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Must Capital Income Increase Long-Term Inequality? Evidence from Sweden 1991–2021

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Abstract

Capital income is known to increase income inequality when measured on an annual basis, but the role of personal capital income in long-run inequality is rarely studied. Theoretically, capital income can increase or decrease long-term inequality depending on the correlation with other income. We examine, using Swedish register data, the evolution of annual and long-term income inequality in Sweden 1991-2021, using disposable income with and without capital income. Capital income had a marginally equalizing effect on long-term inequality for the period 1991 to 2006 but added substantially to long-term inequality for the period 2007 to 2021. To fully understand the distributional effects of capital income, a long-term perspective is needed.

JEL-codes: D31, D63, E22

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1. Introduction.

In recent decades, income inequality has increased in many countries. The trend is typically illustrated using time-series of annual income distributions (e.g. Cingano 2014, Milanovic 2016, Chancel and Piketty 2021, Vuković and Damijan 2025). It is also well-known that inequality of incomes summed over time periods longer than one year – often referred to as long-term inequality – tends to be lower than inequality of annual income (Björklund 1993, Gottschalk and Moffitt 2009).[1] It remains an open question whether the *increase* in inequality is greater for long-term inequality than for annual income inequality. Theoretically, the increase in long-term inequality can be larger, smaller or non-existent, even when annual income inequality is increasing rapidly.[2]

Another well-established pattern is that annual income inequality is typically higher when capital income is included, and that capital income is a factor behind the increase in inequality of annual income (Hoffmann et al. 2020, Krolage et al. 2022, Fräßdorf et al. 2011). Including capital income when examining income inequality is important for several reasons. Most obviously, higher capital income means ceteris paribus means higher disposable income and thus better consumption opportunities. In societies with a large leisure class (Veblen, 1899) a significant number of people do not work for income but still earn substantial capital income, and ignoring capital income will substantially underestimate inequality. Finally, if capital income is becoming increasingly important over time (as suggested by Piketty and Zucman 2014, but to some extent disputed by Waldenström 2024), the bias induced by ignoring them will increase. However, because accounting for capital incomes requires detailed data, empirical studies of the role of capital income in long-term inequality using individual level data are rare.

In Sweden, capital income has in been the main explanation of rising annual income inequality after 2000 (Roine and Waldenström 2012, Waldenström 2020). Because capital income includes long-term realized capital gains, its impact on the annual income distribution is likely to differ from the impact on long-term inequality. Theoretically, capital income may lower long-term inequality even when it increases inequality of annual income. That happens, for example when capital income significantly increases the earnings of a subset of individuals each year, but over a longer period result in a relatively even distribution of capital income across the income distribution. Given that an important part of capital income comes from selling houses and apartments, such a scenario cannot be excluded. On the other hand, if low-income earners are less prone to residence ownership, or if other types of capital income tend to be higher among high income earners, capital income may add to long-term inequality. The question must thus be settled empirically.

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[1] Gottschalk and Moffitt (2009) showed that the transitory component of male earnings in the US explains about half of the increase in annual income inequality 1974-1990. For Sweden, Björklund (1993) calculated that inequality of long-term income (summed from 1951 to 1989) was about 35 to 40 percent lower than inequality of annual income.

[2] For example if the career wage gradient becomes steeper for everyone, annual income inequality will increase but inequality of life-time inequality may not increase at all, or only marginally.

Empirical studies of capital income and inequality often apply a historical macro-perspective. Piketty and Zucman (2014) famously documented a long-run U-shaped trend in private wealth-to-income ratios in United States, United Kingdom, Germany, and France, showing a dramatic rebound of capital accumulation since the 1970s after a decline during the early 20th century. Later studies added countries and revised the data (see Blanco et al., 2021 for Spain and Waldenström 2017 for Sweden), making the U-shape less pronounced. Some studies focus on the relationship between the capital share of GDP and top income shares, ie. the proportion of total income received by the top 1 or 10 percent of income earners. For example, Bengtsson and Waldenström (2018) document a strong, positive link between the capital share in national income and top personal income shares. Similarly, Berisha & Meszaros (2020) show that a higher capital share is associated with higher income inequality in the US, and that lower interest rates are associated with higher capital shares.

