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## Increasing capital income share and its effect on personal income inequality

Branko Milanovic<sup>1</sup>

### 1. Methodological contributions of Piketty's "Capital..."

When discussing "Capital in the 21<sup>st</sup> century" we need to distinguish between its analytics and methodology, its recommendations, and its forecasts. One can agree with analytics without agreeing with the recommendations, or the reverse. The methodology introduced by "Capital...", because it seems to fit quite well the likely evolution of the rich world in the decades to come, and more importantly because it provides a novel way to look at economic phenomena, is probably the most significant contribution of the book. It will affect not only how we think of income distribution and capitalism in the future but also how we think about economic history, from the Ancient Rome to pre-revolutionary France. (In effect, we can already see some of these developments).

The most important methodological contribution of Piketty's book is his attempt at the unification of the fields of economic growth, functional income

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distribution and personal income distribution.<sup>2</sup> In the standard Walrasian system, the three are formally related, but in the actual work in economics they were generally treated separately, or even simply left out. Functional income distribution was studied much more by Marxist economists. Neoclassical economists tended to assume that capital and labor shares were broadly fixed. This view changed only fairly recently and we are now witnessing an upsurge of interest in the topic (Karabarbunis and Neiman 2013; Elsby, Hobijn and Şahin 2013). Piketty's emphasis on the rising share of capital income contributed to this efflorescence.

Personal income distribution tended to be studied almost as divorced from the rest of economics because in a Walrasian world agents come to the market with already given endowments of capital and labor. Since the original distribution of these endowments is not the subject of the study (as narrowly defined in economics), personal income distribution was assumed to be whatever the market generates. But in "Capital.." the movements in the capital-income ratio, driven by "the fundamental inequality"  $r > g$  (return on capital greater than the growth rate of overall income)<sup>3</sup>, lead to the rising share of capital income in net product and this in turn leads to a greater inter-personal inequality.

This paper concentrated on the last point—implicitly taken for granted: greater share of capital is associated, it is thought, with a rising inter-personal inequality. This view is understandable because during most of economic history people with high capital income were also people with high overall income. Therefore, a greater share of net product going to capitalists came to be associated with greater inter-personal inequality. Yet the link is not as simple and unambiguous as it seems. Even when the positive relationship between the two exists, the strength of that relationship varies.

The paper is organized as follows. Section 2 discusses in general the link between the rising share of capital in net income (Piketty's  $\alpha$ ) and Gini coefficient of inter-personal income inequality. Section 3 looks at this relationship in three ideal-typical societies: socialist, classical capitalist and "new" capitalist. (The terms

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<sup>2</sup> The terms "personal" and "inter-personal" income distribution will be used inter-changeably.

<sup>3</sup> p. 57 French edition.

are defined there). It also draws on some empirical examples from the advanced economies. Section 4 presents policy implications.

It may be useful, even before we embark on the study of the relationship between  $\alpha$  and Gini, to indicate why this is important. The increase in  $\alpha$  is not, by itself, a “problem” if it does not lead to an increase in inequality between individuals. In effect, when the underlying distribution of capital is egalitarian, an increase in  $\alpha$  may cause a decrease in inter-personal inequality or leave it unchanged. Hence, even for the proponents of strong egalitarianism, the increase in capital share cannot be a problem as such. It becomes a “problem” only because in most of real-world situations the underlying distribution of capital assets is extremely skewed. The realization of this fact leads me, in the prescriptive part, to argue in favor of equalization of ownership of assets amongst individuals. This provides a realistic agenda for fighting inequality and is especially relevant for the rich societies where increasing wealth/income ratio implies that, unless the return on capital decreases sufficiently, a greater share of national net product will be received by asset-holders. Thus we have a choice between acquiescing in the rising inter-personal inequality, trying to reduce it through taxation, or working on the deconcentration of asset ownership.

Focusing on the distribution of assets is, in my opinion, a more promising policy than Piketty’s emphasis on taxation of capital. But regardless of whether one tool is better than the other, they are two complementary ways to address rising inequality in the ever more affluent societies (that is, in societies with a rising  $K/Y$  ratio).

## 2. Going from functional to personal income distribution

The main link between functional and personal income distribution is provided by the relationship  $r > g$ . But in order to lead to a rising inter-personal inequality it needs however to satisfy the three following requirements.

First,  $r$  must be overwhelmingly used for investment, and not for consumption. Clearly, if all of  $r$  was simply consumed by capitalists, the  $K/Y$  ratio in the next cycle will remain unchanged, and dynamically there would be no increase in either  $\beta = K/Y$  or in the share of total income derived by capital ( $\alpha$ ). This

the point on which Debraj Ray in his critique of “Capital...” has strongly insisted.<sup>4</sup> It is indeed a formally correct argument, but misses the entire point of what capitalism and capitalists are. If capitalists were interested solely in consumption, in spending most of their income in what Adam Smith beautifully termed “baubles and trinkets”, the process would play out as Ray imagines. But capitalists are precisely capitalists because they do not consume all surplus, are interested in expanding the scope of their operations, and thus in investing all or most of  $r$ . The assumption of saving rate out of  $r$  being close to 1 is not only well-founded in the precedents from theoretical economics (in modern times, from Kalecki 1942, Solow 1956 and Kaldor 1957 onwards, and obviously all the way back to Ricardo and Marx) but is equally well-founded in the empirical behavior of the rich, and in what are the central features of capitalism as a system.<sup>5</sup>

