



$r > g$: WHY THE 'PIKETTY DEBATE' UNSETTLES GERMANY'S ECONOMIC EXPERTS

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Introduction

This article reflects on the significance of Thomas Piketty's 'Capital in the 21st Century' for academic and policy debates in Germany. The second section highlights two potential reasons why this widely-acclaimed book has so far provoked less enthusiastic reactions in Germany than in Britain, France and the United States. Firstly, it seems to be less straightforward to apply Piketty's concepts of top income and wealth shares in the German context. This difficulty is partly due to limited data availability owing to the fact that there is no wealth tax in Germany and that capital incomes have been taxed on an anonymous basis since 2009. A further complicating factor is that top household incomes shares do not take into account trends within the corporate sector, which has accumulated large financial surpluses in Germany since the early 2000s as a result of skyrocketing (retained) profits. Secondly, there still is an unfortunate unwillingness in large parts of the economics profession in Germany to take the issue of income and wealth inequality and its relation to macroeconomic developments more seriously.

The third section briefly recalls the ingredients of Piketty's macroeconomic model developed in 'Capital', before illustrating the dynamics of the model on the basis of some simple numerical simulations that are 'calibrated' roughly to fit the German data (the fourth section). The simulations point to a number of popular misinterpretations of Piketty's model that are widespread in the public debate in Germany.

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In particular, Piketty's unconventional interpretation of the relation between the rate of return on capital, r , and the economic growth rate, g , has unsettled many commentators including the German Council of Economic Experts. Moreover, the simulations cast doubt on the widely reported empirical finding, based on household survey data, that there has been a sharp rise in income inequality over the past decade, but almost no change in wealth inequality in Germany.

The fifth section discusses the potential macroeconomic implications of a growing divergence between r and g , as hypothesised by Piketty. At low accumulation rates in particular, high rates of return on capital can only be sustained by compensating effects on the demand side of the economy. But these effects may induce macroeconomic instability: in the United States prior to the financial crisis starting in 2007, the macroeconomic generation of profits was dependent on the unsustainable (debt-financed) spending of households below the top of the income distribution whose incomes decreased strongly relative to top incomes. This inequality-crisis nexus, emphasised by Piketty in 'Capital', is another topic that most economists in Germany seek to avoid. Yet, in Germany most households' incomes have also developed sluggishly over the past decade or two, translating into weak private consumption demand. Hence, the profit generation process has largely depended on high and persistent current account surpluses, which are also a source of macroeconomic instability.

In sum, it can only be hoped that the 'Piketty debate' will lead to a renewed interest in (the macroeconomic implications of) income and wealth inequality within both the economics profession and among policymakers in Germany.

On the peculiarities of the 'Piketty debate' in Germany

The 'Piketty debate' in Germany has been rather peculiar to date, in at least two ways. Firstly, in terms of data: several years before the publication of Piketty's 'Capital', study after study showed that income inequality had strongly increased in Germany. OECD

(2011), for example, concluded that over the past decade and a half, the Gini coefficient of disposable household income (based on household survey data) in Germany had risen faster than in almost any other OECD nation. From the mid-1980s to the mid-2000s, the rise in the Gini coefficient was approximately the same for Germany as for the United States, for example. Moreover, the decline in the share of wages in national income was more pronounced in Germany than in most other industrialised countries, especially as of the early 2000s. On the other hand, household survey data from the German Socio-economic Panel (SOEP) suggests that wealth inequality was roughly stable from 2002 to 2007 and from 2007 to 2012 (Grabka and Westermeier 2014). Meanwhile, the Household Finance and Consumption Survey (HFCN 2013) showed that the level of wealth inequality in Germany was relatively high compared to that of other European countries.

These trends in income and wealth distribution are often treated like established facts in the German debate, even although the data sources that they are based on – voluntary household surveys – are all limited by the fact that well-off households rarely participate in them. Against this background, the most valuable contribution of Thomas Piketty's research is certainly to be seen in his meticulous analysis of top household incomes based on official tax return files, which has given rise to the World Top Incomes Database (Alvaredo *et al.* 2012). This approach is currently being extended to the analysis of top household wealth shares (e.g. Saez and Zucman 2014). Yet, Piketty's 'Capital' is astonishingly silent on trends in income and wealth distribution in Germany. If anything, Piketty's data seem to suggest that top household income shares have been relatively stable in Germany in recent decades, albeit at a relatively high level compared to other industrialised countries. Data on wealth inequality in Germany are completely absent from 'Capital'.

