

Capital shares and top incomes over the long run: 18 countries, c. 1860—2010

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Abstract

This paper investigates the relationship between the capital share in national income and income inequality as measured by top income shares over the long run. Using a newly compiled cross-country database with capital shares for 18 countries since at least the 1930s and top income shares data from the World Top Income Database, we find strong evidence of a link between the aggregate role of capital in the economy and the size distribution of income. Over time, this dependence has varied; it was strong up until the Second World War, lower during the early interwar era and then stronger again since 1980..

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1. Introduction

Piketty and Zucman (2014) put it succinctly: “capital is back”. With Piketty’s (2014) book *Capital in the 21st Century* the capital-centred approach to inequality has made a huge splash and it is now well-known that in the last few decades capital’s share of national income has increased at the expense of the wage share, throughout the OECD countries. This recognition was not unique to Piketty’s work; since the late 1990s and the seminal paper by Blanchard (1997) and the subsequent development of cross-national datasets covering the period since 1960 or 1970¹, a rather large literature in economics and related subjects has been devoted to the determinants of changes in wage shares (e. Bassanini and Manfredi 2012, Karabarbounis and Neiman 2014a). Basically this debate centres on whether technology, globalization or institutions is the most important determinant of the post-1980 fall.

There has not been as much research on the earlier periods, even though Piketty’s provocative interpretation of the 20th century will surely inspire new research. In *Capital*, Piketty presents historical estimates – going back further in time than the 1950s – of wage and capital shares in four countries: France, Britain, the United States, and Germany. The purpose of this paper is to compile, homogenize and present estimates of wage and capital shares for another 14 countries back at least to the 1930s. This is interesting for two reasons. One, these data are interesting in themselves for what they describe. They allow us to test Piketty’s proposed U-curve of the capital share with a much larger sample with a variety of different type of economies. Secondly, these data allow us to study the relationship between the functional (wage and capital shares) and the personal income distribution in the long run. It is our hypothesis that there is a positive relationship between capital shares and top-driven inequality. This is not an uncontroversial statement; indeed, the prominent inequality scholar Peter Lindert writes in his review of *Capital in the 21st Century*, “The shares of labor versus capital in current income have never proven to be good predictors of inequality, and continue to be poorly correlated with it over time and space. They are antiquated, dating back to nineteenth-century classical economics and to early postwar attempts to fit production functions econometrically. Their alleged link to inequality has never made sense.” (Lindert 2014, p. 5) Clearly, there are different ideas on whether there is a link between capital shares and inequality or not, and these are worth testing empirically on a historical dataset.

We present such a dataset. Along with data for Britain, the United States, France and

¹ The AMECO database from the European Commission provides wage share data back to 1960, and OECD’s Structural Analysis Database has sectorial wage share data back to 1970. Karabarbounis and Neiman (2014a) provide a very encompassing dataset, including many developing countries, for the post-1970 period.

Germany back at least to 1870 from Piketty (2014), we add, based on previous historical national accounts research, the Netherlands since 1807, Denmark, Finland and Sweden since the mid-19th century, Japan since 1906, Argentina since 1911 and Austria since 1913, Australia, Belgium, Brazil, Canada, New Zealand and Norway since the 1920s, and Ireland since 1938.

2. Analytical framework: capital shares and inequality

In national accounts from the income side, national income is divided in three categories: labour income, income of the self-employed, and capital income. By definition, if one of the three is more unequally distributed among the other and increases its share of total income without becoming more equally distributed, then total income inequality will increase. Total inequality depends both on inequality within and the distribution between the classes (Piketty 2014: 40). The relevant scenario here is that capital incomes are more unequally distributed than the others and so when the capital share increases, personal income distribution will become more unequal.

Anthony Atkinson (2009) is a proponent of the view that there is a connection between functional and personal income distribution. He states three reasons why wage shares are interesting. One, methodologically, they provide a link between the macro-level national accounts data and household level income data. Two, they help understand inequality in the personal distribution of income (through the mechanisms discussed above). Three, it is interesting for concerns of social justice and fairness.