But the rising  $\alpha$  does not ensure by itself transmission into greater inter-personal inequality. For this to happen, concentration of capital income has to be very high. Working with only two factor incomes, that of labor and capital, for the overall inequality of personal income to go up, the requirement is that the more unequally distributed source has to grow relatively to the less unequally distributed source. With capital income, this condition is relatively easily satisfied since in all known cases, the concentration of capital income is greater than the concentration of labor income. In the US, for example, Gini of income from capital (calculated across household per capita incomes) is around 80, while similarly calculated Gini of labor income is around 40. The situation is identical in other countries. This is simply a reflection of the well-known concentration of capital assets and of the fact that 30 to 40 percent of Americans have zero no capital assets, and hence draw no income from ownership.

The third requirement is that the association between capital-rich and overall income-rich people be high. A simple high concentration of a given income source will not guarantee that that source contributes to inequality. Unemployment benefits have a Gini which is generally in excess of 90 (since most people receive no unemployment benefits during any given year), but since recipients of unemployment benefits are generally income-poor, an increase in

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<sup>4</sup> See Ray (2014a, 2014b).

<sup>5</sup> For this point see Milanovic (2014) critique of Debraj Ray’s critique of Piketty.

the share of unemployment benefits in total income reduces income inequality. Technically, the third requirement is (in the case of Gini coefficient with which we work here) expressed in the form of a high correlation between rankings according to capital income and rankings according to total income. Put simply, this requirement means that people who receive large capital incomes should also be rich. Empirically, this requirement is easily satisfied in most countries.

It is thus precisely because we tend to take as given

- (1) high saving out of capital income,
- (2) high concentration among owners of capital, and
- (3) high correlation between one's drawing a large capital income and being rich

that we tend to see the transmission from a rising capital income share into an increasing inter-personal inequality as a foregone conclusion. But this is not always so, or at least the strength of the transmission is variable.

We know that total income Gini can be decomposed into inequalities contributed by each income source, in our case capital (c) and labor (l) as in (1):

$$G = s_l R_l G_l + s_c R_c G_c \quad (1)$$

where  $s_i$  = share of a given income ( $i$ -th) source,  $R_i$  = correlation ratio between the source and total income,  $G_i$  = Gini coefficient of an income source, and  $G$  = overall income Gini.  $R_i$  in turn is equal to the ratio of two correlation coefficients ( $\rho$ 's), namely, between income source and recipients' ranks (from the poorest to the richest) according to total income and according to income source itself. For capital income,  $c$ , the correlation ratio can be written:

$$R_c = \frac{\text{covar}(r(y), c)}{\text{covar}(r(c), c)} = \frac{\rho(r(y), c)\sigma_{r(y)}\sigma_c}{\rho(r(c), c)\sigma_{r(c)}\sigma_c} = \frac{\rho(r(y), c)}{\rho(r(c), c)} \quad (2)$$

Notice that if people's ranks according to total income and income from capital coincide,  $R_c=1$ . In all other cases,  $\rho(r(y), c) < \rho(r(c), c)$  and  $R_c < 1$ . For unemployment benefits mentioned above  $R_i < 0$ .

For the rising share of capital income ( $s_c$ ) to increase overall income Gini, we need therefore to have two “transmission” tools, Gini coefficient of capital income and  $R_c$ , positive and high.<sup>6</sup>

The rest of the paper will deal with these two “transmission” tools. Equation (2) gives the definition of  $R_c$ , while the definition of  $G_c$  is a standard one, with the Gini coefficient calculated across the entire sample but with individuals ranked by their amount of capital income (rather than by total income as we normally do in calculations of overall income Gini).

### 3. Transmission of higher capital income into personal inequality: three social systems

It is useful to consider three ideal-typical social systems and to observe how they “transmit” an increased share of income from capital into personal income distribution.

**Socialism.** We assume that in socialism returns from capital are distributed equally per capita. This could happen in two ways: all capital can be state-owned and the returns from it can be distributed equally among members of a community, or every member can have the same amount of (privately-owned) capital on which she receives the same return. Now,  $r > g$  will not be “transmitted” into greater inter-personal inequality simply because  $G_c = 0$ . In such a society, we can write income of an individual  $i$  ( $y_i$ ) as  $y_i = l_i + \bar{c}$  where labor income (or more realistically, log of labor income)  $l$  is distributed normally with the mean  $\bar{l}$  and standard deviation  $\sigma_l$   $l: N(\bar{l}, \sigma_l)$  and income from capital is a constant.  $R_c$  will be equal to zero because the correlation between the ranks according to total income and amount of capital income one receives will be 0 and the denominator of (2),  $\rho(r(y), c)$ , will be equal to zero.

