

# Factor Shares and Income Inequality

## Empirical Evidence from Germany 2002–2008\*

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### Abstract

Using micro data from the German Socio-Economic Panel we examine the interplay between changes in the functional distribution of income and the distribution of market income among individuals. In particular, we categorize and evaluate the implications of changing income shares from asset flows for the concentration of market income. Our empirical analysis offers two insights: First, the relative rise of income from asset flows reported by German National Accounting Statistics is also evident in the micro data taken from the German Socio-Economic Panel. Second, rising capital income shares are associated with an increasing concentration of market income.

*JEL Classification: D31, D33, E6, E25*

“There is no doubt that the functional distribution of income is only of minor importance with regard to social issues. Only if the functional distribution of income implied clear consequences with regard to the personal distribution of income, the former would be of social relevance.” Krupp (1967: 3)<sup>1</sup>

### 1. Introduction

The pronounced rise of the profit share reported in German National Accounts since the beginning of the last decade has frequently been adduced as an instance for a *worsening* of the distribution of income (see, e.g., Dauderstädt, 2010). However, as it is the personal distribution of income that is relevant for

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\* We thank participants of the 15th “The Research Network Macroeconomics and Macroeconomic Policies (FMM)” Conference in Berlin, and in particular Hagen Krämer as well as Christian Arndt, Bernhard Boockmann, Carina Dengler, Gerd Ronning, Michael Schmidt and Gerhard Wagenhals, for helpful comments on an earlier version of this paper. Besides this we are most grateful to Rolf Kleimann and Martin Biewen for support with regard to the data.

<sup>1</sup> Cited from Becker/Hauser (1998) and translated by the authors.

social issues regarding income inequality, solely focussing on the development of factor shares involves the danger of ignoring the more complex relationship existing between the functional and the personal distribution of income and may pave the way for misinterpretation.

The goal of our paper is to examine how capital income shares are associated with the distribution of individual market income. Therefore, we first measure the development of individual capital income shares based on micro data from the German Socio-Economic Panel (SOEP) and compare it to the National Accounts profit share (section 3). Second, we connect changing capital income shares to the personal distribution of market income by a simple theoretical framework (section 4). Third, we assess the relationship between capital income shares and the concentration of market income empirically: Section 5 examines the (average) structural relationship within the years 2002–2008, section 6 analyzes how changes in the income structure (rising or falling average capital income shares) are reflected in the concentration of market income over time. Finally, section 7 summarizes our findings.

## 2. Data

Information about labor income is taken from the SOEP variable I11110, which represents individual labor earnings (including job-related extra payments such as Christmas bonus and profit-sharing income) for both employees and self-employed. In our calculations capital income is the sum of two components: The SOEP variable DIVDY, which represents income from interest and dividends, and the SOEP variable RENTY, which represents income from rental and leasing. Note that capital income variables are only available at the household level. To calculate individual capital income shares we divide household capital income by the number of adult persons within the respective household. We use analytical weights throughout our calculations.

## 3. National Accounts Profit Share and SOEP Capital Income Share

The concept of the functional distribution of income contrasts labor income with profit income. Both income shares sum up to 100 percent of national income. According to National Accounts, since 1992 the profit share in Germany has increased from 27.8 percent to 34.6 percent in 2008.<sup>2</sup> Figure 1 illustrates its development from 2002 onwards. Within these years the profit share rose by approximately one fifth (see also table 1).

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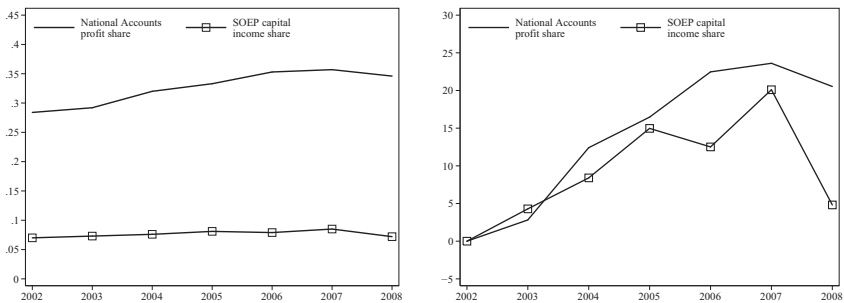
<sup>2</sup> Source: German Federal Statistical Office, Genesis-Database (2011).

