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IN SEARCH OF A *PARADOX OF REDISTRIBUTION*
ANALYSIS OF FISCAL REDISTRIBUTION IN HIGH-INCOME COUNTRIES

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Abstract

The last decade has seen a sharp increase in interest in the possible existence of a *Paradox of Redistribution* (*PoR*) whereby narrow targeting of social transfers aimed at increasing their redistributive (poverty) impact has the perverse effect of increasing poverty over the medium term due to decreasing public support for such spending. However, empirical support for the existence of a *PoR* has been mixed. We revisit this issue using harmonized LIS household survey data covering recent decades. Our analysis is embedded in the standard social welfare framework, which allows for an integrated and transparent evaluation of FR, making explicit the value judgements necessarily inherent in such analyses. Our results support recent findings that FR has increased over the last four decades, although we do not find support for some recent results that FR decreased since 1995. While we find strong support for a *PoR* for social insurance transfers (dominated by pension transfers), we find little support in the context of social assistance transfers. We argue that, in the context of social assistance, more detailed country-specific studies of the underlying political and economic dynamics are needed to adequately determine the existence or otherwise of a *PoR*. Our high-level analysis can, however, help to identify possible candidates for such country case studies.

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I. INTRODUCTION

There exists a large empirical literature highlighting the central role played by income tax and transfer policies in reducing income inequality in high-income countries (HICs).[1] A consistent finding is that, on average, fiscal redistribution (FR) through tax and transfer policies reduces income inequality by approximately one third, but with substantial variation in the level of FR across countries. Approximately three quarters of this variation is achieved through transfers.

Along with the growth of the empirical literature on FR, there has been a resurgence of interest in the possible existence of a *Paradox of Redistribution* (*PoR*) whereby increased emphasis on narrow targeting of transfers towards lower-income groups leads to reduced political support for redistributive transfers and a subsequent decrease in the transfer budget sufficient to result in an actual decline in FR (Korpi and Palme, 1998).[2] If such a paradox exists, then this would lend added support to arguments in favour of more universal transfers (such as universal child benefits or social pensions, or a universal basic income) and caution against over-reliance on narrowly targeted means-tested transfers as a poverty reduction strategy. However, the related empirical literature has found mixed support for the existence of such a paradox, with more recent studies tending to find a lack of support.

In this paper we revisit the question of the existence of a *PoR*. The analysis focuses on FR in high-income countries using harmonized Luxembourg Income Surveys (LIS) household survey data covering recent decades. These data facilitate an evaluation of how FR varies across countries and also over time in a given country or set of countries. Our analysis is embedded in the standard social welfare framework which allows for an integrated and transparent evaluation of the level and determinants of FR, making explicit the value judgements necessarily inherent in such analyses (Coady and others, 2022). In addition to analyzing FR from total transfers, we also examine the separate contributions of insurance

[1] See, for example, OECD (2008, 2011), Immervoll and Richardson (2011), Causa and Hermansen (2019), Caminada and others (2017, 2019), and Coady and others (2022), and references therein.

[2] Interestingly, a search of frequency of use in *Google Ngram*, which bases searches on all English books printed in the US, finds that there has been a very sharp increase in the use of the term "paradox of redistribution" after 1995 (see Figure A1).

and assistance transfer, which are often designed to address different policy concerns, as well as examining the sensitivity of results to alternative value judgements.

The format of the paper is as follows. Section II describes the basic social welfare framework used to evaluate the extent and determinants of FR. Section III then briefly reviews the existing theoretical and empirical literature on the *PoR*. Section IV presents the results of our analysis of FR in HICs covered by LIS surveys, discussing how it varies across countries and over time and the determinants of these trends.[3] Drawing on this analysis, Section V tests for the existence of a *PoR*, both for total transfers and separately for social insurance and assistance transfers. Section VI provides a summary and concluding comments, and emphasizes the importance of complementing the high-level analysis undertaken in the paper with richer and more detailed country studies that develop a better understanding of the political and economic forces that result in the observed "mechanical" relationship between the underlying technical determinants of FR.

