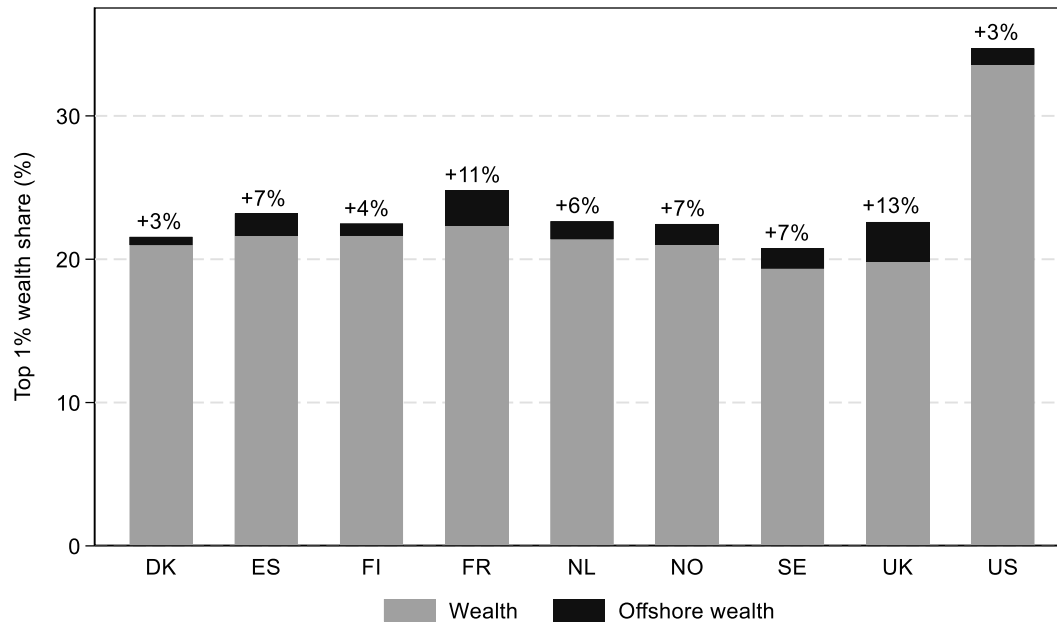
We incorporate estimated offshore assets to determine whether domestically estimated top 1% wealth shares rise when hidden foreign wealth is included. AJZ provide particularly trustworthy estimates of offshore wealth using 2007 data across multiple countries. They find that 55% of this hidden wealth is held by people in just five countries: the U.S. (19%), Russia (11%), Germany (10%), the UK (9%) and, France (7.2%).

We augment the observed domestic wealth of the top percentile with the offshore wealth estimated by AJZ. Figure 4.5 illustrates the outcomes, which provide two central insights. First, integrating offshore wealth increases measured inequality in each country studied. Second, the influence of offshore wealth on inequality, though undeniable, is relatively modest. The most pronounced effect is observed in the UK, where the wealth share of the top percentile rises from 20% to 22.5%, a 13% increment. Across all nations shown, the mean impact stands at 7%. The smallest effect is seen in Denmark, where the ascent from 21% to 21.5%, signifies a mere a 3% rise.

Transfer wealth represents a distinct household asset typically omitted from most analyses of wealth inequality. In principle it represents the present value of all expected government transfer payments net of contributions. In practice attention has focused on the value of unfunded public pensions, often referred to as social security wealth. Conventional wealth definitions do not categorize transfer wealth as an asset since it is not marketable and is usually unfunded. It represents an unenforceable claim on future disbursements by governments. Nevertheless, households may treat transfer wealth as akin to marketable wealth for some purposes. As some economists have stressed, social security wealth may offset private savings intended for retirement, illness, and other eventualities. (Feldstein, 1974, 1976; Munnell, 1976).

Recent studies have estimated the level and distribution of social security wealth in the US, Germany and other Western countries (Wolff, 2011; Wronski, 2023, Longmuir, 2023; Bönke et al. 2020; Kuhn, 2020). In computing social security wealth these studies factor in statutory stipulations pertaining to pensions and social security incomes, for varied worker categories. They also account for differences in life expectancy across demographic groups, including different birth cohorts. The methodology adds a premium to the discount factor to account for the unpredictability of pension benefits compared to present-day incomes. While the exact premium varies across studies it generally ranges between two and three percent.

Figure 4.5: Offshore Assets and Top 1% Wealth Shares.



Source: Waldenström (2024).

Figure 4.6 sums up the effect of including unfunded public pensions, i.e. social security wealth, on wealth inequality across European nations and the US using the Gini coefficient. The effect varies across countries, reducing the Gini coefficient by 13% in Spain, at one extreme, but by 36% in the Netherlands at the other extreme. Overall, the effect is to reduce the Gini coefficient for wealth substantially, from an average of 60 to 44.

Figure 4.6: The Effect of Social Security Wealth on Wealth Inequality in the Western World.



Source: Sierminska and Wroński (2022).

V. Levels and Distributional Impact of Inheritance

V.1 Levels of Inheritance

One may study either the flow or stock of inheritance. We look in turn at both.

Inheritance is a broad term, in principle referring to all intergenerational capital transfers – that is both bequests and gifts inter vivos. In practice, the term is often restricted to refer to bequests. In what follows we try to avoid ambiguity on that score.

V.1.1 Flow of Inheritances

The longest time series on the flow of bequests is provided by the inheritance tax in France, instituted in 1791, which in principle applied to all bequests. Piketty and Zucman (2015) report that the ratio of the annual flow of inheritances to income, b_{yt} , was about 20% in the early 1800s, but rose to around 24% toward the end of that century. After 1900 the ratio began to fall, with the biggest decrease during World War I. By 1920 b_{yt} was down to 10%. There was a further drop over the 1930s and World War II, producing a trough at 4% in 1950. By 1960 the ratio had risen to 6% and flattened out. After 1980 it began to rise again, reaching 14% in 2010.