In political debates that focus on issues of income inequality, it is often ignored that it is not easy to draw clear social or economic conclusions from the phenomenon of a rising profit share. Even when constraining to only the functional distribution of income, the capital income share reported in National Accounts can hardly be interpreted as a return to the production factor capital.<sup>3</sup>

To examine whether the phenomenon of a rising capital income share is also evident with regard to the income structure of individuals, we use individual market income data from the SOEP dataset for the time-span from 2002 to 2008 in order to calculate the *SOEP capital income share*. For this purpose, we approximate individual market income by the sum of individual capital income and individual labor income. Our SOEP capital income share is defined as the sum of capital income of all individuals, divided by the total market income of all individuals:

$$(1) \quad \text{SOEP capital income share} = \frac{\text{total capital income}}{\text{total market income}}$$

Figure 1 contrasts the SOEP capital income share with the National Accounts profit share. Thereby, the left panel documents levels. The right panel illustrates cumulated percentual changes over time.



Source: German Federal Statistical Office (2011), GENESIS-Database, SOEP, own calculations.

Figure 1: National Accounts Profit Share and SOEP Capital Income Share

<sup>3</sup> The profit share is rather a residual, encompassing both measurement error (e.g. considering depreciation) and income categories which are not capital income in a strict sense (i.e., measurable flows of capital income to private households), as for example central bank profits or earned but not distributed corporate profits. As a consequence, individual market income cannot be aggregated clearly to total national income of the economy (see Kalmbach 1995, Krämer 2011 and Ryan 1996).

Table 1

**National Accounts Profit Share and SOEP Capital Income Share**

	National Accounts Profit Share			SOEP Capital Income Share		
	Level	$\Delta\%$	$\Sigma\Delta$	Level	$\Delta\%$	$\Sigma\Delta$
2002	28.4			7.0		
2003	29.2	2.8	2.8	7.3	3.7	3.7
2004	32.0	9.6	12.4	7.6	4.5	8.1
2005	33.3	4.1	16.5	8.1	6.8	15.0
2006	35.3	6.0	22.5	7.9	-2.5	12.5
2007	<u>35.7</u>	1.1	<u>23.6</u>	<u>8.5</u>	7.0	<u>19.5</u>
2008	34.6	-3.1	20.5	7.2	-15.8	3.7

$\Delta\%$ : Year-on-year percentage changes.  $\Sigma\Delta$ : Cumulative percentage changes.

Source: German Federal Statistical Office (2011), GENESIS-Database, SOEP, own calculations.

The two series differ considerably in their levels. Over the years, the National Accounts profit share is around 33 percent on average, whereas the SOEP capital income share is about 8 percent. As mentioned above, a number of factors account for the discrepancy between both measures. Most importantly, labor income of the self-employed is categorized as capital income in National Accounts. Other factors are the existence of earned but not distributed corporate profits and the underestimation of income and wealth data in household surveys.<sup>4</sup>

Regarding the relative evolution of both series, we see that an increase of the capital income share can also be found in the micro data. Starting at 7.0 percent in 2002, the SOEP capital income share increased until 2005, slightly declined in 2006 and increased again in 2007. Between 2002 and 2007, when it reached its peak value of 8.5 percent, it had increased by nearly one fifth. In 2008, it sharply fell back to 7.2 percent. In most years, the relative changes of the SOEP capital income share are quite similar to those of the National Accounts profit share. Moreover, both series have their minimum level in 2002 and their peak in 2007.

The similar evolution of both series suggests that income data on the micro level trace the development reported in National Accounts quite well. Hence, the rising profit share in National Accounts is associated with a structural shift within the average composition of individual market income.<sup>5</sup> The question to

<sup>4</sup> For a more detailed discussion see Adler/Schmid (2012).

