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**Research Report**

## Income and Wealth Distribution in Germany: A Macro-Economic Perspective

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## At a glance

- Voluntary household surveys such as the German Socio-Economic Panel (SOEP) tend to underestimate income and wealth inequality. The research methodology developed by Thomas Piketty et al. therefore analyses official tax statistics in order to more accurately determine the inequality between the people at the top of the income and wealth distribution scale and the rest of the population.
- However, Piketty's methodology underestimates the rise in inequality in Germany since the turn of the millennium due to the fact that companies are retaining a significant percentage of their rising profits which are therefore not recorded as private household income.
- More accurate indicators of inequality in Germany can be developed by means of combining data from the available surveys and national accounting systems.
- The (re-)introduction of a comprehensive income tax base and a wealth tax would make it significantly easier to measure high incomes and wealth in Germany.
- The reduction of inequality in Germany could help to reduce the country's high current account surpluses, thereby contributing to greater macroeconomic stability.

## Income and Wealth Distribution in Germany: A Macro-Economic Perspective

Jan Behringer, Thomas Theobald, Till van Treeck<sup>1</sup>



Videostatement:

Till van Treeck about inequality and macroeconomic imbalances

<http://youtu.be/WOkbfMyGTYk>



**Corrected version (25/10/2014):** In comparison to the version published on 23th of October, in Figure 4b, the erroneous „p90“ percentile was changed to „p99“.

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## The new debate on economic inequality

Thomas Piketty's international bestseller "Capital in the Twenty-First Century" has given rise to a new debate regarding which data should be used as the basis for measuring income and wealth inequality, and what are the macroeconomic repercussions of rising inequality. Even before the publication of his book, the findings of research into income distribution in Germany had made the headlines on more than one occasion. Studies carried out by the Organisation for Economic Co-operation and Development (OECD 2008, 2011), for example, reveal that over the past decade and a half, income inequality in Germany has risen faster than in virtually any other OECD nation. In recent years, the debate has revolved around the question of whether income inequality has fallen again following the financial and economic crisis of 2008/9 (Grabka and Goebel 2013; Rehm et al. 2014). The data that these discussions are based on is provided by the Socio-Economic Panel (SOEP) at the German Institute for Economic Research (DIW).

During the course of the past year, there has also been a furore over the findings of a household survey (HFCN 2013) coordinated by the European Central Bank (ECB), according to which wealth inequality in Germany comes second only to Austria among the EU member states. Moreover, the DIW concluded that, based on SOEP data, there has been "persistently high wealth inequality in Germany" between 2002-2012 (Grabka and Westermeier 2014).

The approach taken by Thomas Piketty and his research team to analysing inequality differs from the studies cited above in two respects. Firstly, he questions the validity of the data that the studies are based on. This is because both the SOEP and the ECB's Household Finance and Consumption Survey (HFCS) rely on voluntary household surveys in which very rich people tend not to take part. In some cases, this can cause income and wealth inequality between the upper end of the income distribution scale and the rest of the population to be seriously underestimated. Consequently, Piketty and his co-authors have been systematically analysing the official income and wealth tax statistics of several different countries for more than ten years. Their goal in so doing is to provide a more realistic estimate of high incomes as a percentage of all household incomes. The results of their seminal research are summarised in the World Top Incomes Database (WTID) which is now publicly available (Alvaredo et al. 2012).

Secondly, in his most recent book (Piketty 2014), Piketty sets his analysis of income and wealth in-

equality in a broader macroeconomic context. In order to do this, he uses data from the National Accounts (NAS) and Financial Accounts (FA). He is thus able to link microeconomic distribution research to macroeconomic issues, allowing him to address questions such as the relationship between rising economic inequality and increased macroeconomic instability (Piketty 2014; van Treeck 2014a).

This report aims to compare the key findings of the two research methodologies outlined above (voluntary household surveys vs. official tax statistics and macroeconomic accounting systems) and discuss the reasons for the significant differences that sometimes occur between them. It will also identify urgent research priorities and policy interventions needed to improve the quality of the available data. Furthermore, drawing e.g. on Piketty (2014), it will set out a number of proposals for accurate indicators of inequality that could be developed using data that is already available. Finally, it will outline the macroeconomic repercussions of rising economic inequality in Germany.

## Inequality in Germany

### The SOEP approach to measuring inequality based on income and wealth data

The debate surrounding income inequality in Germany is profoundly shaped by its focus on the Gini coefficient of net equivalised household income, based on data provided by the SOEP (Figure 1a). Having remained largely stable for many years since the mid-1980s, the Gini coefficient for Germany rose sharply in the first half of the 2000s. From 2006 on it then stabilised around its new, higher level, albeit with a slight downward trend, before rising once more in 2012 to a value of 0.288.

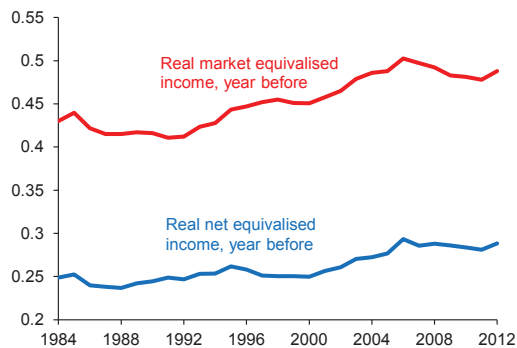
One possible explanation for the slight dip in the Gini coefficient that occurred between 2006 and 2012 could relate to trends in unearned income (Rehm et al. 2014, Horn et al. 2014). Compared to earned income, unearned income is much more heavily concentrated at the upper end of the distribution scale. As a result, the temporary fall in returns on capital that occurred during the financial market crisis automatically led to a reduction in income inequality. Furthermore, the SOEP data can only record the distributed income of corporations, e.g. in the form of private withdrawals in partnerships. It does not record retained earnings.

Since 2002, the SOEP has recorded wealth distribution data on a five-yearly basis. It registered a rise in wealth inequality for the period 2002 to 2007,

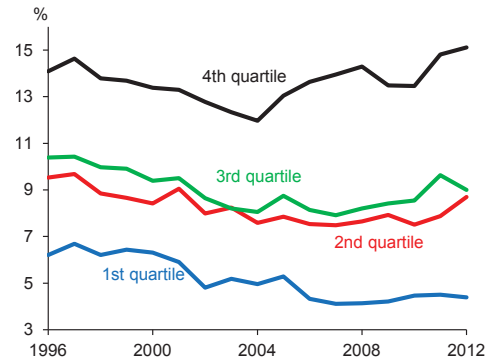
FIGURE 1

## Inequality measures: SOEP

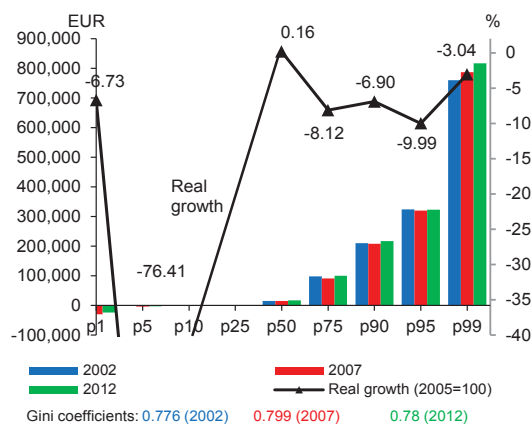
a) Gini income coefficients Germany<sup>1</sup>



