

Revenue-maximizing top earned income tax rate in the presence of income-shifting*

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3 June 2017

Abstract: We provide an analysis of the revenue-maximizing top earned income tax rate for a country with one of the highest levels of earnings taxation in the world, Finland, and compare it to the current level of taxation. We account for the effect of income-shifting possibilities in the calculations and find that the current top tax rate on earnings in Finland is likely to be below the revenue-maximizing rate. We provide an explicit account of assumptions behind Laffer curve calculations and demonstrate that policy conclusions depend critically on non-trivial choices regarding, for example, how the current top tax rate is calculated. The assumptions in Laffer curve calculations need to be made explicit if the calculations are to provide guidance for policy.

JEL-codes: H21, H24, H26

Keywords: Laffer curve, income-shifting, tax policy

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1. Introduction

The idea that lowering top marginal tax rates would increase tax revenue is often raised in the popular debate.¹ Indeed, top marginal earned income tax rates are very high in some countries, and whether they are too high is a real policy question. Would tax revenue increase if the top tax rate on earnings were lower? The answer to this question has implications beyond revenue considerations: if tax rates are above the top of the Laffer curve, reducing them would increase not only tax revenue but also social welfare.

We analyze this question in the context of Finland, which has one of the world's highest marginal earned income tax rates on top earners. The Finnish income tax system is progressive and the top marginal earned income tax rate (including employee social security contributions) was approximately 57% in 2015.² A key feature of our analysis is that we explicitly take into account the effect of income-shifting when calculating the revenue-maximizing top earned income tax rate. In the context of Nordic dual income taxation, where earned income at the top is taxed at a considerably higher rate than capital income, there are ample incentives and possibilities for income-shifting (see e.g. Christiansen and Tuomala 2008 and Harju and Matikka 2016). Taking into account this type of arbitrage has important implications for the revenue-maximizing top earned income tax rate, as some of the lost tax revenue will be recouped through other tax bases. In addition to countries with an inclusive dual income tax system, similar issues are present in countries where at least some forms of capital income are not included in the progressive earned income tax base, including, for example, Germany and the US.

Piketty et al. (2014) provide a theoretical framework for calculating the revenue-maximizing top tax rate in the presence of income-shifting, with top tax rate calculations for typical parameter values for the US. Top tax rate calculations have also been provided for Sweden (Pirttilä and Selin 2011b) and Denmark (Kreiner and Skov 2016), two other Nordic high tax countries. Riihelä et al.

* The paper presents an updated and extended version of the analysis and discussion of top earned income tax rates in the Finnish Economic Policy Council report 2015. We thank Torben Andersen, Jarkko Harju, Tuomas Kosonen, Liisa Laakso, Jukka Pirttilä, Marja Riihelä, Matti Tuomala and Roope Uusitalo for helpful comments and discussions. Funding from the Strategic Research Council (SRC) at the Academy of Finland (grant no. 293120, Work, Inequality, and Public Policy) and Academy of Finland (grant no. 304807) is gratefully acknowledged.

¹ See e.g. <http://www.forbes.com/sites/mikepatton/2012/10/15/do-tax-cuts-increase-government-revenue/#29a1d8fb48a3>.

² Throughout the article, we use the term "top tax rate" to refer to the marginal tax rate of top income earners.

(2014) provide an earlier discussion of top tax rates in the Finnish context. We contribute to this discussion by providing a careful and systematic account of the assumptions behind top tax rate calculations, illustrating how the appropriate choices of parameter values and calculation of the current top tax rate depend on the details of the tax system, and by demonstrating how the choices made may affect policy conclusions. Another key feature of our analysis is that we explicitly account for the effect of income-shifting on the analysis of the revenue-maximizing top tax rate in a high tax country.

We demonstrate that policy conclusions – even the sign of the comparison between current and revenue maximizing tax rates – depend critically on the assumptions made, for example, on how to calculate the current top marginal tax rate, or whether or not to account for income-shifting in the analysis. Therefore, the policy discussion revolving around top tax rates has little content unless the assumptions in the calculations are made explicit. We find that the current top tax rate on earnings in Finland is likely to be below the revenue-maximizing rate.