II. THE SOCIAL WELFARE FRAMEWORK[4]

Social Welfare and FR

Consider an economy with two groups; households and the government. Abstracting from behavioral responses[5], let y_0 be household market income (i.e., income before direct taxes and transfers) and y_1 be household gross income (i.e., income after transfers) so that:

[3] We view the challenges and outcomes in low-and-middle income countries (LMICs) as very different to those in HICs. In contrast to HICs, LMICs are typically characterized by low social transfer spending and low coverage of the poor and non-poor. This reflects a combination of low tax and administrative capacities, large competing claims to finance other social spending (e.g., on education and health), and a large informal sector for which it is difficult to gather and verify income information. For the most part, these characteristics also effectively rule out the use of means testing of social transfers and require a reliance on categorical targeting (e.g., to children, the elderly, the disabled) and self-selection targeting (e.g., as with public works). See Grosh and others (2008), Bastagli and others (2015), and Coady and others (2015) for more detailed discussion and analysis.

[4] This section draws heavily on the discussion in Coady and Skoufias (2004) and Coady and others (2022).

[5] Most empirical papers on FR abstract from the important issue of behavioral responses arising from taxes and transfers. However, such responses could potentially be very important in deciding on the optimal level and design of FR since they generate an efficiency-equity trade-off (Piketty and Saez, 2013; Bargain, 2017; Brewer, Saez and Shepard, 2020; Coady, Jahan and Matsumoto, 2021). Their presence also means that the level and distribution of "original" incomes (i.e., incomes prior to the imposition of taxes and transfers) may be different from the level and distribution of "market" incomes (i.e., "disposable" incomes after taxes and transfers, minus taxes and transfers), the extent of these differences depending on the elasticity of income to net transfers and how this varies across income groups. While the social welfare framework applies regardless of whether original or market incomes are used in equation (1), the empirical results and their policy implications can be sensitive to the nature of behavioural responses.

$$y_1 = y_0 + m \qquad (1)$$

where *m* denotes social transfers. Let social welfare be described by a standard Bergson-Samuelson function of household welfare:

$$W(\dots, V^h(\boldsymbol{p}, y^h), \dots) \qquad (2)$$

where $V^h(.)$ is the indirect utility function of household *h* and **p** is a vector of commodity and factor prices facing the household (henceforth assumed fixed). The social welfare impact of a given transfer program with $dy^h = dm^h$ is:

$$dW = \sum_h \frac{\partial W}{\partial V^h}\frac{\partial V^h}{\partial m^h} dm^h = \sum \beta^h \mathrm{d}m^h \qquad (3)$$

where β^h is the social valuation of extra income to household *h*, or social "welfare weight". Let the total transfer budget (*budget effort*) be $B = \sum_h \mathrm{dm}^h$ so that (3) can be rewritten as:

$$\mathrm{dW} = \frac{\sum_h \beta^h \mathrm{dm}^h}{\sum_h \mathrm{dm}^h} \mathrm{B} = \mathrm{B} \sum_h \beta^h \theta^h = \lambda B \qquad (4)$$

where θ^h is the share of the total budget received by household *h* and λ is a *distributional characteristic* capturing the social welfare impact of a unit transfer delivered through the program (*transfer progressivity*).[6] Clearly λ can differ across transfer programs when welfare weights differ across households and the distribution of transfers differs across programs. The greater the proportion of the budget ending up in the hands of lower-income households (i.e., those with relatively high β^h), the higher transfer progressivity. Note that this measure of progressivity is scale neutral in that it does not change in response to a scaling up or down of transfer levels. Also, within this social welfare framework, the interrelationship between budget effort, progressivity, and FR is exact and internally consistent in that the specification of welfare weights corresponds to a specific measure of progressivity and of FR. This highlights the need to ensure that studies of the relationship between the extent of FR and

[6] For earlier discussion, see Diamond (1975) and Coady and Skoufias (2004).

transfer progressivity are internally consistent, a relationship which is at the heart of any tests for the existence of a *PoR*.

Equation (4) can be easily extended to focus on different components of social transfers, e.g., social insurance and social assistance transfers that often address different policy concerns. It is straightforward to show that:

$$\mathrm{dW} = \lambda B = [\lambda_1 \sigma_1 + \lambda_2 \sigma_2] B \qquad (5)$$

where λ_i is the progressivity of each transfer component and σ_i is the share of each component in the total social transfer budget. One can also extend the analysis to incorporate the need to finance transfers by allowing the first component to be total social transfers and the second tax financing, which would enter as a negative transfer to households, and setting $\sigma_{1,2} = 1$ (Coady and others, 2022). Note that once financing is incorporated, any welfare impact arises solely from redistribution between households making the link between FR and social welfare clearer. For the most part, this paper focuses exclusively on the transfer side given the focus on the *PoR* which is typically expressed as applying to the transfer side of the budget.[7]