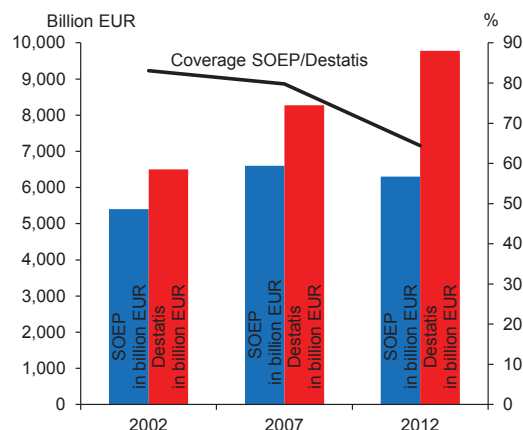
b) SOEP savings rates by income quartiles<sup>2</sup>



c) Individual net wealth for selected percentiles<sup>1</sup>



d) Wealth SOEP vs. Federal Statistical Office<sup>4</sup>



<sup>1</sup> Imputed rent without correction for public officials.

<sup>2</sup> Monthly savings as a % of monthly net income.

<sup>3</sup> N.B.: Wealth data are taken from DIW Wochenbericht 9/2014. For computation of real growth rates the GDP deflator is used.

<sup>4</sup> N.B.: The SOEP wealth data are taken from the DIW Wochenbericht 45/2007, 4/2009 and 9/2014. The Federal Statistical Office wealth data are taken from the corresponding wealth report's position „Private Non-Profit Institutions and Private Households“.

Sources: SOEP; Federal Statistical Office.



when the Gini coefficient rose from 0.78 to 0.80 (Grabka and Westermeier 2014). In other words, wealth is far less equally distributed than income. Between 2007 and 2012, however, the Gini wealth coefficient fell back slightly (Figure 1c).

How are we to explain the fact that income inequality rose sharply from 2002-2012, while wealth inequality remained more or less unchanged, albeit at a high level?<sup>2</sup>

One economic explanation is that changes in income distribution initially only have a modest impact on wealth distribution, since the level of wealth

inequality is already much higher and the accumulation of wealth through savings takes time. Over the longer term, however, wealth inequality can be expected to “catch up” and start having an increasing impact on income inequality (Infobox 2). This is especially true since, according to SOEP data, the savings rates of the upper and lower income groups have diverged since the year 2000 (Figure 1b).<sup>3</sup> The trends witnessed in recent years (the rise in income inequality between 2011 and 2012 and the growing gap in savings rates since 2010) also point to the

<sup>2</sup> See also Brenke/Wagner (2013, p. 114), where it is argued that if unearned income and the income of top earners increase at an above average rate, and if these same top earners have a relatively high savings rate while low-income households save nothing or next to nothing, it is inevitable that wealth will become increasingly concentrated in the hands of the few.

<sup>3</sup> However, the SOEP data on savings suffers from a number of serious flaws and cannot easily be compared against the NAS savings rate. The way that the SOEP questions are phrased rules out negative savings rates. Moreover, compared to the questions on incomes, the number of respondents who fail to provide data on savings or only provide inconsistent data is relatively high.

likelihood of an increase in wealth inequality in the future.

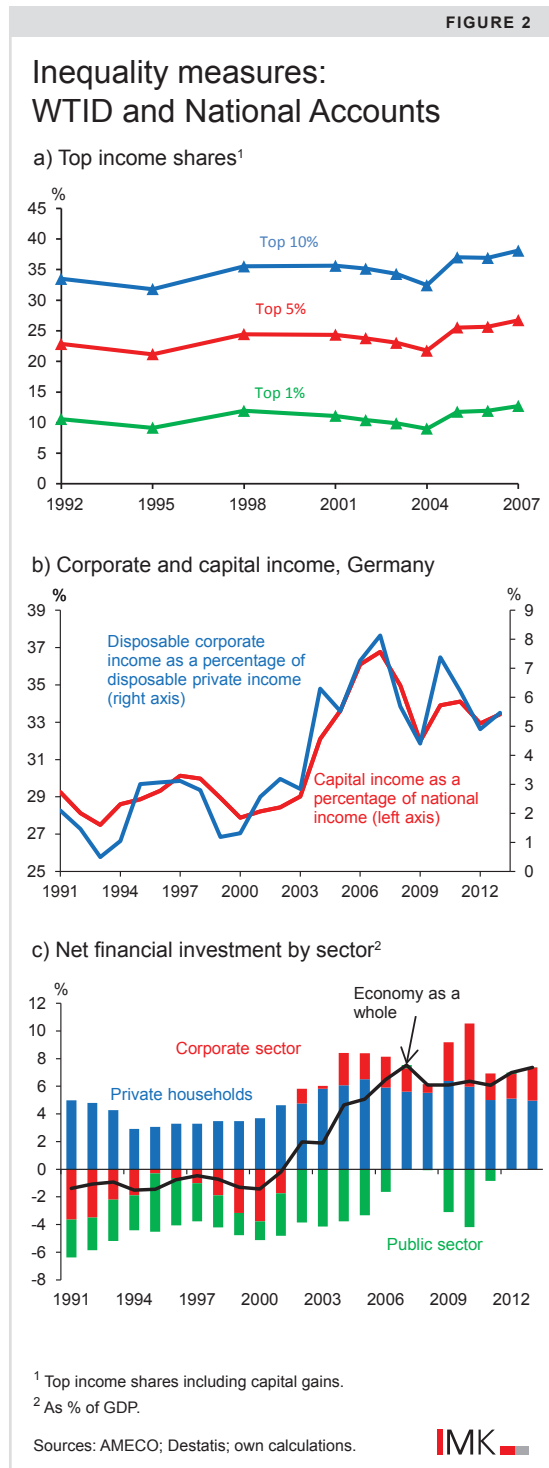
A number of criticisms can also be levelled at the data that the SOEP is based on. It is, by its very nature, difficult to record wealth (especially high levels of wealth) using voluntary household surveys like the SOEP. Accordingly, the finding that real net worth declined between 2002 and 2012 specifically in the upper percentiles (Figure 1c) is somewhat questionable. Over the same period, the SOEP's coverage of the total net worth of private households compared to the wealth report of the Federal Statistical Office ("Private Non-Profit Institutions And Private Households") fell sharply from around 85 % to approximately 65 % (Figure 1d). It may therefore be surmised that wealth inequality is not only being underestimated in terms of its degree (Grabka and Westermeier 2014), but also in terms of its rate of change.

### The World Top Incomes Database as a new data source

As a result of the research carried out by Facundo Alvaredo, Anthony B. Atkinson, Thomas Piketty and Emmanuel Saez, a new measure of income inequality is now emerging alongside the established Gini coefficients. It assesses high income groups' share of the total (pre-tax) income of private households (top income shares). It is based on data taken from official income tax statistics and the National Account Systems.

Figure 2a shows the evolution of the top income share of the total pre-tax income for private households in Germany according to the World Top Incomes Database (WTID). Two things are particularly striking. Firstly, in contrast to most other countries, the time series for Germany end as long ago as 2007. Secondly, the data reveal only a slight increase in the income share of the top 5 % and the top 1 % of households as a percentage of the total income for all households, whilst the share of the top 10 % experienced a somewhat larger increase.