Two aspects should be noted here: firstly, at the statistical level, the fact that no wealth tax exists in Germany and that information about capital income taxes has not been recorded on an individual basis since the introduction of the flat-rate withholding tax (*Abgeltungssteuer*) in 2009 is hindering research in this area. The latest available information on top household income shares in the World Top Incomes Database is from 1998 (excluding capital gains) and 2007 (including capital gains). Attempts to estimate the role of

capital income for top income shares after 2009 (e.g. Bartels and Jenderny 2014) therefore have to refer to other, less authoritative sources.

Secondly, at the conceptual level, Piketty's preferred measure of income inequality, i.e. top household income shares, may fall victim to something of a blind spot when applied to Germany. Much of the huge rise in corporate earnings since the early 2000s has been retained by companies, rather than being passed on to private households. Therefore, to the extent that corporations are predominantly owned by well-off households while retained corporate profits are not counted as household income, top household income shares *à la* Piketty may underestimate the rise of top-end inequality in Germany. This is especially problematic since there are also no reliable data available for the distribution of corporate (and other forms of) wealth across households. Household survey data from the SOEP strongly underestimate the rise in average household net worth as documented by the national flow of funds. In particular, they completely fail to account for the rise in corporate wealth that should be expected in view of the yearly accumulation of net financial assets by the corporate sector in every year since 2002 (Behringer *et al.* 2014).

An obvious lesson to be drawn from Piketty's 'Capital' from the viewpoint of German politics would be to think about how to improve data availability for top incomes and wealth. Yet the federal minister for economic affairs, Sigmar Gabriel, explained during Thomas Piketty's visit to his ministry, that "the wealth tax is dead" in Germany. It also seems unlikely that the current government will call into question the flat-rate withholding tax for capital incomes that was introduced in 2009.

A second peculiarity in the German 'Piketty debate' is the superficial reception of 'Capital' and the caricatural representation of its main conclusions by some German academic economists. It suffices to mention two prominent examples here: shortly after the publication of Piketty's 'Capital' in English, Stefan Homburg, an influential economist in academic and policy-oriented discussions, published a short, but widely-noted critique of Piketty's interpretation of the $r > g$ relationship. According to Homburg, Piketty's conclusions about rising income and wealth inequality crucially depend on the implicit assumption that all capital incomes are saved and never consumed. It is hard to avoid the impression that this critique is based on an

expressly selective reading of Piketty's 'Capital'. It is true that Piketty's argument in 'Capital' is sometimes a bit imprecise, and on page 1 of the Introduction he comes close to suggesting that $r > g$ is a sufficient condition for ever-rising inequality. Yet, it is clearly explained in the book that the implications of $r > g$ for the evolution of income and wealth inequality depend on a number of additional factors. One is the tendency for high net worth individuals to achieve above-average rates of return 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. Another factor is the tendency for high-income households to have higher saving propensities (out of life-time or permanent income) than lower income groups, who simply cannot afford to save a lot. Homburg's critique, by contrast, is based on a model with a representative agent, i.e. without differential saving rates, and with a unique rate of return.

Another noteworthy example of the superficiality of the German 'Piketty debate' is the latest annual report of the German Council of Economic Experts (CEE, 'Sachverständigenrat') with the striking title 'More Confidence in Market Processes'. The CEE argues that Piketty "postulates a quasi-natural law of motion for income inequality", which, according to the CEE, "does not hold from the economic point of view". The CEE goes on to explain that "capital is used in the production process. Moreover, wealth and the income derived from it ultimately also serve the purpose of consumption" (SVR 2014, paragraph 518, own translation). But this is a naïve understanding of wealth. Age-wealth profiles based on the SOEP show 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, or at least those forms of wealth recorded by the SOEP, is inherited by the next generation. Research by Schinke (2012), combining tax data and national accounts data, shows that the proportion of Germany's national income accounted for by inheritances has risen continuously since 1960. As such, there is a danger that economic inequality is being perpetuated from one generation to the next.