The same result obtains if we distribute capital randomly across individuals, regardless of their labor income. In that case,  $G_c$  will be positive, and individual income becomes  $y_i = l_i + c_i$  where now both labor income (or log of labor income) and capital income (or log of capital income) are normally distributed with  $l: N(\bar{l}, \sigma_l)$  and  $c: N(\bar{c}, \sigma_c)$  but are uncorrelated. The “transmission” will

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<sup>6</sup> The condition is  $R_c G_c > R_l G_l$ .

again fail because there would be no clear association between being a capitalist and having a higher overall income.  $R_c$  may be positive or negative (it will just depend on how the lottery of capital incomes gets correlated with the distribution of labor incomes) but it would be very small in the absolute amount. If  $R_c$  is positive, there would be a slight addition to inequality, if it is negative, a slight reduction of inter-personal income inequality.

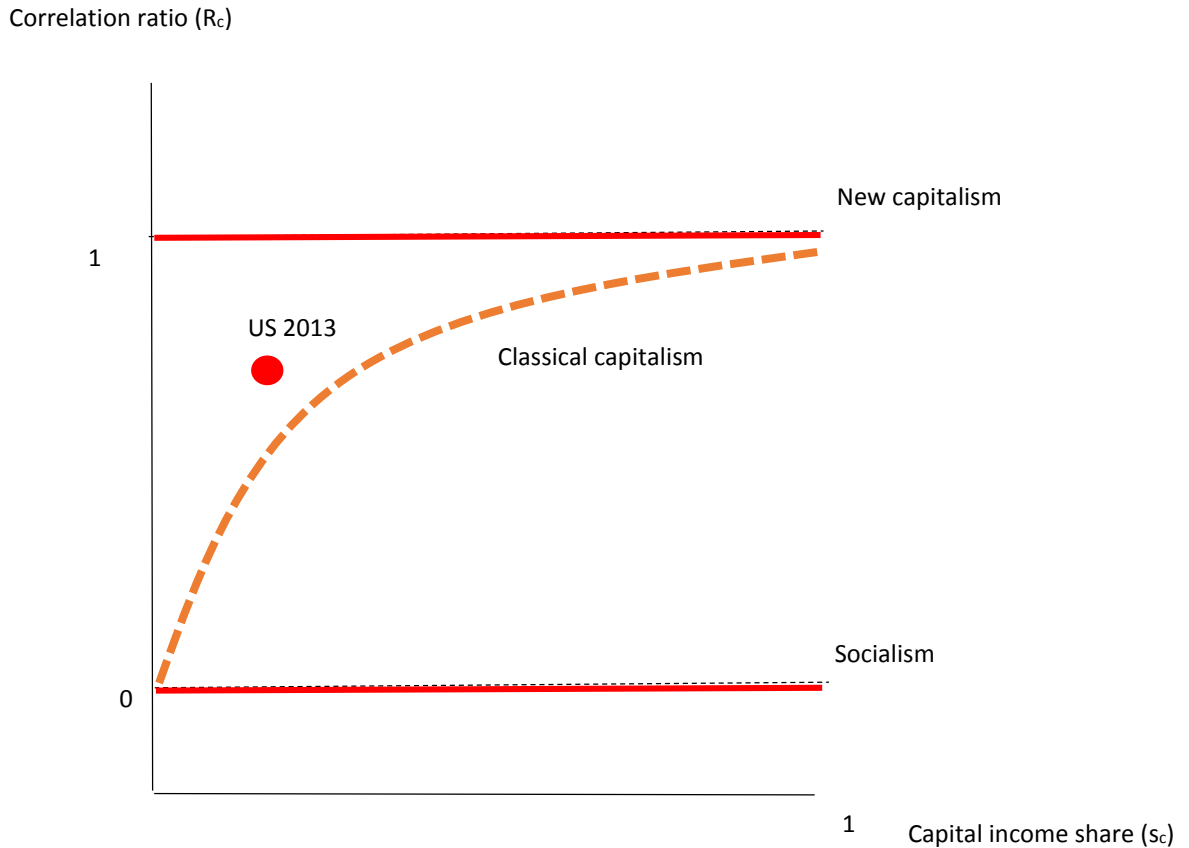
In any case, the transmission from greater share of capital to inter-personal income distribution will be weak: nil or quasi nil across any value of  $s_c$ .<sup>7</sup> This is shown in Figure 1 by the line denoted “socialism” which we draw to be almost undistinguishable from at  $R_c=0$  for all values of  $s_c$ . Basically, we have full independence of personal income distribution from the rising share of capital in net output. The former is “insulated” from the latter.

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<sup>7</sup>  $s_c$  is the same as Piketty's alpha.