Social Welfare Weights

The calculation of λ requires specifying social welfare weights, which helps to further highlight that any analysis of FR (or inequality) involves the adoption of "value judgements" as captured by these weights. Indeed, one of the attractions of the above approach is that it makes these value judgements explicit and facilitates an analysis of the sensitivity of empirical results to alternative value judgements. To start with, such weights can be usefully derived using the constant elasticity social welfare function where the (relative) welfare weight of household h can be calculated as (Atkinson, 1970):

[7] When incorporating tax financing into FR analysis it is important to ensure that tax financing equals the total transfer budget. It is not always clear if this is done in some existing studies. Also, where total revenues do not equal total transfers, one needs to decide how transfers are financed. Since financing it often fungible (e.g., not earmarked for specific spending items), this process is necessarily somewhat arbitrary, but failure to address it delivers an incomplete, and possibly misleading, analysis. We further discuss the implications of allowing for financing in Annex I.

$$\beta^h = \left(\frac{y^k}{y^h}\right)^{\varepsilon}$$

where *k* is a reference income level (e.g., mean income) and ε captures our "aversion to inequality" with aversion increasing in ε. For example, a value of ε=0 implies no aversion to inequality so that all welfare weights take on the value unity (i.e., a euro is a euro no matter to whom it accrues). A value of ε=1 implies that if household *h* has twice (half) the income of household *k* then its welfare weight is 0.5 (2.0) as opposed to unity for *k*. A value of ε=2 similarly implies a welfare weight of 0.25 (4.0) for *h*. In this sense, the Atkinson welfare weights are "distribution dependent", i.e., they vary with the ratio of household incomes.[8]

Instead of appealing to a standard social welfare function, one can consider alternative approaches to specifying welfare weights that, say, a "social planner" might use when evaluating among competing public policies. For example, one can also consider welfare weights that are "distribution free", i.e., fixed independently of relative incomes. For instance, welfare weights could be set at 1 for all households in the bottom two deciles of the income distribution and zero otherwise ("poverty welfare weights"), which is analogous to using a poverty gap index as a social objective. Alternatively, we could set weights to decile ranks, i.e., 1 for richest decile and 10 for poorest decile ("rank welfare weights").[9] Neither rank nor poverty weights would change if initial income inequality (e.g., the ratio of income of the poorest decile to the mean) increased, hence the term "distribution free". So, for example, FR results will not be influenced by changes or differences in relative incomes across deciles. In our empirical analysis below, we consider a range of welfare weights to determine the sensitivity of empirical results to alternative value.

[8] Notice that the Atkinson SWF conflates two distinct issues: (i) the *extent* of income inequality and (ii) the *social cost* (in terms of social welfare forgone) of income inequality. For example, if there is no aversion (or social cost) to inequality then it can give the impression that there is no inequality.

[9] Rank welfare weights are consistent with the social welfare function proposed by Sen (1976), which weights the income of each group by its rank in the income distribution. Rank welfare weights are also implicit in the Gini inequality index, which is very prominent in the empirical FR literature.

Decomposing FR

To analyze the variation of FR across countries, or over time in the same country,we can interpret the set of redistributive transfers in a country as a transfer "program". The total welfare impact of a transfer program in country *j* (dW_j) with budget B_j can then be written as:

$$dW_j = \lambda_j \, . \, B_j \tag{6}$$

To facilitate comparisons of FR across countries or time, this can be usefully rewritten in percentage terms as:

$$\frac{dW_j}{Y_j} = \lambda_j \, . \, \frac{B_j}{Y_j} = \lambda_j \, . \tau_j \tag{7}$$

where Y_j is total household income and τ_j is the ratio of the transfer budget to total household income. This percentage increase in social welfare due to this redistributive transfer program in country *j* can then be compared to the increase for another country or to increases across years in the same country. These differences will reflect differences in *budget effort* (τ) and differences in *transfer progressivity* (λ). Differences in progressivity can be further decomposed into differences in *targeting performance* (θ) and differences in *targeting returns* (β).