The paper proceeds as follows. Section 2 sets out the theoretical background behind our calculations. Section 3 provides a discussion of the considerations that need to be taken into account when choosing parameter values in Laffer curve calculations. Section 4 provides the results for our analysis of the Finnish case. Section 5 makes some further remarks on how the results should be interpreted in the context of making recommendations for tax policy.

2. Theoretical background

The relationship between tax rates and tax revenue is described by the so called Laffer curve. When taxation is at a moderate level, tax revenue is increasing in the tax rate. At high levels of the tax rate, the disincentive effects of taxation (for example due to reduced labour supply) may become so severe that tax revenue may start to fall if the tax rate was further increased. The Laffer curve is often discussed in the context of top incomes: Since top incomes are often most heavily taxed, Laffer curve considerations are likely to be particularly relevant at the top of the income distribution.

The revenue-maximizing tax rate for top incomes depends on how taxable income reacts to taxation (i.e. the elasticity of taxable income, ETI), as well as on the shape of the income distribution (e.g. the number of individuals in the top tax bracket). Following Piketty et al. 2014, consider the taxation of incomes (z) above a certain limit (\bar{z}). It can be shown that the revenue maximizing top tax rate is given by the formula

$$t^{max} = \frac{1}{1+a \cdot e} \quad (1),$$

where $e = \frac{1-t}{z} \frac{dz}{d(1-t)}$ is the elasticity of taxable income in the top tax bracket with respect to the net-of-tax rate ($1 - t$) and $a = \frac{z}{z-\bar{z}}$ is the so-called Pareto-parameter that describes the relevant features of the income distribution. The revenue-maximizing top tax rate is decreasing in the responsiveness of incomes to taxation (captured by e), and the number of individuals who are affected by these adverse incentives (that is, the thickness of the top tail of the income distribution, captured by a).

However, the formula presented in equation (1) for the revenue-maximizing income tax rate is applicable only under the assumption that the elasticity e consists of labour supply responses only. In general, the ETI captures all ways in which earned income responds to changes in the marginal earned income tax rate: in addition to changes in labour supply, it captures changes in tax avoidance and evasion, and in particular, it includes the reduction/increase in the earned income tax base caused by income-shifting, which we discuss below. Therefore, formula (1) is not fully applicable in a Nordic dual income system such as that of Finland, or other tax systems where possibilities for income-shifting are prevalent.

More precisely, in the presence of income-shifting, the ETI is not sufficient to measure the revenue (or welfare) losses from earnings taxation. This is because some of the tax revenue that is lost when the tax on earnings is increased, is returned through the other tax base to which income is shifted. In this case, the revenue-maximizing top tax rate on earned income is given by

$$t^{max} = \frac{1+t_2 \cdot a \cdot s \cdot e}{1+a \cdot e} \quad (2),$$

where t_2 is the marginal tax rate on the alternative tax base to which earnings can be shifted, and s is the part of the total taxable income elasticity e that is due to this income-shifting behavior.

(Piketty et al. 2014, Saez et al. 2012.) The analysis assumes that t_2 is fixed, i.e. we consider the revenue-maximizing top earned income tax rate for a given level of the tax rate on the alternative tax base. Income-shifting ($s > 0$, $t_2 > 0$) implies that the revenue-maximizing tax rate (2) is higher than in the benchmark case (1).

As income-shifting possibilities are prevalent in the Finnish context, we use the case without income-shifting (corresponding to equation (1)) only as a benchmark. In most of the analysis, we use equation (2) to calculate the revenue-maximizing top earned income tax rate for Finland. Empirical evidence on the extent of income-shifting in Finland is provided by Pirttilä and Selin (2011a) and Harju and Matikka (2016).

3. The choice of parameter values in the Laffer curve calculations

We now turn to provide a roadmap of the considerations behind the choices of parameter values in Laffer curve calculations. As we will argue, the assumptions made in the calculations have a crucial impact on the results of the analysis, and it is therefore important to make them explicit. For example, assumptions behind calculating the current effective top marginal tax rate are rarely discussed; but obviously, these assumptions affect the benchmark that the revenue-maximizing tax rate is compared to, and thus may even affect the sign of the comparison. Without providing an explicit account of the assumptions made, it could even be argued that the calculations have little content when it comes to drawing policy conclusions.