In other countries, small estates or inheritances have generally been exempt from tax. Typically, this has meant that half or less of bequests are recorded. The impact on estimates of the aggregate flow is lessened, however, by the high inequality of inheritances, which in the UK for example resulted in about 98% of inheritances by value being recorded in 2005, although only about half of actual deaths were represented in the tax records (Atkinson, 2018, p. 151).

For Germany, Schinke (2012) reported a pattern similar to that in France – including a decline in b_{yt} through most of the twentieth century followed by an increase after 1970. The *level* of flows was lower in Germany than in France, however. Atkinson (2018) reports a decline in b_{yt} in the UK from 22% in 1900 to 17% on the eve of World War I, and then to 9% in 1920. There was a rebound in the 1920s, with the ratio reaching 15% in 1930, but by 1950 it was back down, to 10%. Subsequently b_{yt} fell, reaching 5% in 1980 and had only risen to 7% by the final year in Atkinson’s series, 2008.

Note that in a period when the ratio of wealth to income is rising, as in recent decades in many Western countries, b_{yt} would rise even if the ratio of the inheritance flow to total wealth were constant. Thus whether, or the degree to which, inheritance flows appear to become more important over time depends on whether they are viewed in relation to national income or wealth. For example, Waldenström (2024) finds that while the inheritance flow rose relative to national income in France, Sweden and the UK after 1980, the ratio of that flow to total wealth increased less in France and fell in Sweden and the UK.

V.1.2 Stock of Inherited Wealth

There has been much discussion of what fraction of current wealth can be attributed to inheritance, that is φ_t . There is a range of conceptual issues, discussed e.g. by Davies and Shorrocks (2000).

In the 1980s and 90s discussion centred on inherited wealth in the US. Opting not to capitalize, Modigliani (1988a,b) concluded that φ_t was only about 20% in the US. Kotlikoff and Summers (1981) did capitalize, estimating φ_t at around 80%. This higher figure was partly due to different assumptions, for example whether parental support for education should be included in inheritance. When the only change relative to Modigliani is capitalization, a narrower range of estimates was found – from about 35% to 40% (Blinder, 1988; Davies and Shorrocks, 2000).

As Davies and Shorrocks argued, and as Piketty et al. (2014) agree, the reasonable approach is to recognize that some portion of inherited wealth is consumed, so that full capitalization overstates the fraction of current wealth inherited. Piketty et al. (2014) present an approach allowing saving heterogeneity. They consider two groups. First there are “inheritors” whose assets are less than their capitalized inheritances because they consume more than their labor income. Second are the “savers” who consume less than their labor income and whose current assets exceed their capitalized inheritances. Data on the joint distribution of individual wealth and capitalized bequests over two generations are needed to apply this approach. Results for France indicate that φ_t was between 80 and 90% prior to World War I, fell after that to 44% by 1970 and rose to 67% at the end of the series in 2010.

Waldenström (2024) reviews the evidence on the ratio of the stock of inherited wealth to total wealth over the period since 1900 in five leading developed countries: France, Germany, Sweden, the UK and the US. He finds that this ratio trended downward in all five countries up to 1970. From 1970 to 1990 it began to rise in France and Germany, fluctuated in Sweden, and continued falling in the UK and US. After 1990 it rose in all these countries, but at a low rate in Sweden and the UK.

The size of φ_t can also be estimated with microdata, which yields lower figures, perhaps due to under-reporting of inheritances received. Using the 2004 UK Attitudes to Inheritance Survey (AIS), Karagiannaki and Hills (2013, p. 97) find $\varphi_t = 16%$ with zero capitalization but indexing

for inflation, while capitalizing at a 3% real rate yielded 28%. Also capitalizing at 3%, Wolff (2017, Table 7.2) found an average $\varphi_t = 23.4\%$ over the nine US SCF surveys from 1989 to 2013.

V.2 Distribution of Inheritances

Inheritances are distributed more unequally than total wealth. One sign of this is that many people inherit nothing. For example, 56% of respondents in the 2004 AIS had inherited nothing (Karagiannaki and Hills 2013), while the fraction who had not inherited averaged 80% in the SCF surveys examined by Wolff (2017). For comparison, only about 10 – 20% of households report zero or negative *net worth* in surveys. And where the full distribution of inheritances is reported the inequality is very high. Wolff (2017), for example, found an average Gini coefficient of 0.837 for total household wealth in the US over the nine SCF surveys from 1989 to 2013, but a Gini of 0.963 for inherited wealth.

One approach to the study of inheritance at the highest wealth levels has been to list the richest and inquire how they obtained their wealth. The Forbes lists began in 1987 and for many years categorized the rich as inheritors or self-made. Over time, the fraction of inheritors has fallen (Kaplan and Rauh, 2013). It is not clear how reliable these results are, however.

An alternative approach, which was followed especially in earlier years, is based on the use of probate data. Wedgwood (1928, 1929) examined the origins of the estates of rich male decedents in the UK in the 1920s. He concluded that about one third had inherited the bulk of their wealth and that another third were self-made. The remaining third had received an inheritance but had augmented it through their own efforts. Harbury and Hitchens (1979) applied a similar approach to the UK using data from the 1950s – 70s, finding results similar to Wedgwood's except that the role of inherited wealth had declined a little.

V.3 Effect of Inheritance on Wealth Inequality

Recent studies indicate a positive effect of inheritance on absolute wealth dispersion, as would be measured for example by the standard deviation, but a negative effect on relative inequality, which is captured e.g. by the Gini coefficient.

Using data from the Household Finance and Consumption Survey (HFCS) coordinated by the ECB, Fessler, Permin and Schurz (2018) found that only about one third of the households in the 13 European countries they study had received an inheritance. These recipients had higher average net worth than non-recipient households, indicating that inheritances increased absolute wealth inequality. This finding does not necessarily mean that inheritance increased *relative* inequality, the concept most often applied in distributional studies, since the larger inheritances of the rich could have been a smaller fraction of their wealth.