Not everyone believes in this, as we have seen with the case of Peter Lindert (2014). Gordon and Dew-Becker (2008: 3) in an overview of American inequality similarly claim that “there is no necessary link between labor’s share and the well-being of the median American”. It is true that there is no *necessary* link – as an increase in the wage share could be constituted entirely by increases in top wage earners’ incomes – but the statement is nevertheless misleading, as increases in the wage share generally are not of this type. Furthermore, Milton Friedman did not believe in a clear relationship between functional and personal income distribution; he claimed that

“one of the most widespread fallacies in this area is the belief that one can go readily from the functional to the personal distribution. Wages and salaries, it is believed, are the income of the “poor”; interest, dividends, rents and earnings of individual business, are the income of the “rich”; hence anything that raises wage rates relative

to other factor returns will tend to render income less diverse, and conversely.

Fortunately, or unfortunately, this conclusion is false... (quoted in Barba 2010)²

We would say that it is an empirical question, which should be answered empirically, where the Atkinson-Piketty view can easily be tested against the Friedman-Lindert view.

There is already a fairly sizeable literature showing the short-run effects on inequality by business cycle-related shifts in the capital share (e.g. Schultz 1969, Metcalf 1969, Beach 1977, Nolan 1987). However, this literature has been very business cycle oriented and has not been interested in debating the larger issues about the relationship between functional and personal income distribution. In this paper, we extend the capital share–inequality connection to the long run.

There is some research that gives us reason to expect a positive correlation. Quite a few studies show that capital incomes are more unequally distributed than labour incomes. A recent study of the United States shows that from 1979 to 2007, the Gini coefficient for capital incomes varied between 0.65 and 0.85 while that for labour income varied between 0.4 and 0.5 (Jacobson and Occhino 2012). They show that between 1979 and 2007 in the US a one percentage point transfer from the wage share to the capital share caused between a 0.15 and 0.33 percentage point increase in the Gini coefficient. (This goes well together with Shapiro and Freedman's 2006 result that in the US in 2000–05, more than 50 per cent of capital incomes accrued to the top percentile.) Schlenker and Schmid (2013) use household data for the EU countries 2005–2011 (the EU-SILC dataset) and show that since the Gini coefficient for capital income is very high, between 0.81 (Germany) and 0.96 (Portugal), an increase in capital's share increases income inequality. A 1 per cent increase of the capital share increases the total Gini coefficient by between 0.5 and 1.5 percentage points in the 17 studied countries. Fräßdorf et al (2011: 44) find that the Gini coefficient for capital income was between the early 1990s and early 2000s 0.75 in the UK, 0.78 for the US and 0.81 for West Germany. On the other hand, no published studies find that capital incomes are less concentrated than labour incomes. In other words, contra Friedman and Lindert (2014), at least for the post-1990 period there are very strong reasons to believe that capital incomes are more concentrated to high income earners than labour incomes are, and so that mechanically if capital incomes' share of national income increases at the expense of labour incomes, total inequality will increase.

There are also studies highlighting how increases in inequality can occur in different ways as seen from the perspective of functional income distribution. In the top incomes

² The quote is from Friedman's 1962 book *Price Theory*.

literature, Roine and Waldenström (2008, 2012) and Riihelä et al (2010) have shown that while most of the top-driven increase in inequality in the United States since 1980 has been driven by incomes of the top earners (“superstar economics”), in the Nordic countries an increase in capital incomes relative to labour incomes has been more important. (Cf. García-Peñalosa and Orgiazzi 2011).

Furthermore, there are good reasons to believe that the role of capital incomes for income inequality is underestimated in today’s research. Studies in the field are often based on household surveys – like the Luxembourg Income Study – where top income earners are underrepresented and where capital incomes are not fully included (Ryan 1996: 107; Roine and Waldenström 2012).³ Hence, an empirical focus on capital shares (based on national accounts data) and top income shares (based on tax data) can provide a correction to the household survey-dominated literature.