<sup>5</sup> These findings are also confirmed when calculating the SOEP capital income share more closely to the systematics of National Accounts, categorizing labor income of the self-employed as capital income. Thereby, micro data do not sustain the view that the

what extent this shift does affect the concentration of market income is considered in the next section.

#### 4. Linking Capital Shares and Income Inequality

How a rising capital income share transmits into the distribution of individual market income depends (1) on the concentration of capital income and (2) on the relationship between the share of capital income and the level of market income.<sup>6</sup> Figure 2 (upper panel) illustrates the first aspect via three cases of concentration (A, B, C). The boxes represent the income structure of individuals.

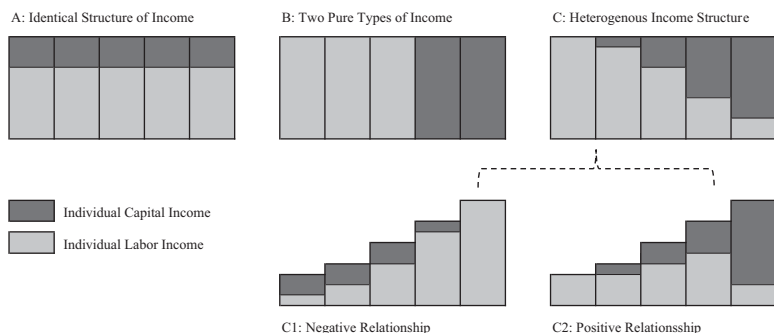
- Case A assumes an identical income structure of all individuals. Here, changes in the functional distribution of income do not alter the personal distribution of income.
- Case B contrasts two extreme types of income structure. Individuals are supposed to exclusively earn labor or capital income. Changes in the functional distribution of income lead to strong changes in the personal distribution of income.
- Case C combines the rather extreme setups A and B. Here, the (as we will see below more realistic) assumption is that individuals gain both labor income and income from asset flows. However, the respective shares differ among individuals.<sup>7</sup>

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increase of the profit share in Germany may partly have been driven by rising labor income of the self-employed. For more details see Adler/Schmid (2012).

<sup>6</sup> A similar idea has been presented by Kalmbach (1995: 283ff) as the so-called *Ricardo Matrix*, a kind of theoretical reference setup clearly allocating income from wages, profits and rents to workers, capitalists and rentiers. Kalmbach refers to an empirical assessment of this categorization by Bedau (1993, 1994) and to the phenomenon of a rather mixed income allocation highlighted by Stobbe (1962). We thank Hagen Krämer for drawing our attention upon this literature.

<sup>7</sup> The need for a more realistic classification of profit and labor income, not just contrasting two pure groups of actors, and its relevance for the impact of changing factor shares upon the personal distribution of income is also mentioned by Glyn (2009: 102).



This figure visualizes that the transmission of a rising capital income share depends on the concentration of capital income (illustrated by three hypothetical cases of income concentration A, B, C) and on the relationship between the share of capital income and the level of market income (illustrated by two cases C1, C2). Within each panel each of the five boxes on the horizontal axis represents the income structure of an individual. The five individuals within each of the five panels constitute the income structure of hypothetical populations. In contrast to the upper panels (A, B, C) that only focus on the structure of income, within the lower panels (C1, C2) the height of the boxes reflects different levels of market income.

*Source:* Own illustration.

Figure 2: Types of the Functional Distribution of Income

Besides this aspect, one has to take into account the relationship between the level of individual market income and the share of capital income. The lower panel of figure 2 therefore contrasts two possible cases (both special cases of C).

- A negative relationship between the level of individual market income and the respective share of capital income (case C1) implies a reduction of the concentration of market income resulting from a rising average capital income share.
- In contrast to this, in case of a positive relationship (case C2), rising capital income shares will cause an increase in the concentration of individual market income.