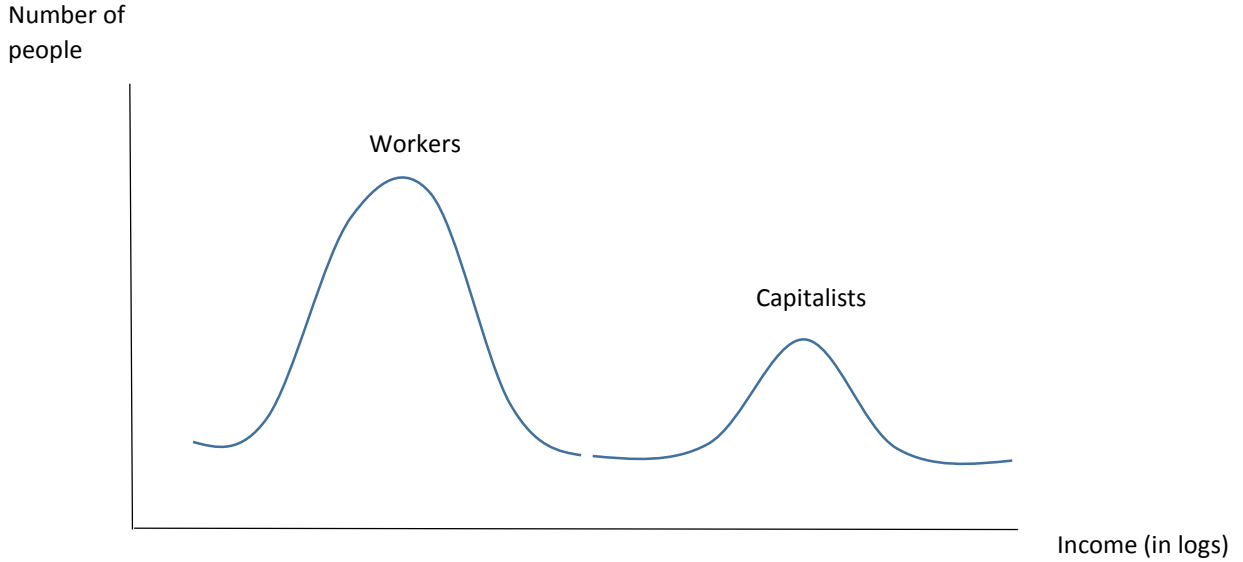


Figure 1. Transmission of rising capital share into inter-personal inequality



**Classical capitalism.** We consider next classical capitalism where ownerships of capital and labor are totally separated, in the sense that workers draw their entire income from labor and have no income from the ownership of assets, while the situation for the capitalists is the reverse. Moreover, we shall assume that all workers are poorer than all capitalists. This gives us, as shown in Figure 2, two social groups, non-overlapping by income level. When the groups are non-overlapping, Gini is exactly decomposable across the recipients (see equation 3), and this simplifies the relationship between Gini calculated across income sources and Gini calculated across the recipients.

Figure 2. Social structure of classical capitalism (simplified)



In general, Gini calculated across recipients belonging to groups  $i$  ( $1,2,\dots,r$ ) is equal to

$$G = \frac{1}{\mu} \sum_{j>i}^r \sum_{i=1}^r (\bar{y}_j - \bar{y}_i) p_i p_j + \sum_{i=1}^r p_i s_i G_i + L$$

where  $\mu$  = overall mean income,  $\bar{y}_i$  = mean income of  $i$ -th group,  $p_i$  = population share of  $i$ -th group,  $s_i$  = share of  $i$ -th group in total income, and  $L$  = the overlap term that is generally calculated as a residual and is positive when there are recipients from the mean-poorer group who are richer than (overlap with) some recipients of a mean-richer group. Since in our case all workers are poorer than all capitalists,  $L$  disappears and the expression for the Gini simplifies:

$$G = \frac{1}{\mu} (\bar{y}_k - \bar{y}_w) p_k p_w + p_k s_k G_k + p_w s_w G_w =$$

$$= s_k p_w - s_w p_k + p_k s_k G_k + p_w s_w G_w = s_k (p_w + p_k G_k) + s_w (-p_k + p_w G_w) \quad (3)$$

where we use subscripts  $w$  for workers, and  $k$  for capitalists.

Overall inequality, whether calculated across income sources or across recipients, must be the same, so (3) must be equal to (1), and thus

$$s_c(p_w + p_k G_c) + s_l(-p_k + p_w G_l) = s_l R_l G_l + s_c R_c G_c$$

$$s_c(p_w + p_k G_c - R_c G_c) + s_l(-p_k + p_w G_l - R_l G_l) = 0 \quad (4)$$

where we make use of the fact that the share of labor income ( $s_l$ ) is exactly the same as the share of income received by workers ( $s_w$ ) and the share of capital income is equal to the share of income received by capitalists,  $s_c = s_k$ . Annex shows further manipulations of the relationship. At the end we obtain a positive and concave relationship between  $s_c$  and  $R_c$  (as shown in Figure 1 by the curve denoted “classical capitalism”). The transmission from an increased capital share into a higher inter-personal inequality increases in  $s_c$  but does so at the diminishing rate. It asymptotically tends toward 1 when  $s_c$  approaches unity.