The most recent available time series are based on the study carried out by Dell (2007) and no further studies have been carried out since. The problem confronting data for the years after 2009 is that, following the introduction of the flat-rate withholding tax in that year, information on tax paid on capital income is no longer recorded on an individual basis as it used to be under the comprehensive income tax system. Instead, financial institutions pay the anonymous flat-rate withholding tax direct to the taxman, meaning that no first-hand information is available regarding the distribution of capital income. Because of the high concentration of wealth,



however, this unearned income is less equally distributed than earned income and therefore makes a significant contribution to the top income shares.

It is necessary to provide an explanation for why the available data points to a relatively modest increase in the top income shares in Germany. After all, based on the Gini coefficient for disposable household income, Germany has experienced one of the sharpest rises in income inequality of all the OECD countries over the past few decades. Between the mid-1980s and the mid-2000s, for instance, the

Gini coefficient in Germany rose by about the same rate as in the US (OECD 2008, 2011). According to the WTID, over the same period, the income share of the top 1 % in the US grew from approx. 10 % to 20 % and the income share of the top 5 % rose from approx. 20 % to 35 %. In other words, these increases were far more pronounced than in Germany.

In this context, it is important to remember that the Gini coefficient's mathematical design means that it is less sensitive to changes at the extreme ends of the distribution scale. This is compounded by the under-recording of high incomes by voluntary household surveys such as the SOEP.<sup>4</sup> As a result, it is actually not so surprising that although the Gini coefficient rose sharply in Germany during the first half of the 2000s, the top income shares remained stable.<sup>5</sup> A rising Gini coefficient is indicative of a tendency for the overall distribution of income to become more unequal. A rise in the top income shares, on the other hand, indicates a shift of income distribution in favour of the top 10 %, 5 % or 1 % of households, to the detriment of the vast majority of the population.

### The “corporate veil” as one of the reasons why inequality is underestimated

Notwithstanding the above, an exclusive focus on top income shares à la Piketty results in the increase in inequality in Germany being underestimated. When analysing a country's top income shares, it is of fundamental importance always to take the macroeconomic context into account and in particular functional income distribution trends (Infobox 1).

Capital income has risen sharply as a percentage of Germany's national income since the year 2000 (Figure 2b). Conversely, the wage share – i.e. earned income as a percentage of national income – has fallen. Much of the huge rise in corporate earnings has been retained by companies rather than being passed on to private households. Consequently, the top household incomes (and their share of total household income) have not risen as much as they would have done if instead of retaining these increased earnings companies had followed the lead of e.g. the US by distributing a greater proportion of them to senior executives and shareholders (who mostly fall within the top income groups). In the

US, the reason that the wage share fell far less sharply prior to the economic downturn is precisely because it was stabilised by the high salaries of senior executives.

The significance of this “corporate veil” is often overlooked by analyses of economic inequality. An approach based on top income shares à la Piketty underestimates economic inequality in countries like Germany. This is because while companies' owners predominantly belong to rich households, the growth in their income is “veiled” by the fact that their companies retain a significant proportion of their earnings (Infobox 1).

This corporate veil is also making it more difficult to measure wealth inequality. According to the SOEP, the average business assets reported by households between 2002 and 2012 fell from approx. 212,000 euros to approx. 191,000 euros (Grabka and Westermeier 2014, p. 159). In view of the fact that the National Account System indicates a sharp rise in profits and wealth for the economy as a whole, there would appear to be some doubt regarding the validity of these figures. It is clear that the value of stakes in partnerships and (unlisted) joint-stock companies is not being accurately reported by the households in the survey (“corporate veil”). Indeed, the leeway that exists in terms of how a company's valuation is reported means that this is to some extent even true of listed companies.

### Alternative indicators of inequality

Piketty (2014) identifies two empirical phenomena that are indicative of a rise in economic inequality. Firstly, in many economies, the top incomes' share of the total pre-tax income of private households has risen significantly. Secondly, the ratio of private wealth to national income has also risen in several countries. This indicates a trend of growing inequality, since wealth is less equally distributed than income. The fact that the ratio of unearned income from inheritances to earned income is also growing only serves to consolidate this economic inequality.

There is no question that the data currently being employed in Germany is unsatisfactory. However, by making certain simplifying assumptions and taking Germany's specific circumstances into account, it is possible for Piketty's indicators to be adapted in order to allow the key current and possible future trends of inequality in Germany to be identified (Infobox 2).

<sup>4</sup> According to the SOEP, a net equivalised household income of about 45,000 euros would be enough for someone to be classified in the top 5 % of incomes for 2012.

<sup>5</sup> Consequently, it is not possible to fully support the proposal of e.g. Leigh (2009) to simply use top income shares as a substitute for other measures of inequality over periods when alternative income distribution measures are unavailable.

## On the relationship between functional and personal income distribution and macroeconomic development

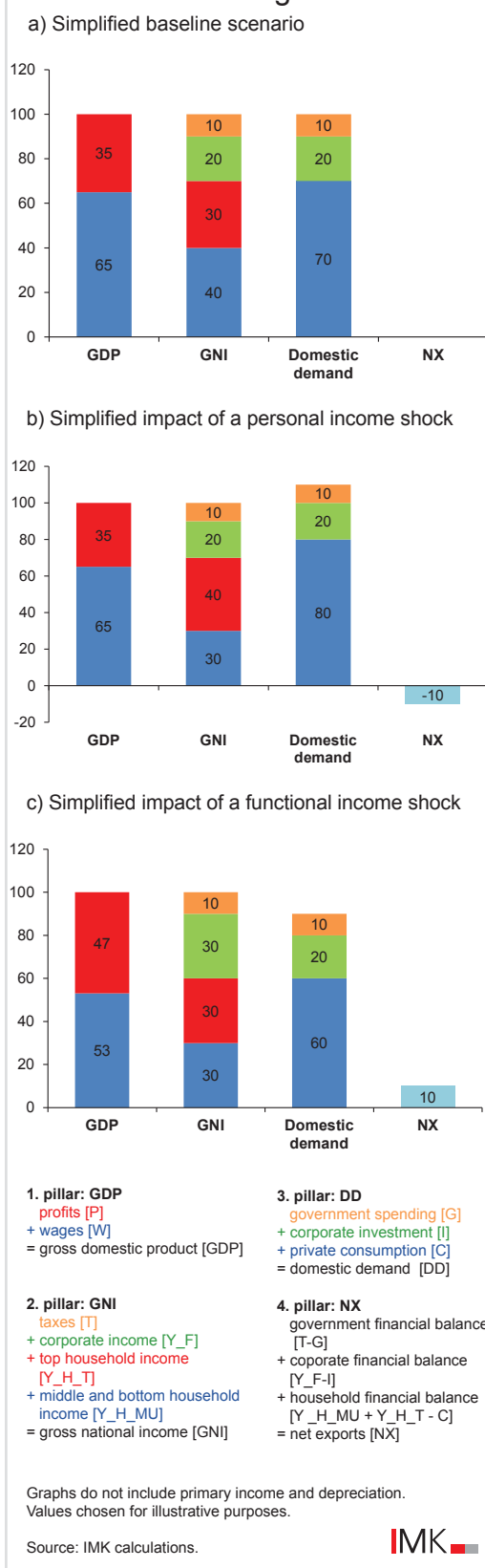
There has been increasing discussion in recent international research of the relationship between high levels of inequality and macroeconomic instability (Rajan 2010, Stiglitz 2012, van Treeck and Sturn 2012). Both functional and personal income distribution should in principle be included in analyses of the macroeconomic implications of income distribution. Functional distribution, which is based on NAS data, breaks gross domestic product down into wage income on the one hand and entrepreneurial and capital income on the other. Personal income distribution describes the distribution of households' pre-tax or disposable income and is generally derived from voluntary household surveys (e.g. SOEP) or tax statistics (e.g. WTID). Different macroeconomic trends can result depending on whether the predominant changes relate to functional or personal income distribution shocks. In particular, changes in distribution can result in either overindebtedness of private households or current account imbalances, both of which can cause macroeconomic instability over the longer term.