3. Data

We have long run capital shares for 18 countries, adding 14 to the ones in the Piketty (2014) dataset. Our dataset covers Argentina, Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Ireland, Japan, the Netherlands, New Zealand, Norway, Sweden, the United Kingdom, and the United States.⁴ There are several measurement issues when estimating factor shares; for thorough discussion of these and discussion of the sources, see Appendix A1. For now New Zealand is excluded from the analysis due to data issues, and since we lack top incomes data for Austria, Belgium, Brazil and Mexico, these countries are not included in the part which looks at the correlation between capital shares and top income shares.

For personal income inequality, we use data on the top percentile and decile’s shares of national income from the World Top Incomes Database (<http://topincomes.parisschoolofeconomics.eu>).

4. Results

4.1 Descriptively: the movement of capital shares and wage shares

With our data set, we can investigate in a descriptive way whether capital shares and wage

³ For example Burdin et al (2014) show on the case of Uruguay that household surveys underestimate the incomes of top income groups; tax data are better.

⁴ For three countries there are no top incomes data: Austria, Belgium and Brazil.

shares move in the same way in different countries or not. The trends are summarized in table 1. There are several interesting hypotheses to test.

Firstly, Robert Allen (2009) for Britain has shown that the capital share increases from 1800 to 1860 when wages do not grow in line with productivity. Around 1870 this is turned around and instead the wage share increases up to 1900. Allen calls this “Engels’ Pause”, referring to Friedrich Engels description of the misery of English workers in *The Condition of the Working Class in England*, which was published in 1945. According to Allen, around 1870 workers’ living standards started increasing at a pace with general living standards, in contrast to the period which Engels described. Piketty (2014: 225) also follows Allen here, and finds a similar pattern in France. Looking at wages to GDP ratios, a very rough measure of the wage share, Bengtsson (2015b) finds the same pattern in Denmark, Norway and Sweden. However with a rough look at capital shares in our database we do not find any uniform support for this supposed regularity. Sweden does have a decrease in the capital share from 1870 to 1900, but we do not find this pattern in Denmark, Finland or Germany.

A second expectation from the existing literature is a very steep decrease in the capital share at the end of the First World War. Williamson (2015) has called the years around 1920 the beginning of the “Great Egalitarian Leveling”, and of course in Piketty’s (2014) analysis of long-run inequality the two world wars play an important role for income distribution. Here the results are mostly as expected. In Austria we find that the capital share is much lower in 1924 than in 1913, in Denmark we find a high point in 1916 and low point in 1921, in Finland we find a high capital share in 1915-17 and a rapid decrease in 1917-23, in Sweden the capital share is historically high in 1916 and drops quickly to a low in 1921, and in the UK capital share is historically low in 1920. The only country where data show something different is France where the capital share decreases heavily already between 1913 and 1915, in contrast to most other countries where profits were very high in the early war years (cf. Arnold 2014).

A third hypothesis comes from the economic history literature on the interwar period. Eichengreen (1994), Broadberry and Ritschl (1995) and others have contrasted the messy interwar period with the successful postwar period which showed great economic performance in the industrialized countries, and claimed that differences in labour relations is an important explanation. According to them, during the interwar period trade unions extracted as high wage increases as they could get, which hurt profits and investments, contributing to the bad economic performance of the 1920s and 1930s. We might then ask whether capital shares decreased during the 1920s. This however does not seem to be the general case. In Germany, just as in Broadberry and Ritschl’s (1995) analysis, we do find a decrease in the capital share

from the mid-20s to 1930, and we find a similar pattern in Canada. But in Belgium, Denmark and the Netherlands we find very low capital shares in 1920-21, after the radical war time events discussed above, and an increasing trend during the rest of the 1920s. In France as mentioned the war time low of the capital share occurs already in 1914-15, and then it increased until the late 1920s. This gives some cause to reconsider the established economic history on the interwar period from Eichengreen (1994). The difference in results here and in previous literature might be due to differences in the types of data used and then triangulation should be possible, but it might also be the case that Eichengreen's (1994, p. 884) perspective of "intense wage pressure" during the interwar period needs to be qualified, and that this alleged wage pressure did not play such an important role for the weak economic performance of this period.