Studies that find inheritance reduces relative wealth inequality include Wolff and Gittleman (2014) for the US; Boserup et al. (2016) for Denmark; Crawford and Hood (2016) and Karagiannaki (2017) for the UK; and Elinder et al. (2018) for Sweden.⁸ The key in each study is that although households or individuals with higher non-inherited wealth on average inherit more, the

⁸ Although Karagiannaki (2017) reports that inherited wealth appears to reduce wealth inequality in UK survey data, she is reluctant to conclude that the result is definitive, in light of data limitations, and concludes that the UK evidence only suggests that inheritance has *little* effect on wealth inequality.

relationship is less than proportional. In other words, those lower in the distribution get inheritances that are larger as a per cent of their non-inherited wealth.

The US and UK studies are affected by well-known limitations of survey data. Results may be affected by imperfect recall of inheritances and the under-representation of the wealthy due either to their lower response rates or survey design.⁹

Elinder et al. (2018) is unaffected by survey problems. It uses population-wide data on both inheritance and wealth from fiscal sources, and has a panel of data, for 2002 – 2004. Tests for several possible sources of bias, including under-valuation of assets in both inheritance and wealth tax records, exclusion of consumer durables and gifts inter vivos, and behavioral effects of inheritance on saving are conducted. Adjustments for these mostly reduce the equalizing effect of inheritances, but leave it significant.

The empirical finding that inheritance reduces relative wealth inequality may appear surprising. It should be noted that it does not necessarily mean that inheritance reduces inequality in a broader sense. The impact on inequality of lifetime income, which is the sum of lifetime labour earnings, transfer payments and inheritances, could still be positive, since lifetime income and current net worth are imperfectly correlated.

VI: Globalization and Wealth Inequality

VI.1: Background

Globalization has political and social, as well as economic aspects. Here we are concerned only with the latter, which refers to the *process* whereby the world economy becomes more integrated. Below we mostly use the term “globalization” however, for simplicity.

The advent of globalization was signalled around 1980 when China began to open its doors both to a market economy and greater international trade. A further seam came in 1989-1990 with the onset of transition to a market economy in Russia and Eastern Europe. Globalization had its most intense phase from the mid 1990s until 2008, in the period of “hyperglobalization”. After 2008 the process slowed and in some respects went into reverse, especially after the election of a protectionist president in the US in 2016. The label of “deglobalization” has sometimes been applied to this most recent trend.

Economic globalization has two main aspects: increasing international trade and closer integration of financial markets. Trade rose from 37.0% of global GDP in 1980 to 43.2% in 1995. It then began its most rapid growth, rising to 59.4% of GDP by 2007. Over the years 1996 to 2007 the average annual growth rate of real international trade was 6.4%. In 2009 global trade fell sharply, but recovered by 2011. However, a slow slide then set in, so that trade stood at only 56.5% of global GDP in 2019, the last year before the COVID-19 pandemic.

The rise of trade was by no means uniform around the globe or over time. Most strikingly, trade rose as a % of GDP in China from 12.4% in 1980 to 64.5% in 2006. While it continued to rise fairly quickly in absolute terms after that, it had fallen to 35.9% of GDP by 2019. The great growth

⁹ It should also be noted that the US SCF survey, used by Wolff and Gittleman, omits the “Forbes 400” list of the wealthiest people in the US from its sample design. Thus the super-rich cannot be reached by this survey.

of Chinese exports is well-known, with 13.6% average real growth over the four decades after 1980, but the growth rate of imports, at 13.2%, was scarcely less. Thus, China served as a growing customer as well as supplier in international trade. India's trade also boomed, rising from 15.4% of GDP in 1980 to 55.8% in 2012, before falling to 37.8%. While both exports and imports rose quickly, in contrast to China India's imports grew somewhat faster than its exports.

A number of other countries in the East Asia – Pacific (EAP) region, such as Vietnam, Thailand, Indonesia and South Korea also had high trade growth. Leaving out China, the average growth rate of trade was 5.0% in this region. For the world as a whole, trade averaged 36.2% of GDP in the 1980s but 57.6% in the 2010s. The annual growth rate was 4.2%. In both the EU countries and North America the rate was 3.4%. While that represents strong growth, it is much below that seen in China, India and the EAP as a whole. One might therefore expect smaller impacts of trade globalization on the advanced Western economies and therefore on their distributions of income and wealth.

The second major aspect of economic globalization was financial. Throughout the 1980s, 90s and much of the 2000s, greater financial integration was strongly encouraged by the IMF, the World Bank and development agencies. Under the “Washington Consensus”, countries were advised to reduce or eliminate exchange controls, and to allow free movement of capital. Such steps were required in many agreements between the IMF and developing countries seeking loans. The end results were disappointing. While initially these policies led to greater capital flows, which were seen as beneficial, before long they exacerbated some serious financial crises – from the Peso Crisis of the early 1990s to the Asian Financial Crisis of 1997-98. Scathing criticism of the Washington Consensus policies by a former chief economist of the World Bank (Stiglitz, 2002) was followed by a softening of these policies in the mid to late 2000s (Rodrik, 2011).

VI.2 Impacts on Wealth Inequality

Over the period of globalization wealth inequality rose significantly in the US and somewhat in a few other advanced countries. At the same time, as we saw earlier, it showed little change in other leading economies, for example France, Germany and the UK. Meanwhile it rose substantially in the BRICS countries, especially China, Russia and India.

Viewed globally, wealth inequality fell significantly over this period (Davies and Shorrocks, 2021, 2022; World Inequality Database, 2022). This decrease was largely due to the rise of China, with much of its vast population rising out of poverty and many citizens becoming wealthy. Less rapid but still impressive growth in India and other emerging markets has also contributed to the decline in global wealth inequality.