As a result, the Macroeconomic Policy Institute (IMK) carried out a research project<sup>1</sup> to investigate the macroeconomic repercussions of changes in personal and functional income distribution. A simplified description of the potential impacts of these different shocks is presented in Boxes 1.1a-1.1c. One of the key components of the analysis is the relative income hypothesis (Duesenberry 1949; Frank 2005), according to which at least part of a household's consumption ("positional goods") is dictated by the consumption of a reference group that generally comprises higher-income households (upward-looking status comparisons). This type of consumption is by no means irrational or solely restricted to the consumption of luxury goods. One example is provided by household spending on education in countries where the "good" schools and universities are mostly private. If rising inequality drives up the cost of a "good" education because the upper income groups are spending more in this area, then even many upper middle-class families can find themselves facing difficult decisions about where their priorities lie (e.g. providing their children with a relatively good education

<sup>1</sup> For more information, visit <http://ineteconomics.org/grants/income-inequality-household-debt-and-current-account-imbalances>

FIGURE BOX 1.1

### Macroeconomic effects of distributional changes



vs. saving enough money for their retirement). This example also demonstrates how very country-specific institutions such as highly developed public services or restrictions on credit-based consumption can temper the influence of reference groups on consumption and help to keep household debt in check. “Positional arms races” (Frank 2007), for instance, are thought to play a greater role in the US than in Germany.

The analysis also drew on the “corporate veil” concept described elsewhere in this report. Whilst it is true that enterprises ultimately belong to households, if a company’s value increases in the form of retained earnings, for instance, this increase tends not to be fully reflected in the consumer behaviour of its owners (top earners). Accordingly, the increase also has little influence on the consumer behaviour of other households who look to the top earners as a reference. The retention of corporate earnings also weakens domestic demand by inhibiting correspondingly higher levels of private investment (Lindner 2014).

The IMK study also makes the assumption that the observed changes in income distribution mostly involve shocks to permanent (as opposed to only transitory) income components – in other words, that it is always the same households that are affected by these changes in distribution.<sup>2</sup> This precludes e.g. an explanation of increased household debt purely in terms of consumption smoothing.

The simplified impacts of personal and functional income shocks are illustrated below using simple numerical examples (Boxes 1.1a-1.1c). In the baseline scenario (Box 1.1a), the wage share is 65 % and the capital income share is 35 % (Column 1). The top income share is approximately 43 % (3/7) of disposable household income, while disposable corporate income accounts for 20 % of the national income and disposable household income for 70 % (Column 2). Domestic demand is equal to the national income (Column 3), in other words the current account is balanced (Column 4). Box 1.1b shows the simplified impacts of a personal income shock in an institutional setting where a rise in the incomes of top earners (Column 2) leads not only to an increase in their own consumption but also to higher levels of credit-based consumption among lower-income groups for

whom the top earners act as a reference group (Column 3). In this scenario, the smaller income share of the lower and middle income groups does not lead to a decline in the wage share as long as the rise in top earners’ incomes is primarily accounted for by earned income (e.g. executive salaries, bonuses, etc.). The wage share in this example remains the same, at 65 % (Column 1), as does the share of disposable household income, at 70 %. However, the top income share rises to around 57 % (4/7). The increase in household debt is accompanied by a decline in households’ financial balance, resulting in a current account deficit (Column 4).

Box 1.1c illustrates the simplified impacts of a functional income shock. The decline in the wage share to 53 % (Column 1) is due primarily to the detriment of low- and middle-income households (Column 2). This decline is accompanied by a rise in disposable corporate income to 30 % (Column 2) and a corresponding fall in disposable household income to 60 % of the national income. The top income share of disposable household income rises less sharply than in the previous scenario, to a level of 50 % (3/6). If the institutional framework also curbs the incentives for reference-based consumption, the savings rate among lower income groups does not fall sufficiently to compensate for the drop in disposable income. This in turn translates into weaker domestic demand (Column 3) and fuels an export-led growth model with substantial current account surpluses (Column 4). Demand for credit among private households is correspondingly weak.

The interactions described above are based on empirical evidence (Behringer and van Treeck 2013) as well as theoretical models (Belabed, Theobald and van Treeck 2013). Box 1.2 provides a purely descriptive illustration of the correlation between measures of personal and functional income distribution for the G7 countries and China. There is a trend towards a negative (positive) correlation between the financial balance of corporations (the wage share) and the top income shares. The decline in the wage share has been less pronounced in countries where a sharp rise in top earners’ income since the beginning of the 1980s has been accompanied by companies saving less over the same period.

In summary, it can be seen that changes in both personal and functional income distribution can have destabilising macroeconomic impacts. In the case of a personal income shock, rising inequality in household incomes can lead to an increase in household debt, a decline in private households’ financial balance and a current account deficit. In the case of a functional income shock, a redistribution of income from

<sup>2</sup> Bartels and Bönke (2013, Figures 3 and 4) illustrate the development of transitory and permanent changes in real income in Germany between 1985 and 2006. Whilst a more pronounced increase was recorded in terms of permanent changes to gross household income, the changes to both the permanent and transitory components of net household income were relatively low. This would appear to be at odds with the evolution of the Gini coefficient over the same period.

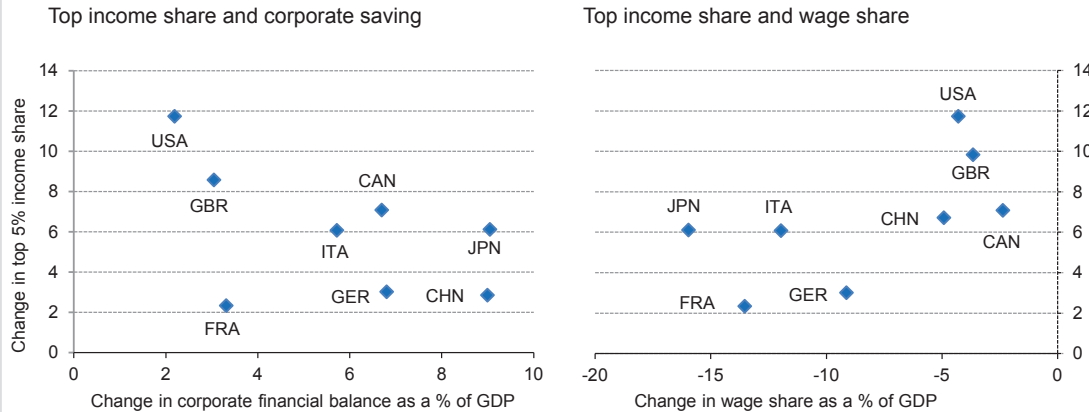


households to businesses can result in weaker domestic demand, a rise in the financial balance of corporations and a current account surplus. As illustrated by the case studies in Behringer et al.