In contrast to the literature using macro-data, empirical studies of the role of personal capital income in long-term inequality using individual level data are rare. The study most closely related to ours is Roine and Waldenström (2012) who used a nationally representative sample of about 3 percent of the Swedish population to study the role of realized capital gains (a subset of all capital income) for top income shares in Sweden. They concluded that the impact of capital gains on top-income shares has increased since 1980, both for annual incomes and for long-term incomes (in their paper typically measured over five years).

Our study extends and improves on the study by Roine and Waldenström (2012) in several ways. First, we use total population register data rather than a small population sample. Second, we examine three inequality measures (the Gini-coefficient, the P90/P50 ratio and the P50/P10 ratio) for both annual and long-term disposable income, with and without capital income included. Third, we study two longer periods, 1991–2006 and 2007–2021. Compared to Roine and Waldenström, that allows us to calculate long-run inequality over a longer time-period while still examining how long-run inequality has changed over time (by comparing the earlier and the latter period).

The calculations use register data that cover the entire population aged 20 or older. Three main results emerge. First, we show that capital income may (depending on the time-period and the inequality measure) decrease long-term inequality, especially in the lower half of the income distribution. Second, when comparing the period 1991–2006 and 2007–2021, long-term inequality has increased substantially when capital income is included, suggesting that the increase in annual inequality is not explained by transitory fluctuations. Third, we find that the distributive profile for capital incomes has changed over the studied period. In the earlier period, capital income did not increase long-term inequality at all, but during the period 2007 to 2021, they contributed substantially to long-term inequality. To illustrate the transition, we show that the correlation between capital income and other income (labor income and transfers) has increased and switched sign from negative to positive between 1991 and 2021.

The paper proceeds as follows: Section 2 presents the the inequality measures used, including the Gini coefficient and the P90/P50 and P50/P10 ratios, and discusses their interpretation and limitations. Section 3 describes the data, focusing on the Swedish register-based longitudinal database LISA and its advantages over sample surveys for measuring annual and long-term inequality. Section 4 presents the empirical results, comparing annual and long-term inequality with and without capital income for the periods 1991–2006 and 2007–2021, and examining how the correlation between capital income and other income has evolved. Section 5 offers a concluding discussion, summarizing the main findings and considering possible explanations for the changes observed in the distributional impact of capital income.

2. Measuring Inequality

The Gini-coefficient is one of the most widely used summary measures of income inequality. It quantifies the extent to which the distribution of income among individuals or households deviates from a perfectly equal distribution. Formally, the Gini-coefficient is defined as:

$$G = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} |y_i - y_j|}{2n^2 \mu}$$

where y_i and y_j are incomes of individuals i and j, n is the number of individuals, and μ is the mean income of the population.

The value of the Gini-coefficient ranges between 0 **(**perfect equality in the sens that everyone has the same income) and 1 (perfect inequality in the sense that one individual has all the income). In practice, Gini values for disposable income tend to fall between 0.25 and 0.5 in most OECD countries.

While the Gini coefficient is useful for summarizing inequality in a single number, it has several limitations. Most importantly, a change in the Gini coefficient can arise from changes in the top, the middle, or the bottom of the distribution. Thus, it does not show whether inequality is due to poverty (bottom tail) or affluence (top tail). To address these issues, this study supplements the Gini-coefficient with two income ratio measures:

- P90/P50 (top-to-middle ratio) compares the income at the 90th percentile to the median income. It captures the degree of affluence or top-end inequality.
- P50/P10 (middle-to-bottom ratio) compares the median income to the 10th percentile income, highlighting the extent of poverty or bottom-end inequality.