A number of other influential German economists have reacted to the publication of Piketty's 'Capital' in

a similarly depreciative way as Homburg (2014) and CEE (2014); see Bank (2014). This is perhaps not surprising, since it is well known that unconventional economists are rare in Germany's academic landscape, and that the German economics community is very conservative by international standards (Truger 2013).

Piketty's model

Many commentators have (mis)represented Piketty's theory as saying that whenever $r > g$, inequality will rise indefinitely and the share of profits in national income will rise to 100 percent (see Stelter 2014). This is obviously not true, as will be illustrated numerically in the fourth section. This section summarises Piketty's (2014) model and discusses the conditions under which $r > g$ will lead to rising inequality.

Piketty's 'model' for what he calls the 'fundamental laws of capitalism' comprises nothing more than an identity equation (equation 1) and a simple arithmetical principle (equation 2). As such, the model can be said to be universally valid as long as a steady-state approach is supposed to be acceptable.

The 'first fundamental law' states that α (defined as the ratio of capital income, P , to the national income, Y) is equal to the return on capital, r , multiplied by β (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, β converges to the ratio between the saving 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. 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, wealth

growth will tend to outpace earned income growth. Under certain circumstances, this results in a continuous rise in the wealth-income ratio, β , meaning that capital income accounts for a greater and greater share of the national income, α . Ultimately, this translates into a constant growth in income inequality. Formally speaking, β will continue to rise infinitely if $s_p r > g$, where s_p is the savings rate for capital income. The inequality dynamics will be further corroborated if well-off savers achieve higher-than-average returns on their financial investments.

The main reason why Piketty's model has been perceived as such a provocation by many economists is that $r > g$ is considered an 'almost self-evident assumption' (Paqué 2014) in neoclassical growth models. But together with the assumption of differentiated household saving rates (and/or differentiated rates of return), it translates into a 'fundamental force for divergence', as Piketty puts it. If saving rates and rates of return were not connected to income, the wealth-income ratio of individual households would not be dependent on their income either. Furthermore, if saving rates and rates of return were uniformly distributed, then wealth and income distribution would become identical to wage distribution in the long term and the r - g ratio would be irrelevant *vis-à-vis* income distribution trends.

A numerical illustration of Piketty's 'fundamental laws of capitalism'

It may be helpful to illustrate how Piketty's model works using a few concrete numerical examples. Given the model's simplicity and the necessary simplifying assumptions, the simulations outlined below are primarily for illustrative purposes (the underlying excel file is available online through van Treeck 2014). Nevertheless, the trends shown by the processes that they describe are not necessarily unrealistic. More important than the concrete numbers, however, are the qualitative trends in the distribution of income and wealth that follow from the simple simulations proposed below. The potential implications for macroeconomic instability are discussed in the fifth section.

In the model, 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. To reduce complexity, it is also assumed that the return on capi-

tal will be the same for all households. Since the model does not include a corporate sector, the top households represent both wealthy households and businesses. High income households have a higher saving rate than low income households. 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.

In Table 1 the model was 'calibrated' so that the key ratios and parameters in period 0 essentially reflect the situation in Germany in the early 2000s. To this end, information from the national accounts, the SOEP and the World Top Incomes Database were combined (see Behringer *et al.* 2014). There is some uncertainty surrounding the appropriate calibration: according to the flow of funds, households' net worth was around 360 percent that of national income at the beginning of the 2000s (see also Piketty 2014, 141). A share of capital incomes in national income of approximately 25 percent is reported by Piketty (2014, 222). This implies a rate of return on capital of approximately 7 percent. The adjusted profit share reported in the AMECO database of the European Commission lies considerably above the capital income share reported by Piketty (2014). According to the Federal Statistical Office, the capital income share was slightly less than 30 percent (Behringer *et al.* 2014, 4). Moreover, Piketty (2014, 205) distinguishes between the observed rate of return and the pure rate of return. The pure rate is lower than the observed rate, because it deducts an estimate of the remuneration of the informal work related to the management of wealth. Furthermore, especially for family-owned and other small and medium-sized enterprises, which are particularly widespread in Germany, the distinction between income from capital and remuneration of entrepreneurial work is not always clear. To the extent that entrepreneurial income is recorded as profit income, the observed rate of return on capital rises. For the 'calibration' of the model the rate of return was initially set at 7.5 percent, which, given the net worth-to-income ratio of 360 percent, implies a capital income share of 27 percent.