## 5. Capital Income Shares of Different Social Groups

In what follows, these theoretical considerations will be assessed empirically on the basis of SOEP micro data. Section 5 examines the (average) structural relationship within the years 2002–2008. Section 6 analyzes how changes in the income structure (rising or falling average capital income shares) are reflected in the concentration of market income over time. Within our calculations we contrast the entire population, the working population, white-collar employees and blue-collar employees as well as the self-employed and civil servants.

The left panels of figure 3 approximate the first theoretical relationship presented in figure 2. Quintile classes (horizontal axis) are constructed on the basis of the average capital income share, which itself is reported on the vertical axis.<sup>8</sup> As one can see, the empirical picture for the working population resembles the heterogenous income structure (case C) presented in figure 2.<sup>9</sup> Civil servants as well as blue-collar workers are characterized by a comparably low concentration of capital income, in contrast to white-collar workers and the self-employed.

The right panels of figure 3 illustrate the structural composition of individual market income in absolute levels (right scale) as well as the share of capital income (left scale) sorted by the level of individual market income (horizontal axis, decile categorization). This approximation corresponds to the second theoretical relationship presented in figure 2 (lower panels).

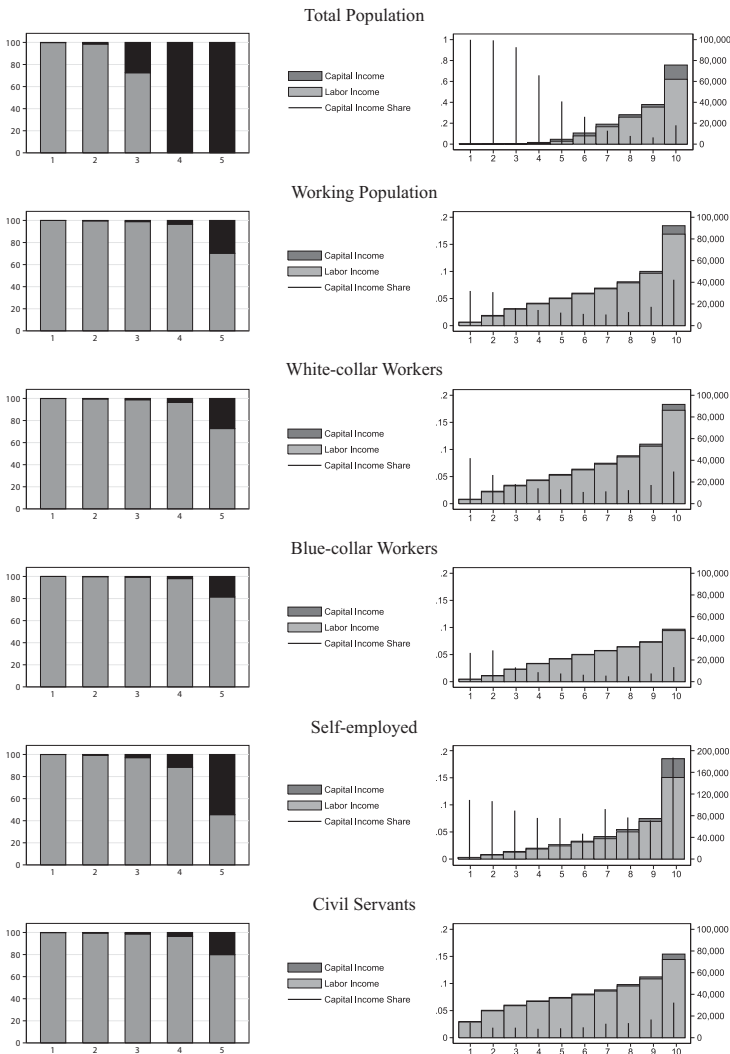
For the working population, we observe a weak U-shaped relationship between the relative market income position (measured in deciles) and the capital income share: For low labor income (left margin of the income distribution) even small levels of capital income lead to a relatively elevated capital income share. Towards the middle of the income distribution absolute capital income stagnates or only grows at low rates, while labor income increases at a much higher rate. This relation inverts in the upper half of the income distribution, where moving to the next decile group is associated with a higher percentage increase in capital income than in labor income. Hence, the capital income share has its minimum in the middle of the income distribution.