While the impacts of globalization on *global* wealth inequality are not difficult to understand, the trends at country level are more complex. Consider the impacts of increased global trade on advanced economies. China's opening initially increased the global supply of labour intensive goods and services, and especially those intensive in less skilled labour. According to the Heckscher-Ohlin model of international trade, the expected impact would be a reduction in the wages of the less skilled, relative to both wages of the highly skilled and to capital income, in advanced countries, increasing income inequality. However, much empirical work has been done on this issue, concluding that trade liberalization explains less of the rise in income inequality than financial liberalization (see Heimberger, 2020, for a review of the evidence). Also, globalization in general was less important than technological change (see e.g. Edwards and Lawrence, 2013). It thus

seems plausible that the impact of globalization on wealth inequality in developed countries via the income inequality channel must have been relatively small.

Standard trade models would predict that unskilled workers in developing countries should have benefitted from the factor price effects of increased trade, tending to reduce income inequality in those countries, again perhaps causing a “knock-on” effect on wealth inequality. However, many developing countries that liberalized trade in the 1980s and 1990s are reported to have had rising rather than falling income inequality (Goldberg and Pavcnik, 2007; Heimberger, 2020). One possible reason is that migration of unskilled workers from rural to urban areas tends to prevent unskilled wages rising in the urban sector, in an effect first analyzed by Lewis (1954).

Another reason for income inequality rising, for a time, in some developing countries during globalization may be the Kuznets effect, which is also based on sectoral migration. Countries like China and India, have dual economies, with a split between a modern urban sector and a more traditional and initially larger rural sector. There is a sizeable gap between rural and urban incomes. During globalization, migration from the rural to urban sectors will initially raise income inequality if the urban-rural income gap is relatively unchanged, but eventually inequality will fall as the urban sector becomes dominant. Early empirical studies found that this effect was not universal in developing countries but interest has been revived as it has appeared to act itself out in China (Knight, 2014; Zhang, 2021).

Both China and India had a rise of income inequality in the initial phase of globalization but have more recently seen a decline. In India, the Gini coefficient for income was estimated at 32.0 in the early 1980s. It then rose to a peak of 35.4 in 2011 and by 2021 had gone down to 32.8. The pattern in China has been more pronounced, with the Gini rising from 32.2 in 1990, when it first became available, to a peak of 43.7 in 2010, but then falling, as in India, to 37.1 in 2020. How do these observations line up with the Kuznets effect? India saw its urban population rate from 23.1% in 1980 to 27.7% in 2000 and 30.9% by 2010. In recent years the trend has been stronger, with the urbanization rate reaching 35.9% in 2022. Changes in China were even more dramatic. The urbanization rate rose from 19.4% in 1980 to 63.6% in 2022. With the majority of the population in the urban sector in China now, the Kuznets effect should clearly now be working to reduce income inequality. But the same may also be occurring in India, since the downward inequality phase of the Kuznets effect begins before urbanization reaches 50%.¹⁰

The fact that income inequality has been falling in both China and India in recent years may help to explain why a slowing in the rise of wealth inequality was seen in both countries in the 2010s. But why was wealth inequality still rising, rather than falling along with income inequality? The reason could well lie partly in the effects of globalization on capital and finance.

Even without increased integration of global finance, trade liberalization by itself would be predicted to raise capital incomes, something that was indeed witnessed during globalization. Capital’s share of national income rose around the world (see e.g. Bourguignon, 2015). The increase in returns to capital would be reflected in a rise in prices of financial assets, which was also observed

¹⁰ The Gini coefficient is half the ratio of Gini’s mean difference or GMD (the average difference in income between any two individuals in the population) to the mean. While GMD initially rises in the Kuznets process, it does so at a declining rate that reaches zero when those populations are equal. On the other hand, the mean income rises throughout the process, so that the ratio of GMD to mean begins to fall before half the population is urban.

before and after the Global Financial Crisis of 2008. This gives an obvious link between globalization and wealth inequality since financial assets form a higher proportion of the portfolios of the wealthy. But financial integration has added to these effects.

Greater financial integration has meant increased flows of foreign direct investment, borrowing, and lending. So capital has been able to flow internationally to where it is most productive, again boosting financial asset prices. Further, the growth of multinational firms has been strongly stimulated. Their size has increased, leading to a rise in the fortunes of owners and executives. Crudely put, the result has been more billionaires. This trend has been especially strong in successful emerging market countries, of which China and India are the best examples. Once again, the result is greater wealth inequality.

The association of growth and development with the marked rise of both new firms and the entrepreneurs who start them in successful emerging markets strongly suggests that rapid economic development and rising wealth inequality tend to go together (Freund and Oliver, 2016). This was not only observed in the recent decades of globalization but also in the era of the “robber barons” in the US and in the Industrial Revolution that began in the UK in the late 18th century. The conclusion may be that even if rising wealth inequality does not cause fast growth, the latter seldom occurs without the former.

VII. Conclusion

Wealth inequality fell throughout the developed world in the first six decades of the twentieth century and has stayed at a lower level in most developed countries. This was caused by a range of influences, of which the spread of home ownership and pension wealth have been leading factors. Other forces at work have included the redistributive effect of progressive income and estate taxes. In contrast, wealth inequality has risen strongly in the leading emerging market countries over the period for which data are available, that is mostly since the 1990s. The rise has been strong in China and Russia, as they have transitioned to a market economy, but has also been seen in Brazil, India and South Africa.

Since the 1980s overall wealth inequality has risen in the US and a few other advanced countries. There has been much discussion about the causes of the short-term increase in wealth inequality in the US and it is unclear whether it augurs the beginning of a long-term trend. Proximate causes include the rapid rise in share prices and consequently in the relative importance of financial assets in household portfolios.

Most data on the distribution of wealth concern marketable wealth, which excludes defined benefit pensions and social security wealth. Including the latter reinforces the message that the long-term trend of wealth inequality has been downward, and weakens the apparent rise in wealth inequality in the US and a few other advanced countries in recent decades.