In period 0, the model is in a steady state. That is, as long as its parameters are not altered, both the ratios α and β and the distribution of income (Y) and wealth (W) will remain unchanged. The saving rates of the three income groups are income-based and have been chosen so that the β value for the economy as a whole and the individual β values remain constant (e.g. $\beta =$

$s/g = 0.108/0.03 = 3.6$; $\beta_M = s_M/g = 0.0897/0.03 = 2.99$). In other words, wealth and income grow at the same rate. This baseline period clearly demonstrates that – contrary to frequent claims – if r is greater than g this in no way means that both β and inequality will inevitably continue to rise indefinitely. The reason here is that the saving rate for top earners is ‘too low’.

Table 1a illustrates period 1, where a shock to the wage 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 percent to 35 percent, while the capital income share rises from 27 percent to 32 percent, approximately mirroring empirical trends during the 2000s (Behringer *et al.* 2014). 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. After 15 periods, the top wealth share rises from 60 percent to 64 percent, after 30 periods it reaches 67 percent, after 50 periods it stands at 70 percent and in the new long-term steady state the top wealth share climbs to 81 percent. As a result, the top income share rises to 51 percent over the long term, even although the top wage share remains at 23 percent. 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 1b, the overall rate of economic growth, g , is reduced from 3 percent in period 0 to 1 percent as of period 1. The assumption that the nominal income growth rate will decline is in line with the trend forecast by many 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 the simulation illustrated in Table 1b initially develops almost identically to that in Table 1a, over the longer term it displays a much stronger tendency towards greater inequality. This is because the r - g ratio rises, while saving 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 percent, while over the longer term, α , β

and income and wealth inequality all continue to rise indefinitely.

In Table 1c, the differential between the saving 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 saving rates (Behringer *et al.* 2014). This phenomenon further exacerbates the rise in inequality. In period 50, the top households already account for 82 percent of all wealth (as opposed to 73 percent in Table 1b) and 71 percent of all income (compared with 60 percent in Table 1b).

Even although the results of these simulations should not be taken at face value, they suggest that 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 appropriate economic policy measures are taken to counter them.

The r - g relation and macroeconomic instability

The least convincing part of ‘Capital’ is Chapter 6, in which Piketty places his two ‘fundamental laws of capitalism’ within the context of neoclassical marginal productivity theory. According to the neoclassical production function, the equilibrium rate of return on capital, r , is derived from the marginal product of capital. The question then is whether a rise in the capital-to-income ratio, β , will induce a decrease in r sufficient to prevent an increase in $\alpha = r\beta$. This will be so if the elasticity of substitution between capital and labour is smaller than one. In this case, the inequality dynamics illustrated in the numerical examples of the previous section do not materialise.

There are several problems with this approach. As is well known, the concept of the aggregate production function is problematic due to the fact that the value of capital is not a real concept but a monetary one, and thus cannot be used to derive a technologically determined rate of return on capital (Harcourt 1972;