3.1 Current effective top marginal tax rate

The choice of how to measure the current effective marginal tax rate on top earnings involves several judgements where the right way to proceed is not obvious. First, how should one treat commodity taxation? Commodity taxation contributes to the deterioration of work incentives, in a similar vein as income taxes do. From an economic theory point of view, commodity taxes should be incorporated in the effective top marginal tax rate. How individuals react to income vs. commodity taxes in reality, however, is difficult to test empirically. There is some laboratory evidence indicating that the reactions to the two types of taxes may differ (Blumkin et al. 2012). However, in the long run, it seems that individuals would have to adjust to commodity tax changes

in order to keep within their budgets. We therefore choose to include commodity taxes in our calculations.

Second, how should one treat employee and employer social security contributions? There is no general rule as to how social security contributions should be treated in these types of calculations, and the appropriate treatment depends on the details of the tax and benefit system. Social security contributions are part of the tax wedge on labour supply, in the same way as regular income taxes. Further, in principle it should not matter which side of the market nominally pays the tax, and therefore social security contributions paid by employers and employees should be treated similarly a priori.

However, a further complication arises here. To the extent that social security contributions confer direct personal benefits in the future, their effects may differ from those of general taxation. In Finland, employer social security contributions mostly consist of pension contributions and there is a direct link to future pension benefits. In such a setting, the benefits related to the contribution payments largely accrue to the consumer himself in the form of future consumption, and a case can be made for treating employer social security contributions as a form of savings.³ To the extent that this holds, pension contributions can be expected to be less distortionary than regular taxes on earnings.⁴ Similar considerations hold, albeit to a much lesser extent, also to employee social security contributions, as part of those also contribute to pensions.

It is hard to determine which fraction of social security contributions should ideally be regarded as distortionary taxes, and we are not aware of such estimates for Finland. We choose to make a simple compromise – admittedly a somewhat arbitrary one – of taking employee social security contributions into account in full, whereas leaving out employer social security contributions altogether. This division has the additional benefit that it corresponds to the way in which the baseline tax rates are constructed for the estimations of the elasticity of taxable income in Matikka (2016) that form an integral part of our calculations (see below).

³ For exact equivalence to hold, this argument presumes a funded pension scheme where the return is the same as the rate of return on individual savings, and that there are no borrowing constraints.

⁴ For a related theoretical argument on income taxes and public provision of private goods, see Blomquist et al. (2010).

The treatment of social security contributions is an example of a case where the appropriate solution clearly depends on the details of the tax system in each country. In the Finnish case, the link between employer social security contributions and pension benefits is more direct than in many other countries. For example in Sweden, a neighbouring country that is otherwise quite similar to Finland, there is no direct link between the employer social security contributions paid and the level of pension and benefits collected for high income individuals (Pirttilä and Selin 2011b). More specifically, the Swedish pension system involves a ceiling such that for incomes under the ceiling there is a direct link between employer social security contributions and the level of pension benefits. However, for incomes above the ceiling the employer still pays the contributions, but the individual does not obtain any extra benefits, and pension contributions can therefore be considered a pure tax for high income individuals. In contrast, there are no such ceilings in the Finnish context.

With the above considerations in mind, the top marginal earned income tax rate including employee social security contributions was approximately 57% in Finland in 2015. This rate applies to taxable income above € 90,000. The rate of commodity taxation, calculated as the share of indirect taxes in aggregate consumption expenditure, was approximately 22% in 2014.⁵ Denote the top marginal tax rate on income by t and the average tax rate on consumption by τ . To provide a simple approximation of the effective marginal tax rate (EMTR), consider the individual's static and linearized budget constraint $(1 + \tau)C = (1 - t)Z$, where C is consumption and Z is pre-tax income. This yields $C = \left(\frac{1-t}{1+\tau}\right)Z = (1 - EMTR)Z$. Given the above numbers, the effective marginal tax rate of top income earners including commodity taxes is approximately 65%.

3.2 The tax rate for the alternative tax base: Dividends

As mentioned above, Finland applies a dual income tax system where earned income (e.g. wages, pensions) is taxed at a progressive income tax rate (top rate 57% in 2015), and capital income (e.g. interest income, capital gains, dividends) is taxed at a lower rate (30% for capital income below 30,000 euros, and 34% for above it in 2015). The large gap between the marginal rates creates an

⁵ At the time of writing, the numbers for 2015 were not available.

obvious incentive to relabel earned income as capital income in order to reduce overall tax payments.