The distribution of inherited wealth is much more unequal than that of total wealth, and inherited and non-inherited wealth are positively correlated. However, on average, inherited wealth rises less than in proportion to other wealth as we go up the scale. The result is an accumulation of studies that now show a negative effect of inheritance on relative wealth inequality despite a positive effect on absolute wealth dispersion.

The negative effect of inheritance on relative wealth inequality may be due partly to a crowding-out effect of public pensions and health care on saving, which would likely reduce wealth in the bottom half of the distribution. That could help to explain the finding of a higher ratio of inherited to other wealth in the lower wealth ranges.

The yearly flow, and estimated stock, of inherited wealth both fell as a fraction of national income in most developed countries in the first six decades of the twentieth century. Since then a rise in these ratios has been found in some countries. However, the ratio of the flow of inheritance to total wealth, rather than to national income, has been more stable and has not consistently increased in recent decades. Further, while the stock of inherited wealth has generally risen as a fraction of total wealth in the most recent few decades, a strong increase has not been seen across all leading developed countries.

There have been some fears that rising inheritance could cause a new long-term trend toward increasing wealth inequality. Our conclusion is that that fear is likely unwarranted, both because inheritance appears to reduce wealth inequality as usually measured, and because the ratio of inherited to total wealth has not shown a uniform upward trend across the developed world.

References

Acemoglu, Daron and James A. Robinson (2015), The rise and decline of general laws of capitalism, *Journal of Economic Perspectives* 29 (1): 3-28.

Achdou, Yves, Han Jiequn, Jean-Michel Lasry, Pierre-Louis Lions and Benjamin Moll (2022), Income and wealth distribution in macroeconomics: a continuous-time approach, *Review of Economic Studies* 89: 45-86.

Advani, A., E. Chamberlain, and A. Summers (2020), *A Wealth Tax for the UK* (London: Wealth Tax Commission).

Acciari, Paolo, Facundo Alvaredo and Salvatore Morelli (2024), The concentration of personal wealth in Italy 1995-2016, *Journal of the European Economic Association*, online January, <https://academic.oup.com/jeea/advance-article/doi/10.1093/jeea/jvae002/7515274>

Aiyagari, S. Rao (1994), Uninsured idiosyncratic risk and aggregate saving. *The Quarterly Journal of Economics* 109 (3): 659–684.

Albers, Thilo N. H., Charlotte Bartels and Moritz Schularick (2022), Wealth and its distribution in Germany, 1895-2018, *CESifo Working Papers* 9739.

Alstadsæter, Annette, Niels Johannesen, and Gabriel Zucman (2018), Who owns the wealth in tax havens? Macro evidence and implications for global inequality, *Journal of Public Economics* 162(C): 89-100.

Alvaredo, Facundo and Anthony B. Atkinson (2018), Top wealth shares in the UK over more than a century, *Journal of Public Economics* 162: 26-47.

- Ameriks, John, Joseph Briggs, Andrew Caplin, Matthew D. Shapiro and Christopher Tonetti (2020), Long-term-care utility and late-in-life saving, *Journal of Political Economy* 128(6): 2375-2451.
- Ando, A. and F. Modigliani (1963), The "life cycle" hypothesis of saving: aggregate implications and tests, *American Economic Review* 53: 55-84.
- Atkinson, A.B. (1971), The distribution of wealth and the individual life cycle, *Oxford Economic Papers* 23: 239-254.
- Atkinson, A.B. (1980), Inheritance and the redistribution of wealth, in G.M. Heal and G.A. Hughes, eds., *Public Policy and the Tax System* (Allen and Unwin, London).
- Atkinson, A.B. (2018), Wealth and inheritance in Britain from 1896 to the present, *Journal of Economic Inequality* 16: 137-169.
- Atkinson, A.B. and A.J. Harrison (1978), *Distribution of Personal Wealth in Britain* (Cambridge University Press, Cambridge).
- Attanasio, Orazio P., and Agar Brugiavini (2003), Social security and households' saving, *Quarterly Journal of Economics* 118(3): 1075–1119.
- Attanasio, Orazio and Susann Rohwedder, (2003), Pension wealth and household saving: evidence from pension reforms in the United Kingdom, *American Economic Review*, 93, (5): 1499-1521.
- Autor, David H., Lawrence F. Katz, and Alan B. Krueger (1998), Computing inequality: have computers changed the labor market?, *Quarterly Journal of Economics* 113: 1169–1213.
- Autor, David H., Lawrence Katz, and Melissa S. Kearney (2006), The polarization of the U.S. labor market, *American Economic Review* 96 (2): 189-194.
- Becker, G.S. and N. Tomes (1979), An equilibrium theory of the distribution of income and inter-generational mobility, *Journal of Political Economy* 87(6): 1153-89.
- Benhabib, Jess, Alberto Bisin, and Mi Luo (2019), Wealth distribution and social mobility in the US: A quantitative approach, *American Economic Review* 109 (5): 1623-1647.
- Benhabib, Jess, Alberto Bisin and Shenghao Zhu (2011), The distribution of wealth and fiscal policy in economies with finitely lived agents, *Econometrica* 79 (1): 123-157.
- Benhabib, Jess, Alberto Bisin and Shenghao Zhu (2015), The wealth distribution in Bewley economies with capital income risk, *Journal of Economic Theory* 159: 489-515.
- Benhabib, Jess, Alberto Bisin and Shenghao Zhu (2016), The distribution of wealth in the Blanchard-Yaari model, *Macroeconomic Dynamics* 20: 466-481.
- Bernheim, B.D., A. Shleifer and L.H. Summers (1985), The strategic bequest motive, *Journal of Political Economy* 93: 1045-1077.
- Blinder, A.S. (1973), A model of inherited wealth, *Quarterly Journal of Economics* 87: 608-626.