In Eichengreen's (1994, 2007) analysis the postwar period is the counterpoint, where wage moderation helped cause the strong investment and GDP growth performance of the period. This analysis has been criticized by Hatton and Boyer (2005) and Bengtsson (2015a) who instead find high wage pressure during the 1950s and 1960s. Of course Eichengreen's view of the postwar period is also contrary to Piketty's (2014), where it is instead stressed that capital incomes and capital valuation were suppressed by regulation and that for this reason capital shares reached their historical lows exactly here. Our data mostly support the Piketty view as opposed to the Eichengreen view. In Austria, Denmark (but only after the mid-60s), France, Germany, Ireland, the Netherlands (from the mid-50s), Sweden, UK and the US we find growing wage shares and decreasing capital shares in the 1950s and 1960s. In Canada, Finland and Norway (decreases only in the 1970s) on the other hand capital shares are more constant. Most of the countries experience historically low capital shares in the 1970s or early 1980s; exceptions are Austria, Finland and Ireland. We know from an ample literature (i.e. Karabarbounis and Neiman 2014) that capital shares have increased since 1980 across the majority of rich and developing countries so we do not have to discuss that fact here, but it is striking that in Ireland this increasing trend for the capital share begins already in the early 1970s.

Table 1. Common trends in capital shares?

	Yes	No	N.A.
“Engels’ Pause” style decrease in capital share 1870–1900	SWE (slightly from 1870)	FIN, DK (on the contrary an increase), GER (on the contrary)	
Increasing wage share during the end of the First World War	AUT (probably, at least 1913–24), DK (low point 1916, peak 1921), FIN (low 1915-17, rapid increases 1917-23), SWE (low 1916, peak 1921), UK (low point of profits in 1920)	FR (low profits in 1914-15 but otherwise high)	CAN, GER, IRL, NL, NO, USA
Wage pressure during the 1920s	CAN (1926–30), GER	BEL (high point of wage share in early 20s), DK (high point of wage share in 1921), NL (high point of wage share in 1921), FIN, FR (generally growing capital share during the 1920s)	AUT, IRL
Decreasing capital share during the Second World War	FIN (huge decrease 1943-45 after low level 1930-43), FR (large decrease after low in 1939), IRL (1944-49), NO (decrease 1940-45, then increase 1945-50), SWE (high in 1941, then decreasing trend 1941-1978) UK (yes, but it looks more like a constant decreasing trend 1942-76 after a low in 1942), US (from high in 1941)	CAN, DK (not until 1944-47)	AUT, GER, NL
Wage pressure during the 1950s and 1960s	AUT, DK (but only second half of the 60s), FR (slight, only heavy in the 70s), GER, IRL (high level, increase in 60s), NL (from 1954 on), SWE, UK, US	CAN (not when adjusting for self-employed), FIN, NO (only in the 70s)	
Profit squeeze/historical low in the 1970s	CAN (probably), DK, FR (1981 lowest peace-time profit share), GER, BL, NO, SWE, UK (1970 lowest profit share), US (ca. 1980 lowest profit share except Great Depression)	AUT (wage share no higher in 1970s than in 1960), FIN, IRL (starts decrease already in early 1970s)	
Wage share lower today than it has been since WW2	SWE (today lowest since 1940s), UK (only 1900 and 1910 higher than 2010 since the turn of the 20 th century), US (record profit share in 2011)	DK (wage share in 2007 higher than in 1950s and 60s), FR (wage share in 2010 about the level of the 50s and 60s), GER (lowest since 1965 but higher than the 50s), NL (higher than the 50s)	CAN, FIN, NO

Generally, our data set supports Piketty’s story of long-run capital-labour income distribution.

Most countries see rapid decreases of the capital share at the end of the First World War (although we may dispute why; cf. Acemoglu and Robinson 2015), and decreasing capital shares in the 1950s-60s-70s and the opposite after 1980. The results for the late 19th century are more surprising (given what we have seen in Allen 2009, Piketty 2014, and Bengtsson 2015) and here we need more research with careful distinction between different factors and measurement issues which may influence the results.