For top income earners, one of the most convenient and empirically relevant ways to legally shift income from the wage tax base to the capital income dividend tax base is to withdraw dividends from a privately held corporation instead of wage income. In the Finnish tax system, dividends from a privately held corporation are subject to specific tax regulations. Dividend income below a 8% computational return on net assets of the firm (assets-liabilities) is subject to a tax rate of 26%. Therefore, for the parameter t_2 in equation (2) above, we use the effective tax rate on dividends from listed corporations, including corporate-level taxes on distributed profits (20%) and commodity taxes, which amounts to approximately 40%, considerably lower than the EMTR on top earnings calculated above, 65%.⁶

Naturally, the choice for the t_2 parameter is highly dependent on the details of the tax system in any given country, as capital income and dividend tax systems are typically complex and vary significantly between countries.

3.3 Elasticity of taxable income and income-shifting

Going through the empirical ETI literature in any detail is beyond the scope of this paper. The broad conclusion from this literature is that the elasticity of taxable income is fairly small on average – see Saez et al. (2012) for a review. Matikka (2016) has estimated the ETI for Finland. He uses municipal income taxes as the source of tax rate variation in the estimation. This set-up has the desirable property that the tax rate variation is not related to the individual's income level (as municipal income taxes are flat, i.e. the rates are not a function of income). Further, tax rates change differently and at different times in different municipalities. Similar individuals living in different parts of the country can therefore serve as a comparison group for individuals whose tax rates change at any given time due to changes in municipal taxation. According to the estimates in Matikka (2016), the average ETI in Finland is approximately 0.2. Overall, this estimate is of similar

⁶ The personal tax rate on dividends increases slightly to 28.5% if personal capital income is above 30,000 euros, but this has no significant effect on the results of our calculations. A more detailed description of the Finnish dual income tax system and the dividend tax schedule of privately held corporations and the principles of dividend taxation in Finland can be found, for example, in Harju and Matikka (2016).

magnitude compared to those obtained in other Nordic countries (Chetty et al. 2011, Kleven and Schultz 2014, Thoresen and Vattø 2015), and implies that average taxable income in Finland is not very responsive to taxation.

The above discussion relates to the average ETI, whereas for our analysis the ETI for high-income individuals is relevant. The evidence of how the ETI differs between income groups is fairly limited. Matikka (2016) does not find a significant difference between the average ETI and the ETI for high-income individuals, though there is quite a bit of uncertainty associated with the income group specific estimates, and the data do not allow for estimating the ETI separately for very top earners with necessary precision.

Another key parameter relates to how much of the ETI is due to income-shifting. There is good evidence that top income earners actively respond to the incentives described above and income-shifting indeed does take place (see e.g. Saez et al. 2012), but there is less evidence on its exact magnitude among top income earners in Finland. Harju and Matikka (2016) find that approximately $2/3$ of the elasticity of taxable income of Finnish owners of privately-held corporations is due to income-shifting, but this estimate refers to a special group. On the other hand, other forms of tax avoidance would ideally need to be taken into account as well. For example, Kreiner et al. (2016) find that when intertemporal tax avoidance (that is, intratemporal shifting of wage income in order to save on taxes paid) is accounted for, the remaining part of the ETI for high-income earners in Denmark is close to zero. Of course, the extent and nature of income-shifting possibilities depends crucially on the details of the tax system, and therefore income-shifting incentives and their effects typically vary across countries.

The results of the top tax rate calculations are quite sensitive to assumptions made about the values of the parameters on the right-hand side of equations (1) and (2). We therefore consider several values for the parameters. As outlined above, Matikka (2016) estimates the average taxable income elasticity in Finland to be 0.2, with no statistically significant differences between income groups. We also consider other possible values for the elasticity ($e = 0.1$, $e = 0.3$ and $e = 0.5$). We consider two possibilities for the share of income-shifting in the earnings response to taxation, namely $s = 0.5$ and $s = 0.7$.