(2013), the US and Germany provided prime examples of these opposing trends in the run-up to the financial crisis.

FIGURE BOX 1.2

Correlation between personal and functional income distribution



The illustrations show the correlation between measures of personal and functional income distribution for the G7 and China. All figures relate to the period 1980/3 – 2004/7 (four-year averages) except for the UK (1984/7 – 2004/7) and China (1992/5 – 2000/3).

CAN = Canada; CHN = China; GER = Germany ; FRA = France; GBR = Great Britain; ITA = Italy; ; JPN = Japan; USA = USA

Source: IMK calculations.



Enhanced top income shares

Top income shares are intended to provide us with an idea of income distribution across two social groups: top earners on the one hand and all other members of society on the other.<sup>6</sup> However, the increasing divergence between these two groups that can be seen in many places around the world is expressed differently in different countries. In the US and the UK, for example, WTID figures show that the top incomes' share of total household income has risen dramatically since the 1980s. In Germany, on the other hand, the most striking phenomenon is the increase in retained corporate earnings as a percentage of total private income since the early 2000s. The WTID's top income shares do not take this type of income into account since it is not subject to personal income tax. As a result, they fail to provide a complete picture of income polarisation.

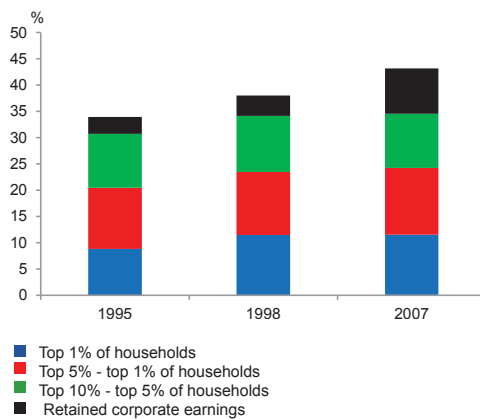
In Figure 3, the WTID data on top income shares is therefore combined with the NAS data on retained corporate earnings before being compared against total private income. This highly simplified approach, which is employed for illustrative purposes, makes the assumption that all corporate earnings can be allocated to the top earners. The il-

lustration reveals a much greater increase in top income shares when they are adjusted in this manner.

Figure 2c illustrates the macroeconomic context in which the rise in retained corporate earnings in Germany should be interpreted. The financial balan-

FIGURE 3

Top income shares adjusted to take account of retained corporate earnings<sup>1</sup>



<sup>1</sup> The graph shows the evolution of top household incomes and retained corporate earnings as a percentage of private pre-tax income.

Sources: AMECO; World Top Incomes Database; IMK calculations.



<sup>6</sup> Kumhof et al. (2010) refer to “investors” (rich households and corporations) and “workers”.

ce for joint-stock companies has been positive since 2002 – in other words the corporate sector as a whole has been accumulating additional net financial wealth on an annual basis over this period. This phenomenon is highly unusual both historically and internationally. Since neither the corporate sector nor the State (owing to the zero-structural-deficit-rule) is absorbing the traditionally positive net savings of private households, Germany has a structural current account surplus. While this trend can clearly be interpreted as an expression of problems in the realm of income distribution, it also has a destabilising impact on the economy as a whole (Infobox 1).<sup>7</sup>

### Wealth-to-income ratios

Figure 4a shows the ratio of net wealth to income for different definitions of wealth and income. The black line in Figure 4a shows the net wealth of private households as a percentage of the national income. Since 1991, this ratio (which Piketty refers to as “ $\beta$ ”, see Infobox 2) has risen from around 300 % to over 400 %. Over the same period, the net wealth of the economy as a whole experienced a far more modest increase owing to the decline in net government assets. Since the mid-2000s, the net wealth of the economy as a whole has risen sharply in relation to national income as a result of the increase in the net wealth of private households and private companies. It is also noticeable that, since the beginning of the 2000s, the net wealth of private households has risen far more sharply in relation to disposable household income than it has in relation to the national income. Prior to this date, these two alternative ways of calculating  $\beta$  had largely tracked each other. The divergence of these two ratios over the past decade and a half once again highlights the weak growth of household incomes in relation to (retained) corporate earnings.

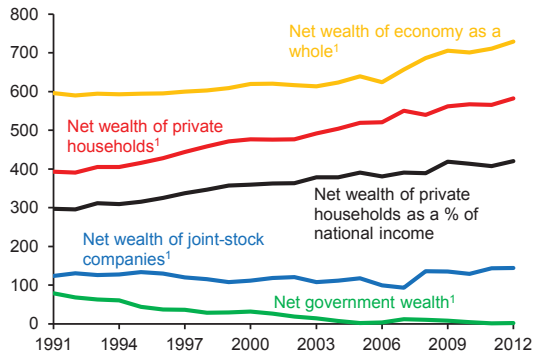
<sup>7</sup> Wagner (2011) sums up this situation by pointing out that the core of the problem is not so much government debt as the huge imbalances in international trade: Germany’s economic model has contributed significantly to the instability of the Eurozone. It has pursued an excessive export strategy, supported by stagnating real wages. If the incomes of the vast majority of the population rise only slowly, then domestic demand will also be weak. This also means that people cannot buy more goods and services from abroad. However, if a country keeps producing more goods than it can consume itself, this inevitably leads to other countries becoming indebted. The basis of these countries’ economies – i.e. jobs and thus also tax revenue – has been gradually eroded, while Germany has continued to accumulate wealth.

From a distribution perspective, a rise in  $\beta$  is relevant if wealth is less equally distributed than income. In this context, one interesting indicator is the ratio of the net wealth of a relatively well-off household to the disposable income of an average household. Figure 4b therefore estimates the net wealth of the 99th percentile of wealth based on a combination of data from the SOEP and the figures for the wealth of the economy as a whole (Gesamtwirtschaftliche Vermögensbilanz). The SOEP wealth distribution data used were for the years 2002, 2007 and 2012. The change in the net wealth of the 99th percentile post-2002 therefore corresponds to the average growth in net wealth as measured by the figures for the wealth of the economy as a whole. The net wealth values calculated using this method (“p99 Destatis”) were then compared against the median equivalised household income figures provided by the SOEP (“Median SOEP”). The advantage of using median income values is that they are less prone to underestimating high incomes and they reflect the financial situation of the average citizen. According to our calculations – which are still likely to underestimate the net wealth of the top percentiles, since this is under-recorded by the SOEP – in 2012, the 99th percentile had a net wealth 80 times higher than the annual income of the median German household. Ten years earlier, the same figure was only 50 times higher. If we were to rely purely on SOEP data, then this trend would apparently be far less pronounced (Figure 4b).