These ratios are intuitive, easy to compute, and allow for a decomposition of inequality into top and bottom components. They are both widely used in comparative work to understand whether inequality changes are driven by gains at the top or losses at the bottom (or both).

3. Data

Our data come from the comprehensive register-based longitudinal database LISA (Longitudinal Integration Database for Health Insurance and Labor Market Studies), developed by Statistics Sweden, for the period 1991–2021. Unlike surveys or samples, the LISA database includes the entire Swedish population aged 15 and older who are registered in Sweden as of December 31 each year. Because LISA is register-based and longitudinal, individuals can be followed year by year over time, allowing researchers to track life-course dynamics and, as in our case, measure long-run inequality, rather than just annual snapshots. As a product of Statistics Sweden (SCB), the LISA database is consistently structured, well documented and trusted in both national and international research contexts.

While the LISA database offers full population coverage and high-quality administrative data, some potential limitations must be acknowledged—particularly regarding capital income. If capital is moved to other countries, as a result of tax evasion or tax avoidance, register data will be wrong. Even of that capital is taxed and registered in another country, it may still be used for consumption in Sweden. If such practices are more common among high-wealth individuals, our estimates could understate the true level of inequality, especially at the top of the distribution.

Our inequality metrics are calculated for the population aged 20 and older. Inequality metrics are calculated using individual disposable income with and without capital income included, both measured in constant prices. Disposable income includes labor and capital income, taxable and non-taxable benefits, and is measured net of taxes. Capital income contains realized capital gains, interests, and dividends.

After a major tax reform Sweden introduced a dual tax system in 1991. In dual tax systems, labor income is taxed progressively while capital income is taxed proportionally. This year is therefore the natural starting point of our analysis. We follow individuals as long as possible, which means that the most recent year in our data is 2021, which is in total 31 years of data. Because we are interested in changes in long-term inequality, we divide the time period into an early and a more recent period, 1991-2006 and 2007-2021.

4. Results

The main results using the Gini-coefficient are summarized in table 1a. For the years 2006 and 2021, we calculate the Gini-coefficient for disposable income with and without capital income. As expected, inequality has increased between these two years, and more so when capital income is included: 14.8 and 9.7 percent including and excluding capital income, respectively. In the two rightmost columns we have calculated the Gini-coefficient for incomes summed over the periods 1991-2006 and 2007-2021, again with and without capital incomes. For long-term income the Gini-coefficient has increased by 21.2 and 10.1 percent including and excluding capital income, respectively. A striking observation from these statistics is that the rise in inequality between 2006 and 2021 is higher for long-term income than it is for

annual income. Thus, factors such as transitory incomes or steeper career wage profiles do not explain the recent upwards trend in annual inequality in Sweden.

Another conclusion from Table 1a is that for the earlier period, capital income hardly increased long-term inequality at all: Including capital income in the calculation of long-term inequality raises the Gini-coefficient only marginally (from 0.258 to 0.260).[3] For the more recent period, capital income increased long-term inequality by 10.9 percent (.315 – .284)/.284).

While the Gini coefficient is a widely used measure of income inequality, it is less informative on where in the income distribution changes occur. In Table 1b and 1c, we use the P90/P50 and P50/P10 ratios as supplementary inequality metrics. The P90/P50 ratio compares incomes at the 90th percentile to those at the median, highlighting inequality in the upper half of the distribution, while the P50/P10 ratio compares the median to the 10th percentile, shedding light on inequality in the lower half.