Note that under poverty weights, the welfare impact in (7) will collapse to the share of total income being redistributed to the poorest 20 percent of the population. Also, when Atkinson welfare weights are normalized to be set equal to 1 at mean income, FR (or the percentage increase in social welfare) equals τ_j (and λ_j=1) when all transfers accrue to the person with mean income. Similarly, under Atkinson welfare weights, the welfare impact will converge to the share of total income being redistributed to the population (i.e., τ_j) as one's aversion to inequality, or the magnitude of inequality, converges to zero.

Note also that, for distribution dependent measures of FR, it is possible that countries with the same *redistributive effort* (i.e., exact same level and distribution of transfers as captured by B and θ respectively) can have very different levels of FR solely because of differing initial income distributions (and thus targeting returns, β). In such instances, a country with

relatively high initial income inequality will have a relatively high level of FR because the *social welfare returns to targeting*, captured in more unequally distributed social welfare weights, is higher. In other words, there is very little social benefit from redistributing income in countries where incomes (and welfare weights) vary little across households. When comparing the differing levels of FR across countries and time it is therefore useful to know whether these are driven by differences in redistributive effort (i.e., in levels and distribution of transfers, or "how much countries do") or by different initial income distributions (i.e., or "how much a country has to do"). This can be achieved by examining the robustness of our results to the use of both distribution dependent welfare weights (e.g., *à la* Atkinson) and distribution independent weights (i.e., rank and poverty weights).

III. PREVIOUS LITERATURE

The need to consider the political economy of redistribution when designing redistributive policies has long been recognized.[10] Sen (1995, p. 21) argued that: "The political economy of targeting has to be concerned not just with the economic problems of selection, information, and incentives, but also with the political support for, and feasibility of, aiming public policy specifically at removing the deprivation of particular groups". This cautions against a narrow emphasis on targeting that implicitly abstracts from any underlying relationship between targeting and the size of the redistributive budget.

Interest in the possibility of political economy dynamics resulting in a perverse relationship between narrow targeting of social transfers and poverty (or inequality) reduction grew significantly after the publication of a highly influential article by Korpi and Palme (1998, henceforth denoted K&P)[11], which argued that "the more we target benefits at the poor, and the more concerned we are with creating equality via equal public transfers to all, the less

[10] See, for example, Besley (1990), Goodin and Le Grand (1987), Korpi (1980), Marshall (1950), Pierson (1994), Sen (1995), Rothstein (1998), Tawney (1952), and Titmuss (1968). Reviewing US poverty alleviation programs, Skocpol (1991, p14) argued in favor of "targeting within universalism" whereby the middle class receive a significant share of targeted resources (e.g., achieved through very gradual means testing of benefits) to ensure their political support. Narrow targeting, on the other hand, channels almost all of transfer benefits to the lowest income deciles. In the same context, Greenstein (1991) in contrast argues that narrowly targeted poverty alleviation programs can attract sufficient political support to be sustainable if they are seen to go to the "deserving" (e.g., those unable to work and the hard-working poor).

[11] According to Gugushvili and Laenen (2021, fn2), *Google Scholar* finds that the seminal paper by Korpi and Palme (1998) has been cited 2,210 times. According to Brady and Bostic (2014, p5, fn. 2), and also based on *Google Scholar*, this article "has over 1,350 citations (and)... appears to be the most cited article on the welfare state published at least since 1998."

likely we are to reduce poverty and inequality" (Korpi and Palme, 1998, p661). Or, from a poverty perspective, the more narrowly countries target redistributive transfers at the poor, the less poverty reduction that will actually be achieved.[12] This subsequently gave rise to both theoretical and empirical work attempting to provide insights as to the conditions under which such a paradox might exist (or be avoided) and its pervasiveness in practice.

Theoretical Literature

The early literature on FR through transfers, which assumes self-interested voters, focused on the size of redistribution in the context of a uniform lump-sum transfer financed by a proportional income tax (Meltzer and Richard, 1981; Persson and Tabellini, 2002; McCarty and Pontusson, 2014). This literature finds that the extent of FR increases the greater income inequality as captured by the distance between median and mean incomes but decreases with the extent (or depth) of poverty. Introducing an insurance motive for redistribution, Moene and Wallerstein (2001, 2003) show that an increase in the gap between the pre-transfer income when unemployed and income if employed leads workers to demand more redistribution. But increasing wage inequality around a given mean reduces the gap between income when unemployed and when employed at wages below the mean. Higher wage inequality therefore implies that the median voter demands less insurance. However, this relationship is mitigated when risk is inversely related to income, e.g., low-income households face a higher risk of a negative income shock and are less able to efficiently self-insure against this risk (e.g., because of low savings or lack of access to borrowing).