Table 1

Some simple simulations based on a variant of Piketty's (2014) model

a) Rise in top wage share and rate of return

Period	alpha (=PY)	Share of L			r	g	Saving rates			s/g	beta (=W/Y)			Share of W			Share of Y			
		T	M	U			Total	T	M		U	Total	T	M	U	Total	T	M	U	
0	0.27	0.13	0.45	0.43	0.075	0.03	0.11	0.26	0.09	0.02	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	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	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	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	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	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	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	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	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	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	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	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	8.53	2.98	0.56	0.81	0.18	0.02	0.51	0.32	0.17

b) Fall in growth rate

Period	alpha (=PY)	Share of L			r	g	Saving rates			s/g	beta (=W/Y)			Share of W			Share of Y			
		T	M	U			Total	T	M		U	Total	T	M	U	Total	T	M	U	
0	0.27	0.13	0.45	0.43	0.075	0.03	0.11	0.26	0.09	0.02	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	13.07	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	13.16	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	13.25	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	13.33	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	13.42	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	13.88	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	14.34	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	15.86	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	18.18	10.01	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	22.42	11.34	11.69	18.27	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	0.85	0.14	0.01	0.99	0.07	-0.06
1000	3113.02	0.23	0.45	0.32	0.09	0.01	661.18	0.26	0.09	0.02	66117.97	13.38	4.67	0.87	1.35	-0.33	-0.03	3498.51	-2416.81	-1080.7

c) Divergence of saving rates

Period	alpha (=P/Y)	Share of L			r	g	Saving rates			sg	Total	beta (=W/Y)			Share of W			Share of Y			
		T	M	U			Total	T	M			U	T	M	U	T	M	U	T	M	U
0	0.27	0.13	0.45	0.43	0.075	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	12.97	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	13.12	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	13.27	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	13.42	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	13.57	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	14.35	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	15.17	4.95	7.84	3.65	1.04	0.69	0.27	0.03	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	17.95	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	22.45	8.99	10.42	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	31.44	13.58	11.65	195.40	-2.9	0.9	0.09	0.01	1.05	0.01	-0.06
100	1.57	0.23	0.45	0.32	0.09	0.01	0.39	0.3	0.05	0.02	39.38	17.48	12.19	-5.02	-0.57	0.94	0.05	0.01	1.35	-0.18	-0.17
1000	45748.41	0.23	0.45	0.32	0.09	0.01	10961.85	0.3	0.05	0.02	1096184.78	508315.68	13.91	2.32	0.77	1.14	-0.12	-0.02	41750.08	-26014.65	-15734.43

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.

Felipe and McCombie 2013). This is all the more true as Piketty (2014, 46) defines capital as “all nonhuman assets that can be owned and exchanged on some market”, i.e. including residential housing and financial wealth, which are not directly used for production and for which the meaning of the elasticity of substitution is even less obvious. However, in many countries the rise of β in recent decades documented in ‘Capital’ was primarily due to what Piketty refers to as ‘housing’, while the ratio of ‘other domestic capital’ to national income remained essentially stable (see Piketty 2014, Part Two).

A somewhat more straightforward analysis of the $r-g$ relationship can be based on elementary national accounting identities. Such an analysis also shows that a large discrepancy between r and g can give rise to important instabilities in the profit generation process, i.e. on the demand side of the economy.

The expenditure side of the gross domestic product (GDP) is defined as

$$(3) \quad Y = C_L + C_p + I + G + (X - M)$$

where C_L is consumption from wages, C_p is consumption from capital income, I is private investment, G is government final demand, and $(X - M)$ is net exports. The national income can be written as

$$(4) \quad Y = L^{net} + \Pi^{net} + T$$

where L^{net} , Π^{net} and T are after-tax wages, after-tax profits and government tax income, respectively. If, for simplicity, we abstract from international income flows (i.e. net exports = current account), total output (equation 3) and national income (equation 4) are equivalent so that:

$$(5) \quad \Pi^{net} = C_p + I + (C_L - L^{net}) + (G - T) + (X - M)$$

Now, if productive capital grows at the same rate as income, equation (5) can be written as:

$$(6) \quad r - g = \frac{C_p}{K} - \frac{S_L}{K} + \frac{G - T}{K} + \frac{X - M}{K}$$

Equation (6) is the starting point of post-Keynesian models of distribution and growth. It also points to the macroeconomic conditions necessary to allow the rate of profit ($r = \Pi^{net}/K$) to increase relative to the growth rate ($g = I/K$). This requires either a rise in con-

sumption from capital income (C_p), or a reduction of saving from wage income ($S_L = L^{net} - C_L$), or a rise in the government deficit ($G - T$), or a rise in net exports ($X - M$) (all relative to the capital stock).