4.2 Does functional income distribution correlate with inequality?

We now move on to the issue of the link between functional and personal income distribution. Is the capital share a good predictor of inequality or not? Table 1 shows the raw correlations between capital share and top income shares for the entire periods available as well as subdivided into the pre-1945 period, the 1950—80 period, and the post-1980 period.

Table 2. Raw correlations of capital shares and top income shares

	Top1				Top 10			
	Whole period	-1945	1950–80	1981–	Whole period	-1945	1950–80	1981–
Argentina (1932–2000)	-0.31	-0.09	-0.82 (only 13 years)	-0.99 (only 4 years)	n.a.			
Australia (1927–2010)	0.66 ⁵	0.22	0.73	0.74	0.38 (1941–2010)	0.29	0.55	0.67
Canada (1926–2000)	-0.45	-0.36	-0.47	0.18	-0.08 (1941–2000)	0.83	-0.63	0.21
Denmark (1903–2010)	0.81	0.71	0.77	-0.06	0.78	0.53	0.63	-0.24
Finland (1920–1985)	0.18	-0.14	-0.37	0.18	n.a.			
France (1905–2009)	0.60	0.74	0.55	0.69	0.70	0.84	0.40	0.88
Germany ⁶ (1891–2008)	0.64	0.75	0.74	0.87	0.71	0.40	-0.18	0.89
Ireland (1938–2009)	0.55	n.a. (only 1 year)	0.17 (only 7 years)	0.85	0.38			0.65
Japan (1906–2010)	0.74				0.26		0.25	0.44
Netherlands (1921–2010)	0.97	0.86	0.94	0.37	0.97	0.84	0.93	0.62
New Zealand (1922–1967)	0.70							
Norway (1910–2010)	0.66	-0.84	0.86	0.59	0.55	-0.99	0.69	0.63
Sweden (1903–2010)	0.72	0.83	0.81	0.88	0.67	0.87	0.64	0.89
UK (1918–2009)	0.71	0.92 (only 3 years)	0.92	0.72	0.52	-0.56 (three years)	0.85	0.65
USA (1929–2010)	0.25	0.67	0.56	0.69	0.10	-0.59	-0.01	0.71

Overall, functional and personal income distribution are strongly and positively correlated. In 11 of the 15 countries in table 2 the correlation of the capital share and the top 1 per cent income

⁵ This is including the industry only data for 1927–1945. If we only use whole economy data, 1949–2010, then the correlation is 0.67.

⁶Please note that this is with the top income share measure without capital gains. The series with capital gains only begins in 1950. The correlation for 1950–2010 is 0.37 with the top 1 share and 0.84 with the top 10 share.

share for the whole period is 0.55 or higher. In the US the correlation is only 0.25 (but higher for sub-periods), and in Finland only 0.18. The two major outliers are Argentina and Canada, where the correlations are actually negative, at -0.31 and -0.45. This is very surprising and we will have to look more closely at the data and possible causes of differences between countries.

Overall, however, the results in table 2 support Piketty's (2014) assertion that the capital–labour split is an important determinant of inequality, and contradict Lindert's (2014, p. 5) argument that wage and capital shares aren't "good predictors of inequality, and continue to be poorly correlated with it over time and space". On the contrary, capital shares are in fact strongly correlated with inequality over time.

5. Conclusions

This is obviously a very early stage draft and there can be no definitive conclusions. We need to do further work with the data to maximize comparability and to enable robustness checks with different definitions of capital shares (gross versus net, different adjustments for self-employed, etc. – see Appendix) as well as top income shares. Utilizing further estimates of labour force size and the number of self-employed so that we can make consistent adjustments for the self-employed is key.

When it comes to the analysis, we need to develop the mechanisms through which the functional income distribution affects the personal income distribution.⁷ This is about wealth inequality and the distribution of different kinds of assets (Piketty 2014, ch. 7), and should also include the connection between financial markets, wages, and inequality (as in Greenwald et al 2014 and Lettau et al 2015).

⁷ Several recent papers do this in different ways. García-Peñalosa and Orgiazzi (2011), Dafermos and Papatheodorou (2015) and Karanassou, and Sala (2012) all do it from more or less heterodox perspectives. Piketty (2014, ch. 7) sketches the fundamental relationships.

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