Within the groups of white-collar workers and the self-employed the capital income share is lowest for the sixth decile group. For blue-collar workers the turning point is the eighth decile group, whereas for civil servants the smallest capital income share is in the fourth decile group. Regarding levels, the capital income share clearly is highest for the self-employed – it is about twice as high as the mean of the working population. In contrast, civil servants and blue-collar workers exhibit capital income shares slightly below the mean of the working population.

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<sup>8</sup> Note that this representation does not consider the level of individual market income and therefore only addresses the aspect of income structure heterogeneity.

<sup>9</sup> Within the whole population (upper left panel) the concentration of capital income is higher than within the working population and its subgroups. This is due to a considerable amount of people that live on transfer payments, such as pensioners and unemployed persons. These subpopulations gain zero or only little labor income, so that even a low capital income yields a high capital income share.



The left panels of this figure approximate income structure heterogeneity with regard to capital income shares. Thereby, within each quintile class of capital income shares we report the average capital share. The right panels illustrate the structural composition of individual market income in absolute levels (right scale) as well as the share of capital income (left scale) sorted by the level of individual market income (horizontal axis, decile categorization). Note that the ranges (scaling of the axes) are identical for all panels, except in two cases within the right panels: The capital share (left axis) for the whole population ranges from 0 to 100 percent. In any other cases the maximum capital share is set to 20 percent. Further, the level of income (right axis) ranges from 0 to 100.000 Euros except in case of the self-employed. Here, the range goes up to 200.000 Euros.

Source: SOEP, own calculations.

Figure 3: Capital Income Share and Level of Market Income



## 6. Capital Shares and Market Income Concentration

Next, we contrast capital income shares and changes of market income concentration over time within the years 2002–2008. Therefore, figure 4 illustrates capital income shares on the horizontal axis. The concentration of market income is measured by GINI indices and is reported on the vertical axis. The centered panel presents a comparison of the four subpopulations within the working population, whereas the subpanels below offer a more detailed representation illustrating the respective changes over time.

We observe that the four subpopulations are characterized by considerable differences regarding average capital income shares and the concentration of market income (centered panel). In general, a higher average capital income share implies a stronger concentration of market income.

This does not only hold for the development within each group over time, but also for the comparison between groups.<sup>10</sup> For white-collar workers (upper left subpanel) we observe a concentration peak in 2007, but a clear decline in 2008. Within the group of blue-collar workers (upper right subpanel) – except the changes from 2002 to 2003 – rising market income concentration is associated with increasing capital income shares.