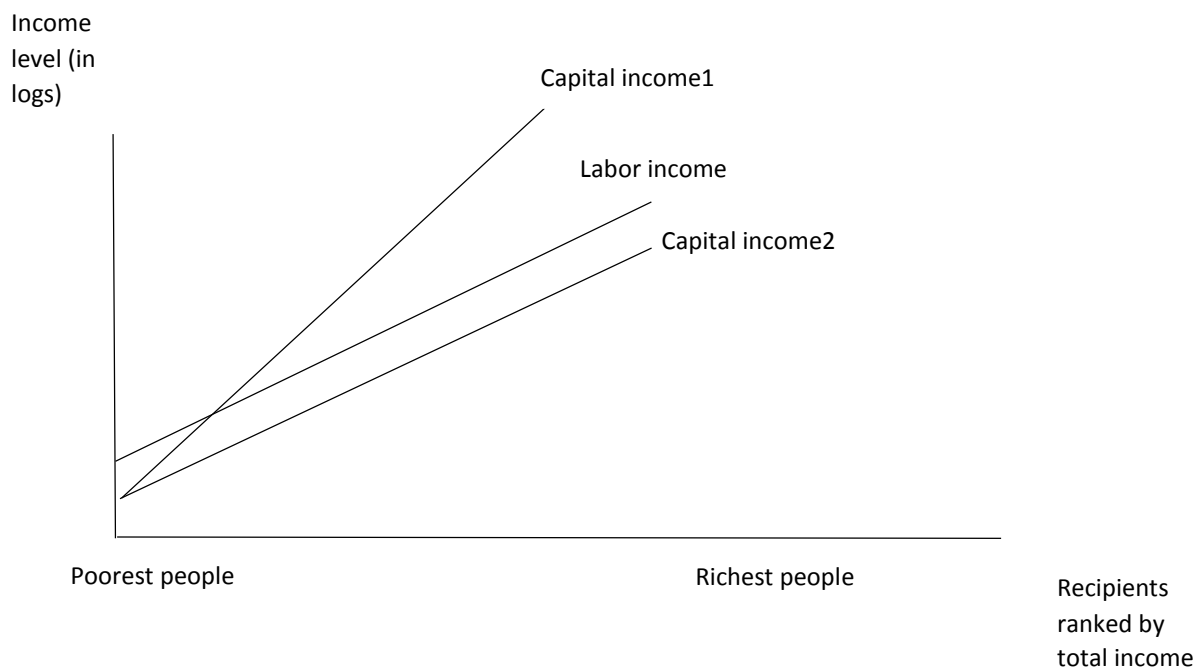
Some intuition will help explain the result. Suppose that classical capitalism is such that there is only an infinitesimally small number of capitalists (at the extreme, just one person) and that all other individuals are workers so that  $s_c$  is low. By assuming a sole capitalist we also assume that he/she is the richest person in the community. The correlation coefficient in the numerator of  $R_c$ ,  $\text{cov}(r(y), c)$ , will be low because ranks according to total income, running from 1 to 100, will be not be correlated with the amount of income from capital. We shall have two vectors, that of ranks [1 2 3.....n] and that of capital income [0 0 0 0....K] where K=total capital income (received by one person only). Now, the denominator of  $R_c$  will be obtained from a correlation between a vector where the ranks for all recipients but the top will be the same (since they all have the same, nil, amount of income from capital), that is between a vector such as  $\left[ \frac{1}{(n)/2}, \frac{1}{(n)/2} \dots n \right]$  and [0 0 0..K]. Such a correlation will be much higher and the ratio between the two correlation coefficient will thus be low. We can illustrate it with a numerical example. Let  $n=100$  and  $K$  any random number but which we selected to be 100. The correlation in the numerator is 0.17, that of the denominator 1. Hence  $R_c=0.17$ .

Consider now the other extreme where classical capitalist society is composed mostly of capitalists and an infinitesimally small number of workers so that  $s_c$  approaches unity. It is clear that person’s rank according to capital income

will entirely (or almost entirely) coincide with his rank according to total income, and  $\text{cov}(r(y), c) \approx \text{cov}(r(y), y)$  and thus  $R_c \approx 1$ . In other words, there would be practically no difference between total and capital income since at the limit they are the same. This makes the two correlation coefficients almost the same and their ratio  $R_c \approx 1$ .

**New capitalism.** We assume that new capitalism differs from the classical capitalism in that that all individuals receive income from both capital and labor. Thus, instead of two sharply delineated groups, workers with income  $(l_i, 0)$  and capitalists with income  $(0, c_i)$ , we have for all individuals positive labor and capital incomes  $(l_i, c_i)$ . We assume further that the amounts of both labor and capital income received increase monotonically as we move toward (total income-) richer individuals. A poor person's income would be for example  $(2, 1)$ , middle-income person's  $(7, 3)$  and rich person's income  $(24, 53)$ .

Figure 3. Labor and capital income across recipients in new capitalism (simplified)



Monotonic increases of labor, capital and total income (such that if  $y_j > y_i$  then we must have  $l_j > l_i$  and  $k_j > k_i$ ) ensure that the ranks according to capital, labor and total income are the same. Thus,  $R_c=R_l=1$ . This is why in Figure 1 we draw the “transmission” function for new capitalism at  $R_c=1$  throughout.