One of the earliest theoretical papers to explicitly model redistribution in the context of means-tested transfers was by De Donder and Hindriks (1998), who modelled public support for a redistributive transfer program designed as a uniform transfer available to those below a given income level and financed by a proportional income tax. They found that for the program to be supported by the majority of self-interested voters, it would need to be targeted towards significantly more than one-half of the voting population. Using a similar model, a

[12] Note that increased targeting may also require a higher share of the transfer budget to be allocated to administrative costs, thus lowering the poverty impact. Similarly, if low-income targeting generates stigma then this may lead to lower take-up among eligible households, lower benefit spending and thus lower poverty impact. Consistent with the empirical literature, we abstract from these issues in this paper, essentially treating them as second-order impacts.

later paper by Cardak and others (2013) allowed for voters to first vote over the size of the program and then over the narrowness of means testing. They find that, since the chosen level of means testing is determined by the median-income voter, targeting cannot be an equilibrium outcome.

Therefore, for means-tested benefits to be politically supported, it seems one needs to appeal to motives such as those arising from potential insurance benefits in the presence of income uncertainty, altruism, or imperfect information. For instance, Moene and Wallerstein (2001) introduced an insurance motive for transfers by assuming that income is uncertain and agents are risk averse. In their numerical simulations, political support for a targeted system disappears when less than two-thirds of the population receive the transfer. Appealing to the existence of "targeting errors" due to imperfect information on the part of the government or individuals, De Donder and Peluso (2018) allow for a random selection component in addition to a means-tested selection component which gives rise to "errors of inclusion and exclusion". Individuals vote over the size of the transfer budget (i.e., the size of the proportional income tax used to finance it). The authors demonstrate that it is possible that a majority voting system will generate sufficient support for a narrowly targeted transfer program provided that the level of the benefit and the expected probability of receiving it are large enough for the median voter to have a positive expected transfer. But presumably this is unlikely to be the case in purely means-tested income transfer programs with extensive coverage of low-income households.

Empirical Literature

Numerous empirical studies have produced mixed support for the existence of a *PoR*. Early studies focused on the relationship between FR and the degree of targeting *across countries*. Kenworthy (2011) extended K&P's cross-sectional analysis[13] using cross-section data for both the 1990s and 2000s and concluded that the negative relationship between targeting and

[13] K&P's analysis covered 11 high-income countries using LIS data in or around 1985: Australia (1985), Canada (1987), Finland (1987), France (1984), FR Germany (1984), the Netherlands (1987), Norway (1987), Sweden (1987), Switzerland (1982), United Kingdom (1986), and the United States (1986). Analyses were carried out for the total population, the working-age population (25 to 59 years of age), and the elderly (over age 65). The analysis also focused on total (i.e., the sum of social insurance and assistance transfers) transfers.

redistribution was less clear by 1995 and no longer evident after 2000.[14] Marx and others (2013) updated and extended K&P with more recent LIS data and an expanded country sample but found no robust empirical relationship between targeting and FR. Brady and Bostic (2014), using a multi-level model, find that budget effort is actually positively correlated with progressivity (or low-income targeting), which ensures that poverty impact is positively correlated with progressivity. Caminada and others (2017) also fail to find any significant relationship between targeting and FR for a sample of 20 high-income LIS countries, while Mantovani (2018) confirms these results using EUROMOD data.

In a recent paper, Coady and others (2022) analyze the cross-country variation in FR using EUROMOD data for 28 EU countries and fail to find any robust evidence of the existence of a *PoR*. On the contrary, on average, countries with relatively high fiscal progressivity have high FR despite there being a negative relationship between progressivity and the size of the transfer budget. The high statistical significance associated with the positive relationship between progressivity and FR suggests that this finding is robust to the sample of countries used. This study, however, focuses on *net* FR, i.e., the redistributive impact of transfers and their tax financing, which we will show below is more likely to reject the *PoR* hypothesis compared to focusing solely on transfers.