Table 1. Annual and long-term inequality for disposable income with and without capital incomes

a. Gini-coefficients

	Gini for annual income		**Gini for long-term income**	
	Incl capital income	Excl capital income	Incl capital income	Excl capital income
2006	0,334	0,298	0,260	0,258
2021	0,384	0,327	0,315	0,284
Increase (percent)	**14,8**	**9,7**	**21,2**	**10,1**

b. P90/P50

	P90/P50 for annual income		**P90/P50 long-term income**	
	Incl capital income	Excl capital income	Incl capital income	Excl capital income
2006	1,779	1,752	1,637	1,672
2021	1,850	1,804	1,810	1,764
Increase (percent)	**4,0**	**3,0**	**10,6**	**5,5**

c. P50/P10

	P50/P10 for annual income		**P50/P10 long-term income**	
	Incl capital income	Excl capital income	Incl capital income	Excl capital income
2006	2,110	2,173	1,805	1,931
2021	2,393	2,416	1,951	1,961
Increase (percent)	**13,4**	**11,2**	**8,1**	**1,6**

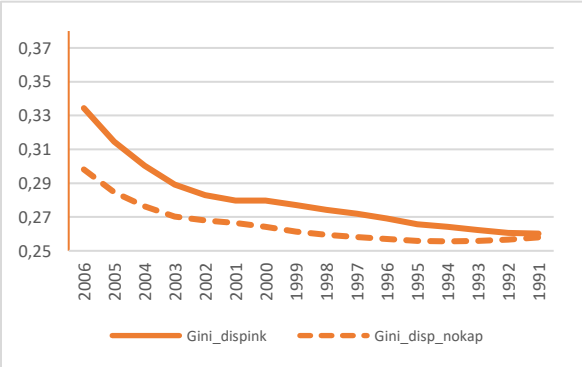
[3] Note that we are reporting measurement based on a population register, not inferring from a sample.

The percentile ratios in table 1b and 1c reveal that, for the earlier period, capital income lowered long-term inequality in both the upper and the lower half of the income distribution (e.g. by (1.931-1.805)/1.931 ≈ 7% for P50/P10). For the more recent period, capital income still marginally lowered (0.5 percent) the P50/P10 ratio of long-term income (but the same is true for annual income). To summarize, the analysis has shown that capital income can in fact decrease long-term inequality, especially in the lower half of the income distribution. But it no longer does so in Sweden.

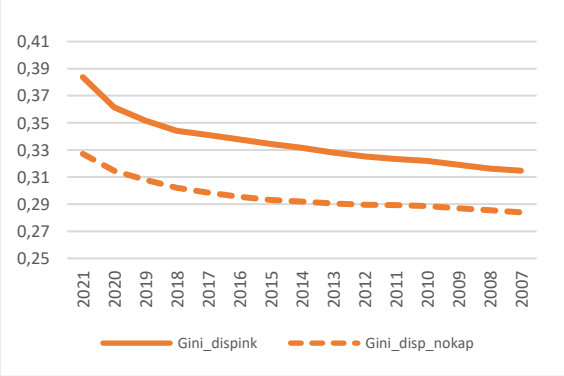
Figure 1 illustrates how the three inequality metrics change when incomes are summed up over more years. The values for 2021 in Figure 1a are the Gini-coefficients for the income distribution in 2021 (with and without capital incomes), the values for 2020 are Gini-coefficients calculated when incomes are averaged over the years 2020 and 2021, and so on until 2006 where values are based on all incomes during the 2006 to 2021 period. Thus, for the year 2021 the Gini-coefficients in Figure 1a are the same as the Gini-coefficients for annual income in 2021 in Table 1a, and for the year 2006 the Gini-coefficients in Figure 1a are the same as the Gini-coefficients for long-term income in 2021. Figure 1b illustrates the same exercise but starting with the year 2006 and summing back to 1991 at the longest. The remaining graphs repeat the exercise for different inequality metrics.

Figure 1. The effect of calculating inequality metrics for longer time periods.