- Blinder, A.S. (1974), *Toward an economic theory of income distribution* (MIT Press, Cambridge, Massachusetts).
- Blinder, A.S. (1988), Comments on chapter 1 and chapter 2, in D. Kessler and A. Masson, eds., *Modelling the Accumulation and Distribution of Wealth* (Clarendon Press, Oxford), pp. 68-76.
- Bönke, Timm, Markus M. Grabka, Carsten Schröder and Edward N. Wolff (2020), A head-to-head comparison of augmented wealth in Germany and the United States. *Scandinavian Journal of Economics*, 122: 1140-1180.
- Boserup, Simon H., Wojciech Kopczuk and Claus T. Kreiner (2016), The role of bequests in shaping wealth inequality: evidence from Danish wealth records, *American Economic Review* 106(5): 656-61.
- Bourguignon, Francois (2015), *The Globalization of Inequality* (Princeton University Press: Princeton).
- Bozio, Antoine, Carl Emmerson, Cormac O’Dea and Gemma Tetlow (2017), Do the rich save more? Evidence from linked survey and administrative data, *Oxford Economic Papers* 69(4): 1101–1119.
- Cagetti, Marco, Mariacristina De Nardi (2006), Entrepreneurship, frictions, and wealth, *Journal of Political Economy* 114 (5): 835–870.
- Cagetti, Marco and Mariacristina De Nardi (2009), Estate taxation, entrepreneurship and wealth, *American Economic Review* 99(1): 85-111.
- Cao, D. and W. Luo (2017), Persistent heterogeneous returns and top end wealth inequality, *Review of Economic Dynamics* 26: 301–326.
- Champernowne, D.G. (1953), A model of income distribution, *Economic Journal* 63: 318-351.
- Cox, D. (1987), Motives for private income transfers, *Journal of Political Economy* 95: 508-546.
- Cox, D. and M.R. Rank (1992), Inter-vivos transfers and intergenerational exchange, *Review of Economics and Statistics* 74: 305-314.
- Davies, James B. (1981), Uncertain lifetime, consumption, and dissaving in retirement, *Journal of Political Economy* 89: 561-577.
- Davies, James B. (1982), The relative impact of inheritance and other factors on economic inequality, *Quarterly Journal of Economics* 47: 471-498.
- Davies, James B. (1986), Does redistribution reduce inequality?, *Journal of Labor Economics* 4: 538-559.
- Davies, James B. and Livio Di Matteo (2021), Long run Canadian wealth inequality in international context, *Review of Income and Wealth* 67 (1): 134-164.
- Davies, James B., and Anthony F. Shorrocks (2000), The distribution of wealth, in Atkinson, A.B. and F. Bourguignon, *Handbook of Income Distribution Vol. 1*: 605-675 (North Holland Elsevier, Amsterdam).

- Davies, James B. and Anthony Shorrocks (2021), Comparing global inequality of income and wealth, chapter 3 of Carlos Gradin, Murray Leibbrandt and Finn Tarp (eds.), *Inequality in the Developing World* (Oxford University Press: Oxford).
- Davies, James B. and Anthony Shorrocks (2022), World inequality, in Klaus F. Zimmermann (ed.), *Handbook of Labor, Human Resources and Population Economics* (Springer): New York).
- De Nardi, Mariacristina (2004), Wealth inequality and intergenerational links, *Review of Economic Studies* 71(3): 743-768.
- De Nardi, Mariacristina and Giulio Fella (2017), Saving and wealth inequality, *Review of Economic Dynamics* 26: 280-300.
- De Nardi, Mariacristina and Fang Yang (2016) Wealth inequality, family background and estate taxation. *Journal of Monetary Economics* 77: 130–145.
- Dynan, Karen E., Jonathan Skinner and Stephen P. Zeldes (2004), Do the rich save more?, *Journal of Political Economy* 112 (2): 397-444.
- Elinder, Mikael, Oscar Erixson, and Daniel Waldenstrom (2018), Inheritance and wealth inequality: Evidence from population registers, *Journal of Public Economics* 165: 17-30.
- Erixson, Oscar and Henry Ohlsson (2019), Estate division: equal sharing, exchange motives, and Cinderella effects, *Journal of Population Economics* 2:1437–1480.
- Fagereng, Andreas, Luigi Guiso, Davide Malacrino and Luigi Pistaferri (2020), Heterogeneity and persistence in returns to wealth, *Econometrica* 88 (1): 115-70.
- Feldstein, Martin (1974), Social security, induced retirement and aggregate capital accumulation, *Journal of Political Economy* 82(5): 905-926.
- Feldstein, Martin (1976), Social security and saving: the extended life cycle theory, *American Economic Review* 66(2): 77-86.
- Fessler, Pirmin and Martin Schürz (2018), Private wealth across European countries: The role of income, inheritance and the welfare state, *Journal of Human Development and Capabilities* 19(4): 1-29.
- Freeland, Chrystia (2000), *Sale of the Century: Russia's Wild Ride From Communism to Capitalism* (Doubleday: Toronto).
- French, Eric, John B. Jones and Rory McGee (2022), Savings after retirement, Richmond Federal Reserve Bank working paper 22-12.
- Freund, Caroline and Sarah Oliver (2016), *Rich People, Poor countries: the Rise of Emerging-market Tycoons and Their Mega Firms*, (Peterson Institute for International Economics: Washington, DC).
- Gale, W.G. (1998), The effects of pensions on household wealth: a reevaluation of theory and evidence, *Journal of Political Economy* 106(4): 706–23.