However, especially in cases where macroeconomic profits derive from either the (debt-financed) consumption of low-income worker households or a large export surplus (implying rising indebtedness for international trading partners), a rising r-g-differential can be indicative of increased macroeconomic instability. Prior to the global financial crisis, both the debt-led and the export-led models could be observed in different countries, combining to produce the so-called global current account imbalances.

In the case of the United States, as shown by Saez and Zucman (2014), it was the bottom 99 percent of the wealth distribution who strongly reduced their saving rates starting in the early 1980s, whereas the saving rate of the top 1 percent remained roughly stable. Meanwhile, the rise in the debt-to-net worth and the debt-to-income ratios took place within the bottom 95 percent of the distribution, and not at all at the top (Kumhof and Rancière 2010; Cynamon and Fazzari 2013). A theoretical explanation of these powerful macroeconomic trends, which sustained domestic demand in the United States despite the weak income growth for the vast majority of the population, is provided by models of ‘expenditure cascades’ (Frank 2005; Frank *et al.* 2010) or ‘trickle-down consumption’ (Betrand and Morse 2012). Rajan (2010, 9) focuses on the credit supply and argues that “easy credit has been used as a palliative throughout history by governments that are unable to address the deeper anxieties of the middle class directly”. For Piketty (2014, 297), “there is absolutely no doubt that the increase in inequality in the United States contributed to the Nation’s financial instability”.

In the case of Germany, the rise in retained corporate profits has restrained domestic demand to the extent that the investment spending of firms has not increased proportionally to the rise in retained profits. The financial balance of the German corporate sector has been persistently positive since 2002. Because both the private household sector and the public sector have also been in or near financial surplus in recent years, the current account surplus of the German economy has become structural. This is also the reason why it was possible to sustain high macroeconom-

ic profits, despite an anaemic domestic economy and the absence of a US-style ‘debt culture’.

At the international level, there is growing evidence that changes in income distribution were an important structural cause for the rise in household debt and current account imbalances and, ultimately, for the global financial and economic crisis starting in 2007 (see Kumhof *et al.* 2012; Behringer and van Treeck 2013; van Treeck and Sturn 2012, for a survey). This macroeconomic dimension is neglected in Piketty’s model where, as in the simple simulations in the fourth section above, r and g are taken to be independent variables.

Income and wealth inequality and secular stagnation

One important reason for $r > g$ implying indefinitely rising wealth and income inequality is that the saving rates of high income groups significantly exceeds the saving rates of lower income groups. However, as we have seen in the examples of the United States and Germany, the discrepancy between top-end and average saving rates has strongly increased in both countries, albeit in rather different ways: In the United States, lower income groups have lowered their saving rates, presumably in an attempt to keep up with the spending patterns of the rich. In Germany, rich households have increased their saving rates through corporate retained earnings. This means that, even independently of the precise relationship between r and g, the increased gap between saving rates implies a tendency for the inequality of income and wealth to rise further.

While new evidence documents the substantial rise in wealth inequality in recent decades for the United States (Saez and Zucman 2014), reliable data do not exist for Germany. But given the observed shifts in income distribution and saving behaviour, it is almost certain that wealth inequality has already increased and will further increase in the future unless countered by political measures.

There is also evidence that inequality was an important cause of the global financial crisis, which has materialised in some countries (e.g. United States) in the form of over-indebted households and in others (e.g. Germany) in the form of excessive current account surpluses, which are linked to the over-indebtedness of trading partners. Clearly, this inequality-induced

‘debt overhang’ directly adds to the now much-debated risk of ‘secular stagnation’.

A key concern for the future is how consumption demand, which accounts for 60 to 70 percent of GDP, can recover in a sustainable way given current levels of inequality and household debt. Generally speaking, it would seem that a much more equitable distribution of income and wealth will be necessary to overcome the unsustainable debt- and export-led models seen before the crisis. From an aggregate demand perspective, it is far from obvious whether or how a large $r-g$ differential (high profit rates at low growth rates and high levels of inequality) could be consistent with macroeconomic stability.

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