However several elaborations of this situation are possible. For example, we can have a situation illustrated in Figure 3 by *labor income* and *capital income2* lines: the proportions of labor and capital income stay constant throughout the distribution, that is, both amounts of capital and labor increase by the same percentage as we move from poorer to richer recipients. A person’s income can be written as  $y_i = \zeta_i(\bar{l} + \bar{c})$  where  $\zeta_i$  increases in  $i$ , indicating that everybody receives a specific portion of overall labor and capital income (the proportions of capital and labor are the same for each individual, but vary across individuals). In that case (let’s call it, “new capitalism 2”), Gini of both labor and capital will be the same and the Gini coefficient of total income can be written as

$$G = s_l \bar{G} + s_c \bar{G} = \bar{G} \quad (5)$$

When  $r > g$  and the share of capital income goes up overall inequality is unaffected. Thus, in the “new capitalism 2” where everybody (poor and rich alike) has the same proportions of capital and labor income, a rising share of capital income (like in socialism) does not get transmitted into an increased inter-personal inequality. Note that happens because the rising capital share leaves Gini of capital income unchanged (and Gini of capital income is the same as Gini of labor income). In socialism, it happens because  $G_c = 0$ .

A more realistic version of the new capitalism (named “new capitalism 1”) is the one where the proportion of capital income increases as person becomes (total-income) richer. This can be written (in a continuous case) as  $\frac{d(\frac{c}{l})}{dy} > 0$  with  $\frac{dc}{dy} > 0$  and  $\frac{dl}{dy} > 0$  ensuring that incomes from both capital and labor are higher for richer individuals.<sup>8</sup> The relationship  $\text{cov}(r(y), c) = \text{cov}(r(y), y)$  then still holds since the rankings according to total income and ranking according to capital income coincide, but now an increase in the capital share pushes the overall Gini up. This happens because capital income (depicted by *capital income 1* line in Figure 3) has a greater Gini than labor income and as the share of more unequally distributed source increases, so does the overall Gini. The actual increase in Gini will be  $G_c - G_l$ .

New capitalism represents a strong departure from the model of classical capitalism.<sup>9</sup> Every individual receives both labor and capital income, and in principle (if their shares were the same across the distribution), we could obtain the same outcome as in socialism, namely full orthogonality of personal income distribution from the rising share of capital income. This however seems unlikely as rich countries today are in effect closer to “new capitalism 1”.

Under “new capitalism 1” the transmission from increased capital share into greater inter-personal inequality may be as strong as in classical capitalism.

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<sup>8</sup> For the evidence on new capitalism, see Lakner and Atkinson (2014) who show an increasing association of high labor and capital income in the United States during the past half century. Such a society is also evoked by Piketty (2013; Chapter 7, p. 416 in French edition).

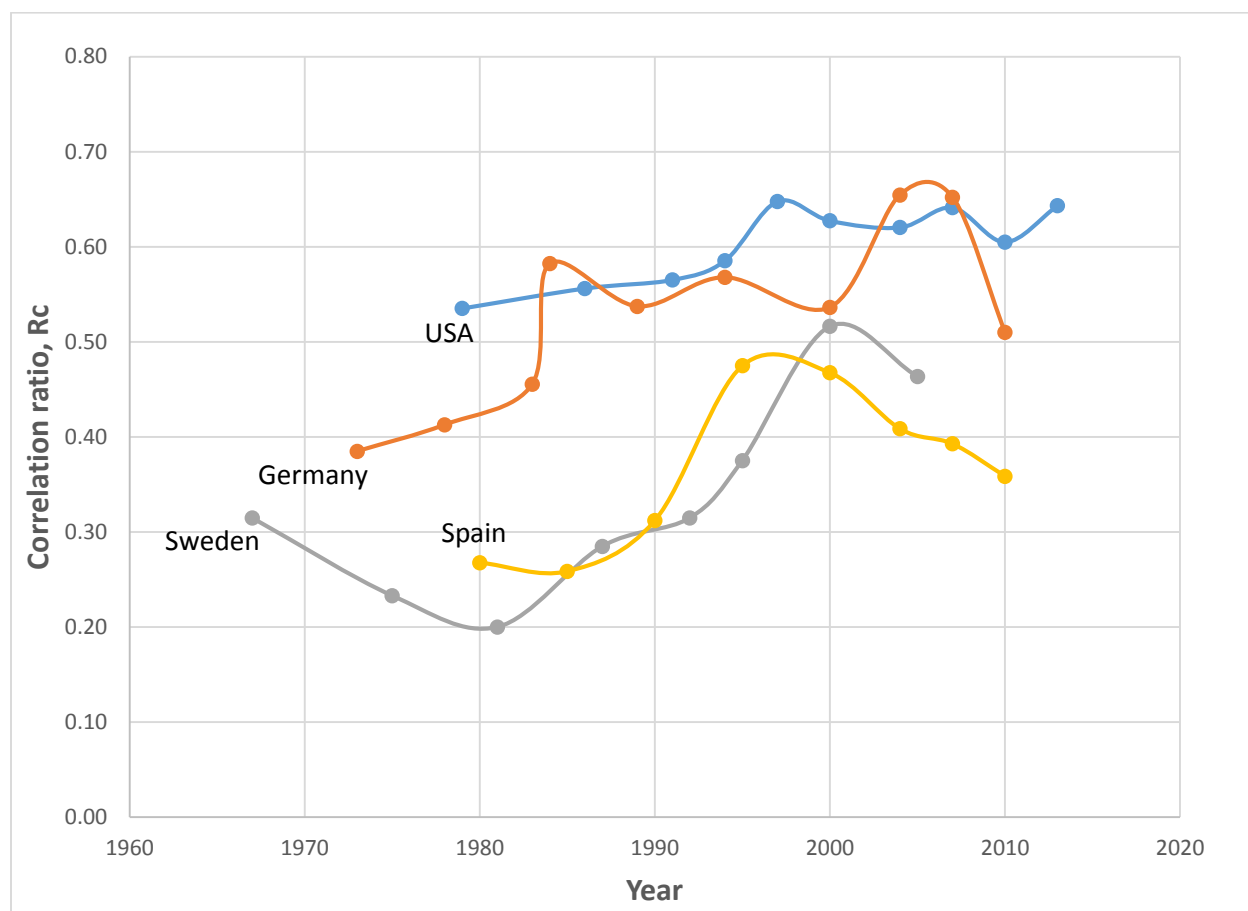
<sup>9</sup> This is similar to the point repeatedly made by Piketty that the post-War period is distinguished by the emergence of a property-owning middle class even if its share has remained small (see Piketty, 2013, p. 410, 552).