Arguably, analyzing the relationship between FR and targeting across countries does not provide a valid test of the *PoR* hypothesis since the nature of political institutions and the underlying economic context can differ substantially across countries and can change over time. It implicitly assumes that any observed relationship is a steady-state relationship to which all countries will converge based on their initial institutional conditions. Such an assumption might, however, be more valid for social insurance transfers in high-income countries which are dominated by contributory public pension transfers, since pension systems in these countries are mature, are often underpinned by strong legal protection, and spending changes only very slowly in response to demographic factors (e.g., ageing populations) and reforms (Clements and others, 2015). This contrasts with social assistance

[14] The results also suggest that the K&P empirical findings are driven by outliers given the small sample. The analysis based on a larger number of countries, and controlling for pension transfers, finds that universalism has been negatively associated with redistribution since the mid-2020 thus contradicting the *PoR* hypothesis.

transfers which are more discretionary and susceptible to the whims of shorter-term political changes. A more complete test would then need to be based on examining the relationship within a country over time to capture the relevant political and economic dynamics. This was the approach taken in McKnight (2015) who examined the relationship in four EU countries (France, Italy, Sweden, and the UK). In contrast to previous cross-section studies, the paper finds a negative relationship between the concentration of net transfers (i.e., transfers minus taxes) and the extent of FR as captured by the impact of redistributive net transfers on inequality and relative poverty.[15] However, to the extent that the relationship between targeting and FR is dynamic, it is unclear why the underlying dynamic relationship would be adequately captured by year-on-year changes as opposed to changes over a longer time period.

IV. Fiscal Redistribution in High-income Countries

We focus on FR in 28 HICs over recent decades using LIS harmonized household-level data.[16] These countries have extensive social protection systems, including social insurance benefits (where public pension spending dominates) and social assistance benefits with broad coverage of the poor and often the non-poor. Our analysis of LIS household data focuses on total social transfers calculated as the sum of social insurance (*hi32+ hi421+hi43+hi44*) and social assistance (*hi31+hi41+hi422+hi45 +hi46*). Country datasets are dropped if information on these transfer components is missing or incomplete (*at87, es80/85, it86*). Market income is calculated as "current income" (i.e., factor and total transfer income; *hitotal*) minus total transfers (*hitransfer*) plus private transfers (*hiprivate*) and private pensions (*hi33*). When market income is zero or negative, we set it equal to public pensions (*hipension* minus *hi33*) and drop if it is still zero or negative. We apply standard LIS top and bottom coding to deal with income outliers.

[15] Coady and others (2022) examine the within-country relationship between progressivity and FR using fixed-effects regressions on EUROMOD data for 28 EU countries over the period 2011-2016 and find a strong statistically positive relationship. However, the short time period means that results are driven predominantly by cross-country variation.
[16] The countries covered are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Norway, Poland, Serbia, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, United Kingdom, and United States.

We also drop observations if household population weights (*hpopwgt*) or number of household members (*nhhmen*) are less than or equal to zero. We then construct individual population deciles based on *per capita* gross income using individual weights calculated as the product of household population weights and the number of household members, where household gross income is calculated as market income plus total public transfers. All income and transfer flows are then grossed up using household weights and aggregated into income deciles based on per capita gross household income, i.e., the data are collapsed into ten observations per country-year dataset.

Fiscal Redistribution in 2016

We start by analyzing the level and determinants of FR in 2016 based on the decile-level databases since this year has the largest mass of country datasets for our country sample. Where a country does not have a dataset for 2016 we use 2015 data (Hungary, Slovenia). Consistent with the construction of income deciles, social welfare weights are based on per capita gross household income, but we also examine how results change when we use rank and poverty welfare weights.[17] To facilitate comparison across countries with different mean incomes, we normalize welfare weights to equal unity at mean income in every country-year dataset. To help develop our understanding of the impact of different welfare weights, Figure 1 shows the different weights for 2016 for two countries but now normalized to sum to unity for presentational purposes.

Starting with Ireland, we see that welfare weights (β) for ε=1 and ε=2 give a higher weight to the poorest decile but a lower weight to middle deciles compared to rank welfare weights, which are closer to welfare weights with ε=0.5. The drop in welfare weights as income increases is much sharper for the higher values of ε compared to rank welfare weights. Poverty welfare weights attach a relatively high weight to the bottom two deciles, and lower (at zero) for all higher deciles. Turning to France, we can see that the weight attached to the lowest decile compared to rank welfare weights is substantially higher but falls below as early as the second decile and to near zero for all higher deciles. This reflects the

[17] We also considered using per capita *market* income as our welfare metric and the basis for social welfare weights but, in many cases, the weight given to the poorest welfare decile was excessively high and not very insightful for our analysis.