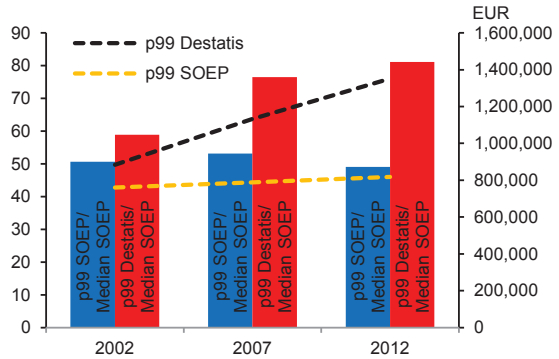
Another question that needs to be tackled is the extent to which this increase in the ratio between the top percentiles’ wealth and average incomes is contributing or may contribute in future to the perpetuation of economic inequality down the generations. It is helpful to consider the age-wealth profile when addressing this issue (Figure 4c). It is interesting to note that there is only an extremely modest decline in people’s wealth in the years before they die (as a result of them spending their savings). The average net wealth for the over-81 age group is not significantly lower than for people aged 65. In other words, most wealth in Germany is inherited by the next generation. Figure 4d shows that the proportion of Germany’s national income accounted for by inheritances (Schinke 2012) has risen continuously since 1960. As such, there is a danger that economic inequality will be perpetuated from one future generation to the next (Infobox 2).

# Wealth-to-income ratios

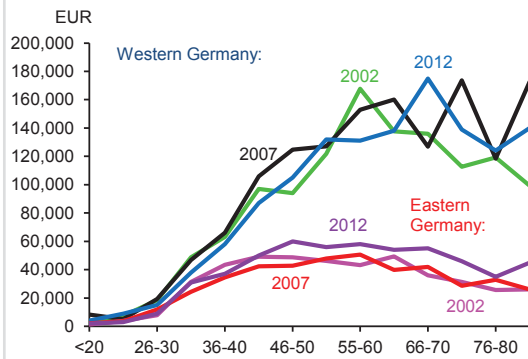
a) Wealth by sector



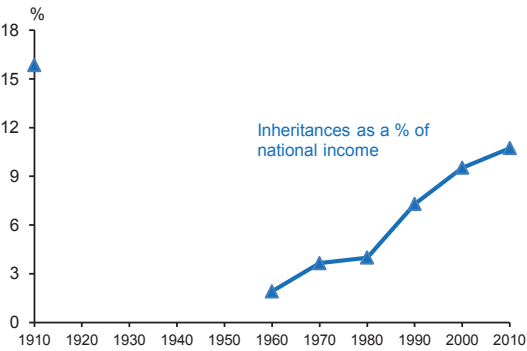
b) Ratio of p99 wealth to median income<sup>2</sup>



c) Income by age group



d) Rising importance of inheritances



<sup>1</sup> as a % of national income.

<sup>2</sup> p99 refers to the 99th percentile of the relevant distribution. „p99 Destatis“ was calculated by combining the SOEP wealth distribution figures with the average wealth trends according to Federal Statistical Office data: p99 Destatis = (p99 SOEP/per capita SOEP)\*per capita Destatis. Per capita Destatis was calculated based on the population over 14 years of age according to AMECO data.

Source: Schinke (2012).



## An illustration of Piketty's "fundamental laws of capitalism" and long-term trends in income and wealth inequality

Piketty (2014) proposes a simple model for describing the interaction between income inequality and wealth inequality. His model for what he calls the "fundamental laws of capitalism" lives up to its billing, comprising nothing more than an identity equation (Equation 1) and a simple arithmetical principle (Equation 2). However, notwithstanding fundamental theoretical disputes (e.g. Keynesian vs. neoclassical macroeconomics), the model can be said to be valid as long as a steady-state approach is supposed to be acceptable.

The "first fundamental law" states that  $\alpha$  (defined as the ratio of capital income (P) to the national income (Y)) is equal to the return on capital (r) multiplied by  $\beta$  (defined as the net wealth of the economy as a whole (W) divided by the national income (Y)):

$$(1) \quad \alpha = P/Y = r \cdot \beta = rW/Y$$

According to the "second fundamental law", in a long-term steady state,  $\beta$  converges with the ratio between the savings rate for the economy as a whole (s) and the nominal growth rate of the national income (g):

$$(2) \quad \beta = s/g$$

Piketty makes two empirical observations that highlight the importance of these relationships to income and wealth distribution trends:

Firstly, high-income groups save a greater proportion of their income and bequeath a larger percentage of their income than low-income groups. This plays a key role in causing wealth to be less equally distributed than income and in ensuring that the importance of inheritances relative to earned income increases over the course of time.<sup>1</sup> Secondly, Piketty argues that historically, the return on capital (r) has often exceeded the rate of economic growth (g). What this means is that if the owners of capital save a sufficiently large proportion of their income, capital will tend to outpace earned income. Under certain circumstances, this results in a continuous rise in the wealth-income ratio ( $\beta$ ), meaning that capital income accounts for a greater and greater share of the national income ( $\alpha$ ). Ultimately, this translates

<sup>1</sup> The concentration of wealth is exacerbated by low population growth.

into a constant growth in income inequality.<sup>2</sup>

In order to gain a better understanding of the interaction between income inequality and wealth inequality, it may be helpful to illustrate how Piketty's model works using a few concrete numerical examples.<sup>3</sup> Given the model's simplicity and the necessary simplifying assumptions, the simulations outlined below are primarily for illustrative purposes. Nevertheless, the trends shown by the processes that they describe are perfectly realistic.

In Table 2.1 the model was "calibrated" so that its key ratios and parameters in Period 0 essentially reflected the situation in Germany in the early 2000s.

In Period 0, the model is in steady state. In other words, as long as its parameters are not altered, both the ratios  $\alpha$  and  $\beta$  and the distribution of income (Y) and wealth (W) will remain unchanged. Households are divided into three groups (T: top, M: middle, U: lower). The simplifying assumption is made that the income and wealth quantiles coincide and remain stable over time.<sup>4</sup> In the interests of simplicity, it is also assumed that the return on capital will be the same for all households.<sup>5</sup> Since the model does not include a corporate sector, the top households represent both wealthy households and businesses. Moreover, since the State is also not represented in the model, no distinction is made between gross and net income and pre- and after-tax rates of return. The savings rates of the three income groups are income-based and have been cho-

<sup>2</sup> Formally speaking,  $\beta$  will continue to rise infinitely if  $s_{\text{Profit}} r > g$ , where  $s_{\text{Profit}}$  is the savings rate for capital income. The reason that a high r-g ratio is so explosive in income distribution policy terms is because the different income groups have different savings rates. If savings rates were unconnected to income, the wealth-income ratio of individual households would not be dependent on their income either. Furthermore, if savings rates were uniformly distributed, then in the long term wealth and income distribution would become identical to wage distribution and the r-g ratio would be irrelevant to income distribution trends.

<sup>3</sup> The excel file, on which this simulations are based, is available online (van Treeck 2014b).

<sup>4</sup> Empirically, a rise in income inequality can be caused either by a rise in transitory or permanent changes in income or by a combination of both factors (Bartels and Bönke 2013).