3.4 The shape of the income distribution: Pareto parameter

The revenue-maximizing top tax rate is also affected by the shape of the income distribution, captured by the Pareto parameter, a . When there is income-shifting, the question of which income distribution one should use to calculate a arises. The relevant distribution would be total earnings prior to any possible income-shifting response. Such a distribution is not directly observable, however. It is nevertheless clear that considering the distribution of earned income only would be inadequate. Capital income is an important income source at the top of the income distribution: the share of capital income in the total gross income of the top 1% of income earners in Finland was about 31% in 2014. We therefore consider two values for the Pareto-parameter, calculated from individual-level data on earned income and capital income in 2014: $a = 3$ (for earned income) and $a = 2.25$ (for earned income plus capital income).⁷ We consider the former to be relevant when we calculate the benchmark with no income-shifting, and the latter to correspond to the case where income-shifting possibilities are taken into account.

4. Results

We can now compare the current top earned income tax rate with the revenue-maximizing rate. Table 1 calculates the revenue-maximizing top tax rate for different parameter values. We start from a benchmark where we assume that there is no income-shifting. This case is presented on the first row of Table 1. Given that this is only a benchmark, we consider only one value for the taxable income elasticity (Matikka 2016) in this case. When there is no income-shifting, assuming a modest elasticity (0.2) is reasonable. In this case, the revenue-maximizing top income tax rate would be 63%, which is very similar in size compared to the current top rate of 65%. (Note that all numbers refer to the effective marginal top tax rate that includes commodity taxation and employee social security contributions, as discussed above.)

Given the prevalence of income-shifting among top earners, it is important to calculate the revenue-maximizing income tax rate in such a way that income-shifting possibilities are taken into

⁷ The data used in the calculations are a register-based representative data set including a wide variety of income and tax record information. The data set is originally formed for microsimulation purposes, and it includes approximately 820,000 observations for 2014 (approximately 15% of the population).

account. This is done on the remaining rows of Table 1. For example, for the ETI estimate of 0.2 from Matikka (2016) and making the assumption that income-shifting accounts for 50% of the overall response of top earners, the revenue-maximizing top earned income tax rate would be as high as 80%. Therefore, the revenue-maximizing top tax rate for these parameter values is clearly higher than the current effective marginal tax rate, 65%.

Table 1. The revenue-maximizing top earned income tax rate for different parameter values.

elasticity of taxable income, ETI (e)	share of income-shifting in ETI (s)	pareto-parameter (a)	top tax rate on dividends (incl. commodity tax) (t_2)	revenue-maximizing top tax rate (t^{max})
0.2	0	3	-	0.63
0.1	0.5	2.25	0.40	0.85
0.2	0.5	2.25	0.40	0.75
0.3	0.5	2.25	0.40	0.68
0.5	0.5	2.25	0.40	0.58
0.1	0.7	2.25	0.40	0.87
0.2	0.7	2.25	0.40	0.78
0.3	0.7	2.25	0.40	0.71
0.5	0.7	2.25	0.40	0.62

On the other hand, if the elasticity of taxable income at the top of the income distribution is considerably higher than that found in Matikka (2016), then the current top tax rate may be quite close to the revenue maximizing one. For the current top tax rate to exceed the revenue-maximizing rate, the ETI would have to be above 0.42 (if the share of income-shifting in the ETI is 0.7), or above 0.35 (if the share of income-shifting is 0.5). Given that the ETI estimates in the relevant literature (for example those found for other Nordic countries) are below these numbers, it appears likely that the current top income tax rate is below the revenue-maximizing rate. It has to be kept in mind, however, that the above calculations are subject to considerable uncertainty, not least because of the uncertainty involved in estimates of e and s . Therefore, it is also possible that the current top tax rate may be close to the revenue-maximizing level.

Some further notes concerning the above calculations are in order. First, as mentioned above, we have included consumption taxes in calculating the current top tax rate. Since consumption taxes affect work incentives, in our view it is advisable to take consumption taxes into account in the calculations. However, to our knowledge, none of the ETI estimates in the literature actually take into account consumption taxes. While there are good reasons for this practice in the ETI literature, e.g. ensuring that ETI estimates are more comparable across countries, it implies that there is somewhat of a discrepancy between the EMTR used in our calculations, and the ETI estimates. To eliminate the discrepancy, existing ETI estimates should be revised downwards.⁸ This would strengthen our conclusion that current top tax rates are likely to be below the revenue-maximizing rate. On the other hand, if we had not included commodity taxes in calculating the current top tax rate, it would seem that the current top earned income tax rate (57%) is further below the top of the Laffer curve, rather than quite close to it. This remark serves to emphasize the importance of making the assumptions behind the calculations explicit.