Suppose that  $s_c=0.3$  and that it increases to 0.35. Under classical capitalism with  $R_c$  (say) around 0.6, these 5 additional percentage points of net income received by capitalists will increase overall Gini by about 3 points. Under the actually-existing capitalism, the increase will be  $(G_c-G_i)$  times 5. The  $G_c-G_i$  gap is empirically about 0.4-0.5 (0.8-0.9 minus 0.4-0.5), so the Gini increase may be 2-2.5 points. The new capitalism may be just marginally more successful than classical capitalism in checking the spill-over from the rising capital share into a greater inter-personal inequality.

An obvious but important point is that the transmission coefficient  $R_i$  shows the increase in personal income inequality that is associated with either a rising capital income share (while the Gini of capital income stays the same), or with a rising inequality in the distribution of capital income (while income share stays constant). Thus, every Gini point increase in the concentration of capital income will be translated into  $R_c s_c$  Gini point increase in total income Gini. Similarly, as the share of capital in total income increases by a percentage point, Gini will go up by  $(G_c-G_i)R_c$ . The transmission coefficient  $R_c$  may be viewed as the (key component) of the *elasticity* of personal income distribution to the changes in the share of capital income or to distribution of capital incomes.

**Some illustrative data.** Figure 4 shows some actual data on the elasticity calculated for four advanced economies. In addition to the United States, I selected Germany as an example of a continental-corporatist welfare state, Sweden as a prototype Scandinavian welfare state, and Spain as an advanced Mediterranean welfare state. Not surprisingly, the results show the US with the highest elasticity almost throughout. It registers moreover a steady increase, passing from 0.54 in the late 1970s to 0.64 in 2013. Most interesting however is Sweden where the elasticity was in the mid-1970s as low as 0.2 but increased to 0.5 by 2000. This parallels the well-known increase in income, and especially wealth, inequality in Sweden (see OECD, 2015, Piketty 2013, p. 549). German elasticity also increased significantly, from 0.4 to the peak of 0.65. There was everywhere, over the past twenty years, an upward trend in the elasticity with which greater capital income share “seeps” into greater personal income inequality. The gaps between countries’ elasticities are now also smaller than they were in the 1970s.

Figure 4. Elasticity of inter-personal income Gini to changes in capital income share; advanced economies 1973-2013



Source: calculated from household-level data available from Luxembourg Income Study. All underlying variables normalized by household size, that is expressed in per capita terms.

Table 1 summarizes the elasticities we obtain from the ideal-typical social systems and in real life. It also enables us to see better where, within different ideal types, do modern capitalist economies lie. In the late 1970s, Germany, Sweden and Spain were quite close to the socialist model. But this was no longer the case by 2010-13.<sup>10</sup>

<sup>10</sup> Note that we cannot judge well how close they come to “new capitalism 2” because under “new capitalism 2”  $R_c$  would be still 1 although the transmission link between greater capital income share and inter-personal inequality is severed.



Table 1. Elasticity of transmission of rising share of capital income into personal income inequality

Economic system	Elasticity	Gini change
“New capitalism 1” (with $G_c > G_l$ )	Around 1	$G_c - G_l$
Classical capitalism	$< 1$	$< (G_c - G_l)$
Rich countries today	0.4-0.6	$\sim \frac{1}{2} (G_c - G_l)$
“New capitalism 2” (with $G_c = G_l$ )*	0	0
Socialism	Around 0	Around 0

\* This despite the fact that  $R_c = 1$ .