<sup>5</sup> In actual fact, households that have a lot of wealth are typically able to obtain a better return on wealth, since a large portfolio can be more easily diversified and is better able to incorporate a larger proportion of higher-risk investments that also offer higher returns. Furthermore, wealthier households tend to be better informed about attractive investment opportunities.

sen so that the  $\beta$  value for the economy as a whole and the individual  $\beta$  values remain constant.<sup>6</sup> In other words, wealth and income grow at the same rate. This baseline period clearly demonstrates that – contrary to what is often claimed – if  $r$  is greater than  $g$  this in no way means that both  $\beta$  and inequality will inevitably continue to rise indefinitely.<sup>7</sup>

Table 2.1a illustrates Period 1, where a shock to wage income distribution that benefits top earners is accompanied by a rise in returns on capital. This results in a direct rise in the top income share from 25 % to 35 %, along the same lines as in Figure 3. The capital income share rises from 27 % to 32 %, mirroring the trend shown in Figure 2b. It is interesting to observe how things develop over the subsequent periods. Initially, wealth inequality is largely unaffected by the increase in wage and income inequality. However, since the top income groups save a relatively high proportion of their increased income, wealth inequality also gradually increases. This in turn has the effect of exacerbating income inequality. (The greater the differential between savings rates, the stronger the effect.) After 15 periods, the top wealth share has risen from 60 % to 64 %, after 30 periods it has reached 67 %, after 50 periods it stands at 70 % and in the new long-term steady state the top wealth share climbs to 81 %. As a result, the top income share rises to 51 % over the long term, even though the top wage share remains at 23 %. This demonstrates how differences in the baseline wage and wealth distribution can be exacerbated over time as a result of differences in the savings rates of the different income groups.

In Table 2.1b, the overall rate of economic growth ( $g$ ) is reduced from 3 % in Period 0 to 1 % as of Period 1. The assumption that the nominal in-

come growth rate will decline is in line with the trend forecast by Piketty and several other economists and demographers who claim that we can expect lower population growth (accompanied by lower income growth) and even “secular stagnation” (Summers 2014) over the next few decades. Whilst initially the simulation illustrated in Table 2.1b develops almost identically to that in Table 2.1a, over the longer term it displays a much stronger tendency towards greater inequality. This is because the  $r$ - $g$  ratio rises while savings rates remain unchanged. The result is that wealth and capital income increase significantly faster than the national income. Even after 50 periods, the top income share has reached 60 %, while over the longer term,  $\alpha$ ,  $\beta$  and income and wealth inequality all continue to rise indefinitely.

In Table 2.1c, the differential between the savings rates of the top and middle income groups is also increased. This is a trend that has been apparent in Germany for some years as a result of a rise in corporate saving and it can also be detected in the SOEP household savings rates. This phenomenon further exacerbates the rise in inequality. In Period 50, the top households already account for 82 % of all wealth (as opposed to 73 % in Table 2.1b) and 71 % of all income (compared with 60 % in Table 2.1b).

Based on these simulations, the SOEP’s finding that there has been a sharp rise in income inequality over the past decade but almost no change in wealth inequality is unlikely to remain valid over the longer term. By its very nature, wealth inequality is initially slow to react to changes in income distribution – not only is it starting at a much higher level, but it also takes time to accumulate wealth through savings. Nevertheless, in the long term both wealth inequality and income inequality can be expected to keep rising unless the appropriate economic policy measures are taken to counter them.

<sup>6</sup> E.g.:  $\beta = s/g = 0.108/0.03 = 3.6$ ;  
 $\beta M = sM/g = 0.0897/0.03 = 2.99$ .

<sup>7</sup> The reason for this is that the savings rate for top earners is “too low”.

TABLE BOX 2.1

### Some simple simulations based on a version of Piketty's (2014) model<sup>1</sup>

#### a) Rise in top wage incomes and capital returns

Period	alpha (=P/Y)	Share of L			r	g	Savings rates				s/g	beta (=W/Y)				Share of W			Share of Y		
		T	M	U			Total	T	M	U		Total	T	M	U	T	M	U	T	M	U
0	0.27	0.13	0.45	0.43	0.08	0.03	0.11	0.26	0.09	0.02	3.6	3.6	8.53	2.98	0.56	0.6	0.35	0.05	0.25	0.42	0.32
1	0.32	0.23	0.45	0.32	0.09	0.03	0.13	0.26	0.09	0.02	4.36	3.6	6.17	3.02	0.77	0.6	0.35	0.05	0.35	0.42	0.23
2	0.33	0.23	0.45	0.32	0.09	0.03	0.13	0.26	0.09	0.02	4.37	3.62	6.21	3.02	0.77	0.6	0.35	0.05	0.35	0.42	0.23
3	0.33	0.23	0.45	0.32	0.09	0.03	0.13	0.26	0.09	0.02	4.38	3.64	6.25	3.03	0.77	0.61	0.35	0.05	0.35	0.42	0.23
4	0.33	0.23	0.45	0.32	0.09	0.03	0.13	0.26	0.09	0.02	4.39	3.67	6.29	3.03	0.76	0.61	0.34	0.05	0.35	0.41	0.23
5	0.33	0.23	0.45	0.32	0.09	0.03	0.13	0.26	0.09	0.02	4.4	3.69	6.32	3.04	0.76	0.61	0.34	0.05	0.36	0.41	0.23
10	0.34	0.23	0.45	0.32	0.09	0.03	0.13	0.26	0.09	0.02	4.45	3.79	6.49	3.06	0.74	0.62	0.33	0.04	0.36	0.41	0.23
15	0.35	0.23	0.45	0.32	0.09	0.03	0.14	0.26	0.09	0.02	4.5	3.88	6.64	3.08	0.73	0.64	0.32	0.04	0.37	0.41	0.22
30	0.37	0.23	0.45	0.32	0.09	0.03	0.14	0.26	0.09	0.02	4.64	4.13	7.02	3.12	0.69	0.67	0.3	0.04	0.39	0.39	0.21
50	0.4	0.23	0.45	0.32	0.09	0.03	0.14	0.26	0.09	0.02	4.78	4.39	7.39	3.14	0.65	0.7	0.27	0.03	0.42	0.38	0.21
80	0.42	0.23	0.45	0.32	0.09	0.03	0.15	0.26	0.09	0.02	4.95	4.68	7.76	3.14	0.61	0.73	0.24	0.03	0.44	0.36	0.2
100	0.43	0.23	0.45	0.32	0.09	0.03	0.15	0.26	0.09	0.02	5.04	4.82	7.93	3.12	0.6	0.75	0.23	0.02	0.45	0.35	0.19
1000	0.48	0.23	0.45	0.32	0.09	0.03	0.16	0.26	0.09	0.02	5.39	5.39	8.53	2.98	0.56	0.81	0.18	0.02	0.51	0.32	0.17