Finally, we have not accounted for the possibility of tax-motivated emigration in our calculations. If high taxes were to cause a significant proportion of high-income individuals to emigrate, this would call for lower tax rates at the top. (Brewer, Shepard and Saez, 2010.) There is relatively little empirical evidence of the effects of taxation on migration decisions to date (Kleven et al. 2014). Piketty and Saez (2013) conclude that the migration elasticity is likely to be fairly low in most countries. Furthermore, in Finland the migration elasticity is likely to be lower than in many other countries due to the relatively low fraction of foreigners (whose migration elasticity is likely to be higher than that of natives) in the population. The effect of migration on optimal top tax rates is therefore likely to be fairly limited in practice, even though its importance may increase if labour markets become more integrated internationally.

⁸ This is because baseline tax rates including consumption taxes are higher than the baseline tax rates used in the ETI studies – and therefore baseline net-of-tax rates including consumption taxes are correspondingly lower. Hence, a one percent change in the baseline net-of-tax rates in the ETI studies corresponds to a more than one percent change in the net-of-tax rate including consumption taxes. A one percent change in net-of-tax rates including consumption taxes would therefore lead to a smaller response than those typically estimated in ETI studies.

5. Discussion

In this paper, we have discussed the role of income-shifting in evaluating the revenue-maximizing top tax rate on earned income. Taking into account income-shifting from the earned income tax base to the more leniently taxed capital income tax bases increases the estimate for the revenue-maximizing rate. Under reasonable assumptions on overall tax elasticities estimated for Finland and other Nordic countries, income-shifting responses imply that the current top tax rates are below the revenue-maximizing rates.

However, it is important to note that the Laffer curve calculations do not imply that top earned income tax rates should be increased. First, the analysis was conducted keeping the capital income tax rate fixed. When both tax rates on earned income and capital income can be adjusted, income-shifting considerations are typically regarded as providing an argument for moving the two tax rates closer together: the two rates should be closer to each other than they would be if income-shifting was not a concern (Piketty and Saez, 2013). It should also be noted that the extent of income-shifting is not completely beyond the control of policy-makers. Rather, income-shifting or tax avoidance in general are to some extent determined by the features of the tax system (Piketty et al. 2014) and the efficiency of tax collection can be improved by limiting the opportunities for tax avoidance if the costs of combatting avoidance are not too high. From this perspective, the capital income tax rate (in particular taxation of dividends) and the top earned income tax rate in Finland are still quite far apart.⁹

Finally, it needs to be stressed that the above discussion relates to tax revenue maximization only. However, the objective of the government should be to maximize the welfare of citizens, not tax revenue. The analysis is nevertheless relevant also for discussions about welfare, as the revenue-maximizing tax rate provides an upper bound for the welfare-maximizing tax rate: increasing tax rates above the Laffer rate would make no sense, since it would make taxpayers worse off (due to lower disposable income), and would also reduce tax revenue (as we would be on the downward

⁹ If capital income and earned income have the same taxable income elasticity, the two tax rates should be equalized to maximize tax revenue. (Piketty et al. 2014, Piketty and Saez 2013.) This also assumes that shifting and labour supply elasticities are homogenous within the population. Recent research has argued that a gap between the two tax rates might be optimal if individuals who engage in income-shifting also have more elastic labour supply. (Selin and Simula 2017.) More generally, taking into account considerations beyond income-shifting, there is no unanimity in the literature on whether the tax rates should be identical. See e.g. Diamond and Saez (2011) for a policy-oriented discussion on capital income taxation.

sloping part of the Laffer curve). Therefore, it is clear that tax rates should in most cases be lower than and never exceed the revenue-maximizing rate.¹⁰ Based on the above analysis, it seems likely that this is the case in Finland currently.

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¹⁰ The revenue-maximizing tax rate and the optimal tax rate are equal only if the social welfare weight of top income earners is zero, as in the Rawlsian social welfare criterion. This type of a situation may also arise in the context of utilitarianism. Roughly speaking, this would occur if the marginal utility of money goes to zero when income is very high. See e.g. Diamond and Saez (2011, 169) for a discussion.

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