#### 4. Policy Implications

The implication of this analysis is that the way the rising share of capital income gets transmitted into greater inter-personal inequality varies between different social systems in function of the underlying asset distribution. We are used to implicitly making the assumption that capital incomes are very concentrated and that the association between being capital-rich and overall-income rich is very close. Both of these assumptions are reasonable given the empirical evidence. Indeed, as we see in the ideal-typical world of new capitalism, the increase in  $s_c$  almost directly translates into a higher Gini. In the classical capitalism, this is also true once the share of capitalists becomes sufficiently high. But in a socialist world rising  $s_c$  does not imply rising inter-personal Gini; in effect, given our assumption of equal per capita distribution of capital assets, it implies a reduction in income inequality. Similarly, in capitalism where capital and labor shares are equal across income distribution, rising capital share does not affect inter-personal income distribution.

This carries, I think, clear lessons for the rich societies in particular. The definition of rich societies is that they have high  $K/Y$  ( $\beta$ ) ratios. As currently advanced societies become even richer, the  $r > g$  dynamic will lead to the rising beta and alpha. One way to ensure that this does not spill out into increased income inequality is through taxation, as advocated by Piketty, but another way—

perhaps a more promising one or at least a complementary—is to reduce the concentration of ownership of capital and thus of income from capital.

In the framework discussed here, reduced  $G_c$  will also reduce the association between (high) capital income and (high) overall incomes. Both  $G_c$  and  $R_c$  would be reduced and an increase in  $\alpha$  will have a small or even a minimal effect on personal income distribution.

In turn, this means that greater attention should be paid to policies that would redistribute ownership of capital and make it less concentrated. In principle, there are two kinds of such policies: one would be giving greater importance to ESOPs and similar plans that would give a capital stake to workers who currently have none. A well-known Swedish trade union plan that would have companies issue special shares to go into a fund which would support workers' pensions was recently "resuscitated" by Taylor, Ömer and Rezai (2015, p. 23). This approach however runs into the well-known problem of non-diversification of risk, where individuals' income depends entirely on working in a given company. This is indeed the case for most people today who have only labor incomes, so having both labor and capital income coming from the same company, it could be argued, does not expose them to more risk than they presently experience. While this may be true, it begs the question of why such pro-labor ownership would be introduced if it does not manifestly improve the situation of those who currently hold no capital assets. It therefore seems to me that this approach, while valuable, runs quickly into some limits.

A more promising approach may be to focus on wider share ownership divorced from one's workplace. This could be done through various incentives that would encourage small shareholdings, and penalize heavy concentration of assets. Indeed. Piketty's suggestion of a progressive wealth tax could be combined with implicit and explicit subsidies to those who hold small amounts of wealth.

In rich societies whose capital-output ratio will tend to rise, the share of capital income in net income may be expected to go up as well.<sup>11</sup> If so, efforts should be directed toward ensuring that this inevitable upward movement in the  $K/Y$  ratio does not produce unsustainable levels of income inequality. A way to

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<sup>11</sup> Assuming some stickiness in the rate of return.

achieve this is to equalize as much as possible individuals' positions at the pre-distribution stage, or to put it in terms introduced in this paper to move away from "new capitalism 1", which is in many ways similar to the actually-existing capitalism today, and closer to "new capitalism 2". This involves primarily lesser concentration of capital assets, but also (a topic which I did not discuss here) more equal access to education and deconcentration of the returns to skills.

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Annex. Derivation of the transmission function in the case of classical capitalism  
(with two non-overlapping income classes)

$$\begin{aligned}
 s_c(p_w + p_k G_c - R_c G_c) &= -s_l(-p_k + p_w G_l - R_l G_l) \\
 s_c(p_w + p_k G_c - R_c G_c) &= -(1 - s_c)(-p_k + p_w G_l - R_l G_l) \\
 s_c(p_w + p_k G_c - R_c G_c) &= -(1 - s_c)(A) \\
 s_c(p_w + p_k G_c - R_c G_c - A) &= -A \\
 -s_c R_c G_c &= -s_c(p_w + p_k G_c - A) - A \\
 s_c R_c G_c &= s_c(p_w + p_k G_c - A) + A \\
 R_c G_c &= (p_w + p_k G_c - A) + \frac{A}{s_c} \\
 R_c &= \left( \frac{p_w - A}{G_c} + p_k \right) + \frac{A}{s_c G_c} \\
 \frac{dR_c}{ds_c} &= -\frac{A}{s_c} \frac{1}{G_c^2} > 0
 \end{aligned}$$

Since  $A = -p_k + p_w G_l - R_l G_l = -(1 - p_w) + p_w G_l - R_l G_l = p_w(1 + G_l) - 1 - R_l G_l$  will tend to be negative. In one extreme case when  $p_k \rightarrow 1$  this would be clearly the case. In the other extreme case when  $p_k \rightarrow 0$ ,  $A = G_l(1 - R_l) \rightarrow 0$ . This last case is clearly irrelevant because it implies that there are no capitalists at all. But for all sensible situations where  $0 < p_k < 1$ ,  $A < 0$ .

The second derivative is

$$\frac{d^2 R_c}{ds_c^2} = \frac{2A}{s_c} \frac{1}{G_c^3} < 0$$

All symbols are as explained in the text.