- Garbinti, Bertrand, Jonathan Goupille-Lebret, and Thomas Piketty (2021), Accounting for wealth-inequality dynamics: methods, estimates and simulations for France, *Journal of the European Economic Association*, 19 (1). 620-63.
- Gokhale, Jagadeesh., Laurence J. Kotlikoff, James Sefton and Martin Weale (2001), Simulating the transmission of wealth inequality via bequests, *Journal of Public Economics* 79: 93-128.
- Goldberg, Pinelopi K. and Nina Pavcnik (2007), Distributional effects of globalization in developing countries, *Journal of Economic Literature* 45: 39–82.
- Gomez, Manuel A. (2021), Variable elasticity of substitution and economic growth in the neoclassical model, *Studies in Nonlinear Dynamics and Econometrics* 25 (5): 345-64.
- Harbury, C.D. and D.M.W.N. Hitchens (1979), *Inheritance and Wealth Inequality in Britain* (George Allen and Unwin. London).
- Heathcote, Jonathan, Fabrizio Perri and Giovanni L. Violante (2010), Unequal we stand: An empirical analysis of economic inequality in the United States, 1967–2006, *Review of Economic Dynamics* 13: 15–51.
- Heer, Burkhard (2001), Wealth distribution and optimal inheritance taxation in life-cycle economies with intergenerational transfers, *Scandinavian Journal of Economics* 103 (3): 335-465.
- Heimberger, Philipp (2020), Does Economic Globalisation Affect Income Inequality: A Meta-analysis, *World Economy*, 43(11): 2960-82.
- Helpman, Elhanan (2018), *Globalization and Inequality* (Harvard University Press: Cambridge, Massachusetts).
- Hendricks, Lutz (2007), How important is preference heterogeneity for wealth inequality? *Journal of Economic Dynamics and Control* 31 (9): 3042–3068.
- Hubmer, J., Krusell, P., Smith, A. A . (2020), Sources of U.S. wealth inequality: past, present, and future. *NBER Macroeconomics Annual* 35: 391-455.
- Huggett, Mark (1996), Wealth distribution in life-cycle economies, *Journal of Monetary Economics* 38(3): 469-494.
- İmrohoroğlu, Ayşe and Kai Zhao (2022), Rising wealth inequality: Intergenerational links, entrepreneurship, and the decline in interest rate, *Journal of Monetary Economics* 127: 86-104.
- Jakobsen, Katrine, Kristian Jakobsen, Henrik Kleven and Gabriel Zucman (2020), Wealth taxation and wealth accumulation: theory and evidence from Denmark, *Quarterly Journal of Economics* 135 (1): 329-88.
- Kaplan, Steven N., and Joshua Rauh (2013), It's the market: The broad-based rise in the return to top talent. *Journal of Economic Perspectives* 27 (3): 35-56.
- Karagiannaki, Eleni (2017), The impact of inheritance on the distribution of wealth: Evidence from Great Britain, *Review of Income and Wealth* 63 (2): 394-408.

- Karagiannaki, Eleni and John Hills (2013), Inheritance, transfers and the distribution of wealth, in John Hills et al., *Wealth in the UK: Distribution, Accumulation, and Policy*: 92-118 (Oxford University Press, Oxford).
- Knight, John (2014), Inequality in China: an overview, *The World Bank Research Observer* 29 (1): 1-19.
- Kopczuk, Wojciech and Joseph Lupton (2007), To leave or not to leave: the distribution of bequest motives, *Review of Economic Studies* 74: 207–235.
- Kotlikoff, L.J. and A. Spivak (1981), The family as an incomplete annuities market, *Journal of Political Economy* 89: 372-391.
- Kotlikoff, L.J. and L.H. Summers (1981), The role of intergenerational transfers in aggregate capital accumulation, *Journal of Political Economy* 89: 706-732.
- Krusell, P., A. Smith, Jr. (2015). Is Piketty's 'Second law of capitalism' fundamental?, *Journal of Political Economy* 123: 725–748.
- Kuhn, Ursina (2020), Augmented wealth in Switzerland: the influence of pension wealth on wealth inequality, *Swiss Journal of Economics and Statistics* 156, 19.
- Laitner, J. and E.T. Juster (1996), New evidence on altruism: a study of TIAA-CREF retirees, *American Economic Review* 86: 893-908.
- Lewis, W. Arthur (1954), Economic development with unlimited supplies of labour, *The Manchester School of Economic and Social Studies* 22: 139-91.
- Light, Audrey and Kathleen McGarry (2004), Why parents play favorites: Explanations for unequal bequests, *American Economic Review* 94(5): 1669-81.
- Lockwood, Lee M. (2018), Incidental bequests and the choice to self-insure late-life risks, *American Economic Review* 108(9): 2513-50.
- Longmuir, Maximilian (2023), Fair crack of the whip? The distribution of augmented wealth in Australia from 2002 to 2018. *Journal of Economic Inequality*, 21, 835–866.
- Lundberg, Jacob and Daniel Waldenström (2018), Wealth inequality in Sweden: what can we learn from capitalized income tax data?, *Review of Income and Wealth* 64 (3): 517-41.
- Madsen, Jakob B.; Minniti, Antonio; Venturini, Francesco (2018), Assessing Piketty's second law of capitalism, *Oxford Economic Papers* 70 (1): 1-21.
- Martinez-Toledano, Clara (2020), House price cycles, wealth inequality and portfolio reshuffling, *WID.world Working Paper* 2020/02.
- Mattauch, Linus, David Klenert, Joseph E. Stiglitz and Ottmar Edenhofer (2022), Overcoming wealth inequality by capital taxes that finance public investment, *Structural Change and Economic Dynamics* 63: 383-395.