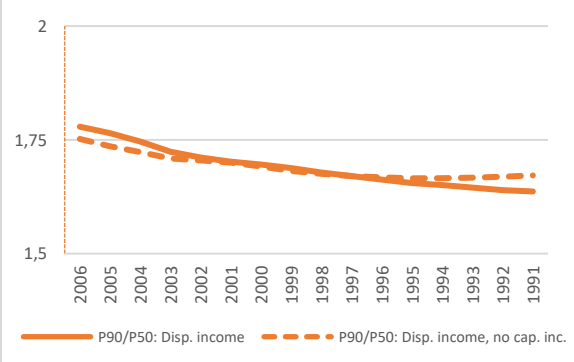
a. Gini, 1991-2006



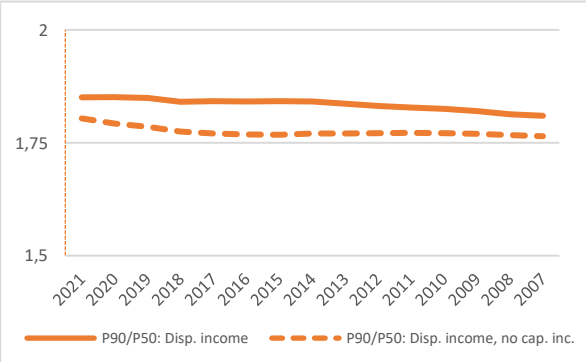
b. Gini, 2007-2021



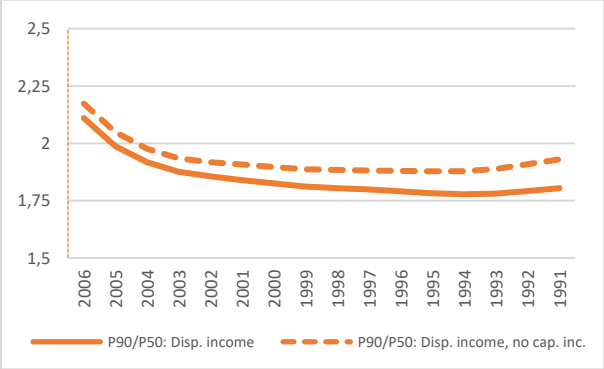
c. P90/P50, 1991-2006



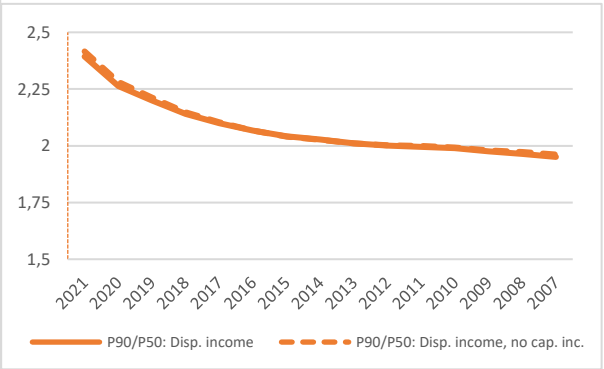
d. P90/P50, 2007-2021



e. P50/P10, 1991-2006



f. P50/P10, 2007-2021

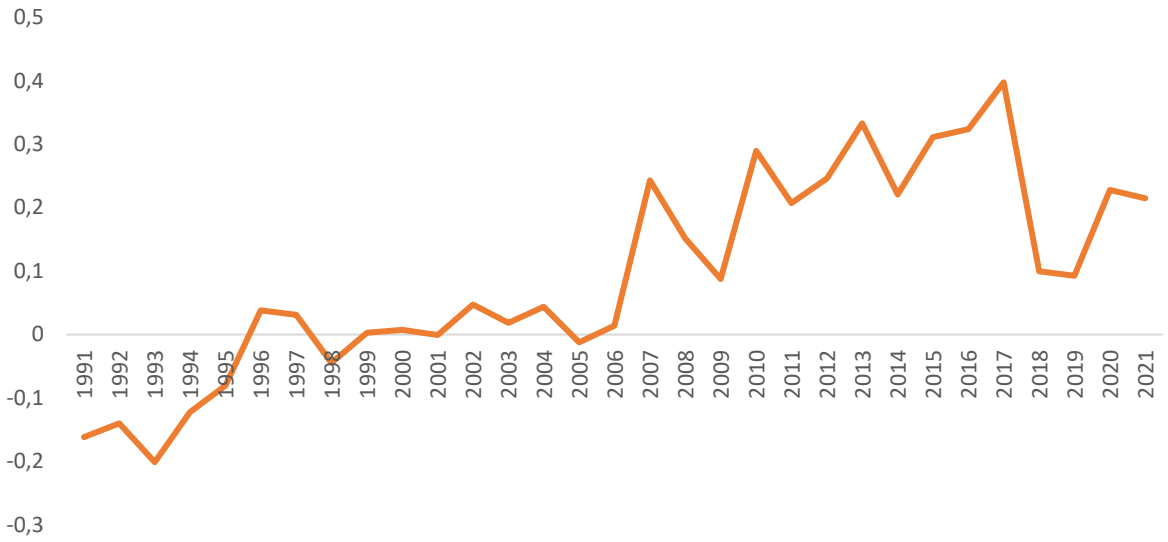


The graphs in figure 1 indicate that when incomes are summed over longer periods, income inequality typically falls (as expected based on previous studies). The effect is larger (in the sense that inequality decreases more) when capital incomes are included, suggesting that capital income fluctuates more from year to year. When incomes are summed from 1991 to 2006, Gini inequality is almost exactly the same with and without capital income. Using the P90/P50 metric, capital income decreases long term inequality when incomes are summed from 2006 back to 1996 (fig 1d). Finally, for the lower half of the income distribution as captured by the P50/P10 metric, capital income are equalizing even for annual inequality and more so for long-term inequality (see Figure 1e and 1f).

From a normative egalitarian point of view, the findings above might be considered good news. But when comparing the two periods, the equalizing effect of capital income has fallen or disappeared completely in the latter period. That is arguably bad news from the same normative point of view.

What explains the difference between the two periods in how capital incomes impact long-term inequality? A hint is provided by figure 2 which shows that the correlation between capital income and other income (i.e. labor and transfer income) has increased and changed sign: It was negative in the early 1990s, fluctuating around zero for a decade beginning in the mid-1990s, and has been positive and possibly also increasing from 2006.