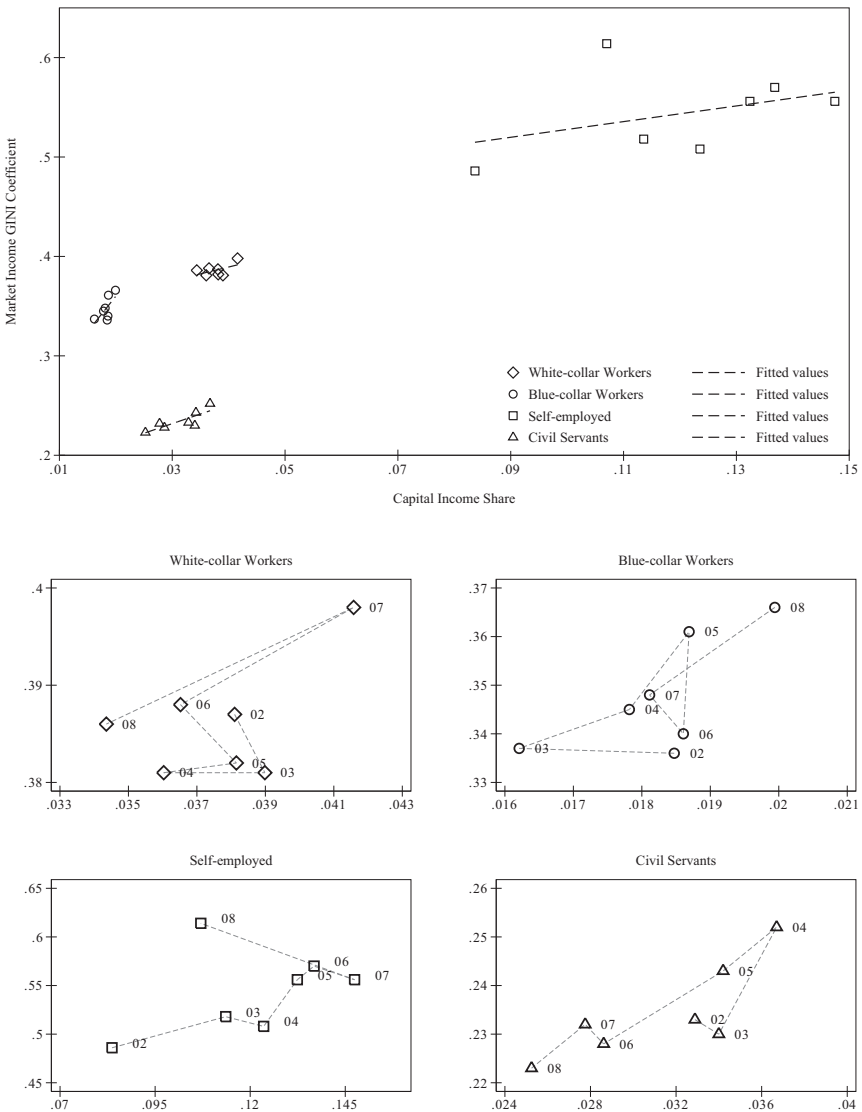
For the self-employed we find a pronounced rise of the average capital income share, peaking in 2007 (lower left subpanel). As already illustrated in figure 3, this group is characterized by the highest capital income shares. From 2002 to 2007 rising capital income shares go along with increasing concentration of market income. However, the further increase of the GINI coefficient from 2007 to 2008 is remarkable as shares and levels of capital income as well as the concentration of capital income fall at this time.<sup>11</sup>

Civil servants' capital income shares (and levels) are comparable to white-collar workers and are slightly below but very close to the average of the whole working population (lower right subpanel). In contrast to other groups, civil servants' capital income shares (and levels) peak in 2004 and decline steadily afterwards. Thereby, again, changes in the concentration of market income are positively related to the development of the respective capital income shares.

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<sup>10</sup> Note that this phenomenon is closely connected to the differences of the concentration of wealth among social groups. For an analysis of the joint distribution of income and wealth among social groups see IAW (2012).

<sup>11</sup> Corresponding summary statistics are provided in Adler/Schmid (2012).



This figure contrasts the development of capital income shares (horizontal axis) and changes of the concentration of market income over time. The centered panel directly compares the four sub-populations within the working population. The subpanels document the development over time for each group in more detail.

Source: SOEP, own calculations.

Figure 4: Capital Income Share and Market Income Concentration Index (GINI)

## 7. Conclusion

Our analysis illustrates that the rise of the profit share reported in German National Accounts is also evident in the SOEP micro data. Thereby, the increase of the SOEP capital income share is comparable to the changes of the profit share, reflecting a structural shift within average individual market income.

Our theoretical considerations that connect changes in the structure of market income to the personal distribution of income provide helpful insights for the discussion and quantitative assessment of changing capital income shares with regard to the concentration of market income. The data suggest rising inequality of market income as a consequence of increasing capital shares on the level of individual market income. In particular, rising capital income shares are associated with an increase of the concentration of market income over time. This holds for each subpopulation within the working-population as well as for the comparison of the respective subgroups. While the rise of the capital income share is associated with an increase of the concentration of market income for white-collar and blue-collar workers as well as for the self-employed, the group of civil servants shows declining capital income shares and a decrease of the concentration of market income.

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