- Modigliani, Franco (1986), Life cycle, individual thrift and the wealth of nations, *American Economic Review* 76 (3): 297-313.
- Modigliani, Franco (1988a), The role of intergenerational transfers and life cycle saving in the accumulation of wealth, *Journal of Economic Perspectives* 2: 15-40.
- Modigliani, Franco (1988b), Measuring the contribution of intergenerational transfers to total wealth: conceptual issues and empirical findings, in D. Kessler and A. Masson, eds., *Modelling the Accumulation and Distribution of Wealth* (Clarendon Press, Oxford): 21-52.
- Modigliani, Franco (1988c) Life cycle, individual thrift and the wealth of nations, *American Economic Review* 76(3): 297–313.
- Modigliani, Franco, and Richard H. Brumberg (1954) Utility analysis and the consumption function: an interpretation of cross-section data, in Kenneth K. Kurihara, ed., *Post-Keynesian Economics*, New Brunswick, NJ. Rutgers University Press: 388–436.
- Munnell, Alicia (1974), The impact of social security on personal saving, *National Tax Journal* 27(4): 553-567.
- Nirei, Makoto and Aoki Shuhei (2016), Pareto distribution of income in neoclassical growth models, *Review of Economic Dynamics* 20: 25-42.
- Piketty, Thomas, (2011), On the long-run evolution of inheritance: France 1820--2050, *Quarterly Journal of Economics* 126 (3): 1071-1131.
- Piketty, Thomas (2014), *Capital in the Twenty-first Century*, (Harvard University Press: Cambridge, Massachusetts).
- Piketty, Thomas, and Emmanuel Saez. (2014), Inequality in the Long Run, *Science* 344: 838–43.
- Piketty, Thomas, Gilles Postel-Vinay, and Jean-Laurent Rosenthal (2006), Wealth concentration in a developing economy: Paris and France, 1807-1994, *American Economic Review* 96 (1): 236-256.
- Piketty, Thomas, Gilles Postel-Vinay, and Jean-Laurent Rosenthal (2014), Inherited vs self-made wealth: Theory & evidence from a rentier society (1872–1927), *Explorations in Economic History* 51(C): 21-40.
- Piketty, Thomas, and Gabriel Zucman (2014), Capital is back: Wealth-income ratios in rich countries 1700-2010, *Quarterly Journal of Economics* 129 (3): 1255-1310.
- Piketty, Thomas and Gabriel Zucman (2015), Wealth and inheritance in the long run, in Atkinson, Anthony B. and Francois Bourguignon (eds.) *Handbook of income distribution*, Vol. 2A, (North Holland Elsevier, Amsterdam: 1303-1368.)
- Pryor, F. (1973), Simulation of the impact of social and economic institutions on the size distribution of income and wealth, *American Economic Review* 63: 50-72.
- Quadrini, Vincenzo, and José-Victor Ríos-Rull (1997), Understanding the U.S. wealth distribution. *Quarterly Review -Federal Reserve Bank of Minneapolis* 21 (2): 1–21.

- Quadrini, Vincenzo, and José-Victor Ríos-Rull (2014), Inequality in macroeconomics. in Atkinson, A.B., Bourguignon, F. (eds.), *Handbook of Income Distribution*, vol. 2B. (North Holland Elsevier, Amsterdam: 1229-1302.
- Ravallion, Martin (2021), What might explain today's conflicting narratives on global inequality?, in *Inequality in the Developing World*. edited by Carlos Gradín, Murray Leibbrandt, and Finn Tarp, Oxford University Press (2021).
- Rodrik, Dani (2011) *The Globalization Paradox, Democracy and the Future of the World Economy* (W.W. Norton and Company: New York, London).
- Roine, J., Waldenström, D. (2009). Wealth Concentration over the Path of Development: Sweden, 1873–2006, *Scandinavian Journal of Economics* 111(1): 151–187.
- Saez, Emmanuel and Gabriel Zucman (2016), Wealth inequality in the United States since 1913: evidence from capitalized income tax data, *Quarterly Journal of Economics* 131 (2): 519-78.
- Saez, Emmanuel and Gabriel Zucman (2019), Progressive wealth taxation, *Brookings Papers on Economic Activity*, Fall: 437-511.
- Saez, Emmanuel and Gabriel Zucman (2020), The rise of income and wealth inequality in America: Evidence from distributional macroeconomic accounts, National Bureau of Economic Research. Working Paper 27922.
- Scheve, Kenneth and David Stasavage (2016), *Taxing the Rich*, (Princeton University Press, Princeton).
- Scheidel, Walter (2018), *The Great Leveler: Violence and the History of Inequality from the Stone Age to the Twenty-First Century*, (Princeton University Press, Princeton).
- Schinke, Christoph (2012). Inheritance in Germany 1911 to 2009: A mortality multiplier approach, *SOEP papers on Multidisciplinary Panel Data Research* 462, DIW Berlin.
- Shorrocks, Anthony F. (1975), On stochastic models of size distribution, *Review of Economic Studies* 42: 631-641.
- Shorrocks, Anthony F., James B Davies and Rodrigo Luberas (2022), *Global Wealth Report*, (Credit Suisse Research Institute, Zurich).
- Smith, Matthew; Owen Zidar and Eric Zwick (2023), Top wealth in America: New estimates under heterogeneous returns, *Quarterly Journal of Economics* 138 (1): 515-73.
- Stiglitz, Joseph (2002), *Globalization and Its Discontents* (W.W Norton and Company: New York, London).
- Tomes, N. (1981), The family, inheritance, and the intergenerational transmission of inequality, *Journal of Political Economy* 89: 928-958.

Waldenström, Daniel (2024), *Richer and More Equal: A New History of Wealth in the West*, (Polity Books, London).

Wedgwood, Josiah (1928), The influence of inheritance on the distribution of wealth, *Economic Journal* 38: 38-55.

Wedgwood, Josiah (1929), *The Economics of Inheritance* (George Routledge & Sons: London).

Weil, David N. (2015), Capital in the twenty-first century, *American Economic Review Papers and Proceedings* 105(5): 34-37.

Wolff, Edward N. and Marcia Marley (1989), *The Measurement of Saving, Investment, and Wealth*, National Bureau of Economic Research Studies in Income and Wealth, vol. 52 Chicago and London: University of Chicago Press.

Wolff, Edward N. (2017), *A Century of American Wealth* (Harvard University Press: Cambridge, Massachusetts).

Wolff, Edward N. and Maury Gittleman (2014), Inheritances and the distribution of wealth or whatever happened to the great inheritance boom? *Journal of Economic Inequality* 12: 439–468.

World Inequality Database (2024), Paris: <https://wid.world/>

Wronski, Marcin (2023), The impact of social security wealth on the distribution of wealth in the European Union, *Journal of the Economics of Ageing* 24 (2).

Zhang, Junsen (2021), A survey on income inequality in China, *Journal of Economic Literature* 59 (4): 1191-1239.