Figure 2. The correlation between capital income and other income (net of taxes) 1991–2021.



5. Concluding discussion

"Realized capital gains are typically disregarded in the study of income inequality" wrote Roine and Waldenström (2012, p. 569). After Piketty (2014) that has arguably changed, and we now know that capital incomes are an important reason why income inequality and top-income shares are increasing. Using the case of Sweden, we have shown that capital incomes need not increase long-term inequality and probably did not do so in Sweden before 2006.

Around the world, the focus on capital and capital income has fueled a political debate where some advocate higher taxes on wealth, capital gains, and dividends to curb inequality, while others argue for lower taxation and favorable treatment of capital to promote investment and entrepreneurship. Our findings add nuance to that debate by showing that long-term and short-term effects of capital income on inequality may differ substantially, and that the nature of capital income can change over time. It is thus blunt, both from a normative and descriptive perspective, to lump all capital incomes. Instead, we hope that future research will look more closely at inequality effects of different types of capital, e.g. housing wealth, pension savings and dividends. Given the booming housing prices in many countries, it seems particularly important to explore the role of realized capital gains from real estate. When housing prices were comparatively low, many households could afford to own a house or a flat, and as a result many gained from the booming real estate market. When prices are higher, more households are likely to be cash constrained, and as a result capital gains from real estate will be skewed towards high-income earners.