#### b) Fall in economic growth rate

Period	alpha (=P/Y)	Share of L			r	g	Savings rates				s/g	beta (=W/Y)				Share of W			Share of Y		
		T	M	U			Total	T	M	U		Total	T	M	U	T	M	U	T	M	U
0	0.27	0.13	0.45	0.43	0.08	0.03	0.11	0.26	0.09	0.02	3.6	3.6	8.53	2.98	0.56	0.6	0.35	0.05	0.25	0.42	0.32
1	0.32	0.23	0.45	0.32	0.09	0.01	0.13	0.26	0.09	0.02	13.1	3.6	6.17	3.02	0.77	0.6	0.35	0.05	0.35	0.42	0.23
2	0.33	0.23	0.45	0.32	0.09	0.01	0.13	0.26	0.09	0.02	13.2	3.69	6.29	3.09	0.79	0.6	0.35	0.05	0.35	0.42	0.23
3	0.34	0.23	0.45	0.32	0.09	0.01	0.13	0.26	0.09	0.02	13.3	3.79	6.41	3.16	0.81	0.61	0.35	0.05	0.36	0.41	0.23
4	0.35	0.23	0.45	0.32	0.09	0.01	0.13	0.26	0.09	0.02	13.3	3.88	6.52	3.23	0.83	0.61	0.34	0.05	0.36	0.41	0.22
5	0.36	0.23	0.45	0.32	0.09	0.01	0.13	0.26	0.09	0.02	13.4	3.97	6.63	3.3	0.84	0.61	0.34	0.05	0.37	0.41	0.22
10	0.4	0.23	0.45	0.32	0.09	0.01	0.14	0.26	0.09	0.02	13.9	4.44	7.16	3.65	0.94	0.63	0.33	0.04	0.39	0.4	0.21
15	0.44	0.23	0.45	0.32	0.09	0.01	0.14	0.26	0.09	0.02	14.3	4.91	7.64	4	1.03	0.64	0.32	0.04	0.41	0.39	0.2
30	0.57	0.23	0.45	0.32	0.09	0.01	0.16	0.26	0.09	0.02	15.9	6.32	8.84	5.08	1.37	0.68	0.29	0.03	0.48	0.36	0.16
50	0.74	0.23	0.45	0.32	0.09	0.01	0.18	0.26	0.09	0.02	18.2	8.24	10	6.78	2.12	0.73	0.25	0.03	0.6	0.3	0.1
80	1.02	0.23	0.45	0.32	0.09	0.01	0.22	0.26	0.09	0.02	22.4	11.34	11.2	11.69	18.3	0.8	0.18	0.02	0.81	0.18	0.01
100	1.23	0.23	0.45	0.32	0.09	0.01	0.26	0.26	0.09	0.02	25.9	13.64	11.7	28.07	-2.4	0.85	0.14	0.01	0.99	0.07	-0.1
1000	3113	0.23	0.45	0.32	0.09	0.01	661.18	0.26	0.09	0.02	####	34589	13.4	4.67	0.87	1.35	-0.3	-0	3499	####	####

#### c) Divergence of savings rates

Period	alpha (=P/Y)	Share of L			r	g	Savings rates				s/g	beta (=W/Y)				Share of W			Share of Y		
		T	M	U			Total	T	M	U		Total	T	M	U	T	M	U	T	M	U
0	0.27	0.13	0.45	0.43	0.08	0.03	0.11	0.26	0.09	0.02	3.6	3.6	8.53	2.98	0.56	0.6	0.35	0.05	0.25	0.42	0.32
1	0.32	0.23	0.45	0.32	0.09	0.01	0.13	0.3	0.05	0.02	13	3.6	6.17	3.02	0.77	0.6	0.35	0.05	0.35	0.42	0.23
2	0.33	0.23	0.45	0.32	0.09	0.01	0.13	0.3	0.05	0.02	13.1	3.69	6.31	3.06	0.79	0.61	0.34	0.05	0.36	0.41	0.23
3	0.34	0.23	0.45	0.32	0.09	0.01	0.13	0.3	0.05	0.02	13.3	3.79	6.44	3.1	0.81	0.61	0.34	0.05	0.36	0.41	0.23
4	0.35	0.23	0.45	0.32	0.09	0.01	0.13	0.3	0.05	0.02	13.4	3.88	6.57	3.14	0.83	0.62	0.33	0.05	0.37	0.41	0.22
5	0.36	0.23	0.45	0.32	0.09	0.01	0.14	0.3	0.05	0.02	13.6	3.97	6.7	3.19	0.84	0.63	0.32	0.05	0.37	0.41	0.22
10	0.4	0.23	0.45	0.32	0.09	0.01	0.14	0.3	0.05	0.02	14.4	4.46	7.3	3.41	0.94	0.66	0.3	0.04	0.4	0.39	0.21
15	0.45	0.23	0.45	0.32	0.09	0.01	0.15	0.3	0.05	0.02	15.2	4.95	7.84	3.65	1.04	0.69	0.27	0.04	0.43	0.37	0.2
30	0.59	0.23	0.45	0.32	0.09	0.01	0.18	0.3	0.05	0.02	18	6.55	9.16	4.51	1.43	0.75	0.21	0.03	0.54	0.31	0.15
50	0.81	0.23	0.45	0.32	0.09	0.01	0.22	0.3	0.05	0.02	22.5	8.99	10.4	6.58	2.64	0.82	0.15	0.02	0.71	0.21	0.08
80	1.22	0.23	0.45	0.32	0.09	0.01	0.31	0.3	0.05	0.02	31.4	13.58	11.7	195.40	-2.9	0.9	0.09	0.01	1.05	0.01	-0.1
100	1.57	0.23	0.45	0.32	0.09	0.01	0.39	0.3	0.05	0.02	39.4	17.48	12.2	-5.02	-0.6	0.94	0.05	0.01	1.35	-0.2	-0.2
1000	45748	0.23	0.45	0.32	0.09	0.01	10962	0.3	0.05	0.02	####	508316	13.9	2.32	0.77	1.14	-0.1	-0	####	####	####

<sup>1</sup> N.B.: L=Wage income, P=Profits, Y=National income, W=Wealth, T=Top income households, M=Middle income households, U=Lower income households, r=Return on capital, g=Growth rate of national income, s=Savings rate.

Source: IMK calculations.



## Conclusions

The data on economic inequality that are currently available for Germany are unsatisfactory, even compared to other countries. While the SOEP data are without doubt extremely valuable for a wide variety of analyses of economic inequality, they are not so good at accurately recording very high incomes and wealth.

In principle, the WTID offers a valuable alternative for measuring top income shares based on official tax statistics. However, the most recent figures for Germany are from 2007. There is an urgent need for further research in this area. However, this is currently complicated by the fact that tax paid on investment income is not recorded on an individual basis. This alone constitutes a strong argument for abolishing the withholding tax and returning to the old comprehensive income tax system.

It is also easier to measure wealth inequality in other countries. In France, for example, the statistical basis for doing so has existed ever since the introduction of the wealth tax during the French Revolution of 1789. No reliable long-term data series on wealth inequality currently exist for Germany, however. The fact that no wealth tax exists in Germany and that the data sets based on gift and inheritance tax are incomplete is hindering research in this area. Well-off households are reluctant to provide details of their financial situation, making it difficult to determine the true concentration of wealth. The introduction of a low-rate wealth tax would therefore allow significant progress to be made in terms of the quality of the available data. Indeed, even a 0 % wealth tax would constitute an important step towards enabling the real distribution of wealth to be recorded.

However, any serious attempt at tackling the negative consequences of rising inequality – both from a distributive justice and a macroeconomic stability perspective – will require more far-reaching fiscal policy interventions. The debate on the reintroduction of a wealth tax (Bach and Beznoska 2012) and an increase in the income tax rate for top earners needs to start placing far greater emphasis on the fact that reducing economic inequality also diminishes the risk of future economic crises. People who lived through the Great Depression came to understand the relationship between inequality and macroeconomic instability, even all those years ago. Indeed, the Wealth Tax Act that formed part of US President Franklin D. Roosevelt's New Deal and was conceived as a response to the global economic crisis of 1929 raised the top income tax rate to 79 %.

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