The fact that capital income after 2006 is increasingly correlated with other income suggest that capital incomes in Sweden propagate inequality also in a longer perspective. Identifying the reason for this change

is beyond the purpose of this note, but several studies have noted that the combination of high marginal tax rates on top labor incomes and low taxes on capital creates strong economic incentives to transform labor income into low taxed capital income, so-called income shifting or tax shifting. Moreover, the Swedish system underwent a profound reform in 2006 such that the possibilities to (legally) engage in such income shifting increased. In some cases tax-shifting will lower the marginal tax-rate by approximately 30 percentage units (Alstadsæter, et al. 2014, Alstadsæter and Jacob 2016, Björklund et al. 2019, Selin 2024). These changes in the tax system (the so-called splitting rules) thus emerge as a plausible explanation of our findings. As noted by Selin (2024), ordinary wage earners have limited opportunities to shift income because their wage income is declared by their employers. In contrast, corporate owners who simultaneously determine their own wage and dividend payouts, have greater opportunities to adapt to the incentives created by the tax system. If that explanation holds, the relatively high marginal tax rate on labor income, arguably intended to promote income equality, has contributed to making the distribution of capital income less equal. This observation leads to another general observation: The incentives created by the tax-system impact whether capital income will exacerbate or mitigate inequality.

Our conclusion in this paper is a modest one: To properly understand the distributional effects of capital income, a long-term perspective is needed.

References

Alstadsæter, A., Jacob, M., 2016. Dividend Taxes and Income Shifting. Scand. J. Econ. 118, 693–717.

Alstadsæter, A., Jacob, M., Vejsiu, A., 2014. 2014:2 3:12-Corporations in Sweden: The Effects of the 2006 Tax Reform on Investments, Job Creation and Business Start-ups. Expertgruppen för studier i offentlig ekonomi (ESO).

Bengtsson, Erik, and Daniel Waldenström. 2018. "Capital Shares and Income Inequality: Evidence from the Long Run". *The Journal of Economic History* 78(3): 712–43.

Berisha, Edmond, and John Meszaros. 2020. "Long-Term Rates, Capital Shares, and Income Inequality". Open Economies Review 31(3): 619–35.

Björklund, A., 1993. A Comparison Between Actual Distributions of Annual and Lifetime Income: Sweden Around 1951-89. Rev. Income Wealth 39, 377–386.

Björklund, A, M Jäntti, P O Robling, J Roine, D Waldenström. 2019. Kapitalinkomster och inkomstfördelning (bilaga 3 till Långtidsutredningen, SOU 2019:62), Swedish government, Stockholm: Norstedts Juridik.

Blanco, Miguel Artola, Luis Bauluz, och Clara Martínez-Toledano. 2021. "Wealth in Spain 1900–2017 A Country of Two Lands". The Economic Journal 131(633): 129–55.

Chancel, L., Piketty, T., 2021. Global income inequality, 1820–2020: the persistence and mutation of extreme inequality. J. Eur. Econ. Assoc. 19, 3025–3062.

Fräßdorf, Anna, Markus M. Grabka, and Johannes Schwarze. 2011. "The Impact of Household Capital Income on Income Inequality—a Factor Decomposition Analysis for the UK, Germany and the USA". The Journal of Economic Inequality 9(1): 35–56.

Gottschalk, P., Moffitt, R., 2009. The Rising Instability of U.S. Earnings. J. Econ. Perspect. 23, 3–24.

Hoffmann, F., Lee, D.S., Lemieux, T., 2020. Growing Income Inequality in the United States and Other Advanced Economies. J. Econ. Perspect. 34, 52–78.

Krolage, C., Peichl, A., Waldenström, D., 2022. Long-run trends in top income shares: The role of income and population growth. J. Econ. Inequal. 20, 97–118.

Milanovic, B. (2016). Global Inequality: A New Approach for the Age of Globalization. Harvard University Press.

Piketty, T., 2014. Capital in the twenty-first century. The Belknap Press of Harvard University Press, Cambridge Massachusetts.

Piketty, Thomas, och Gabriel Zucman. 2014. ”Capital is Back: Wealth-Income Ratios in Rich Countries 1700–2010”. The Quarterly Journal of Economics 129(3): 1255–1310.

Roine, J., Waldenström, D., 2012. On the role of capital gains in Swedish income inequality. Rev. Income Wealth 58, 569–587.

Waldenström, D. (2020). “Perspektiv på den ekonomiska ojämlikheten i Sverige”, Ekonomisk Debatt 48(4), 13–25.