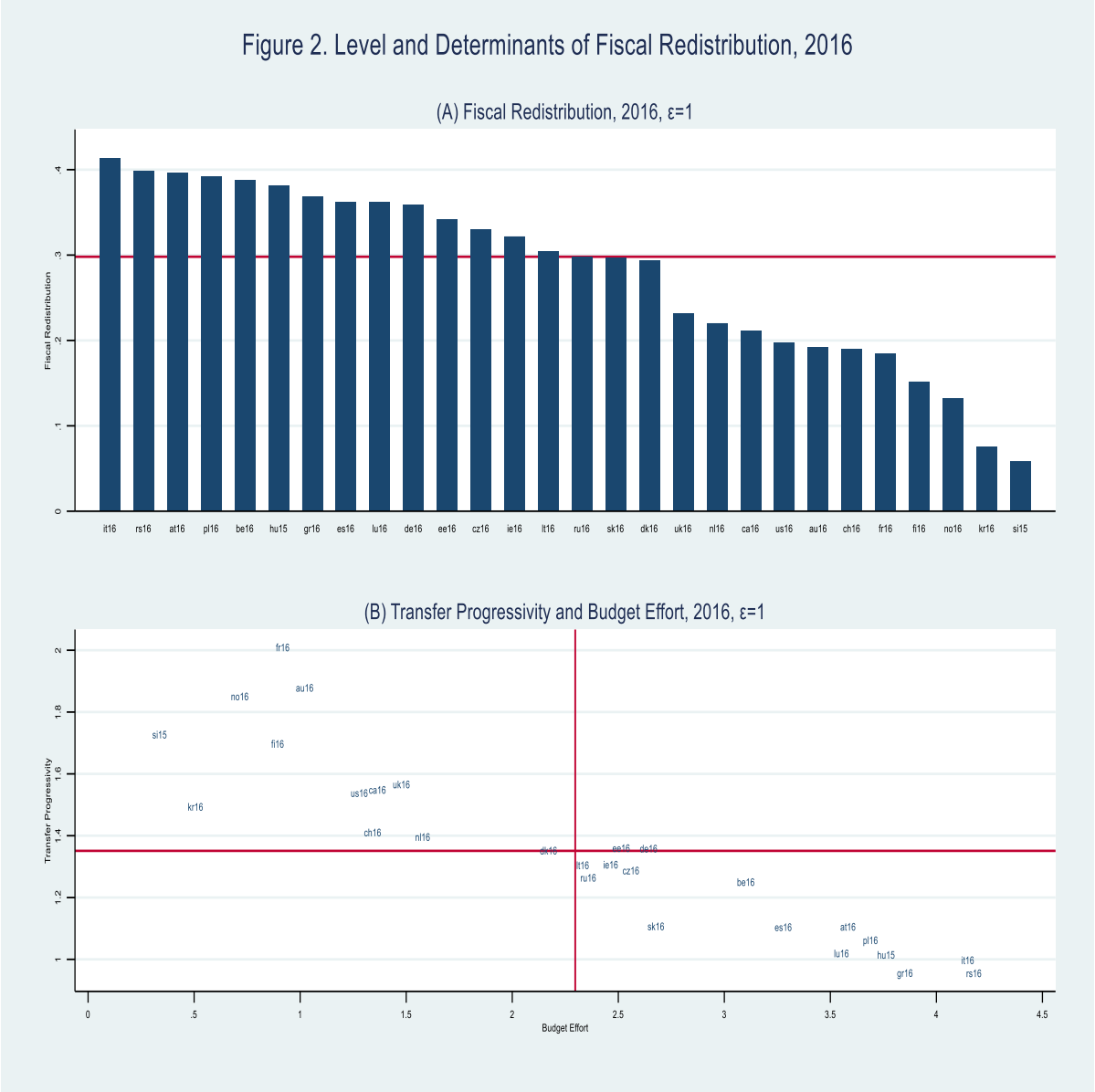
substantially lower per capita income for households in the poorest decile compared to the middle. In contrast to Ireland, where inequality at the bottom of the income distribution is not as pronounced, for ε=2 virtually all the weight is placed on transfers to the poorest decile with little concern for even the second and third deciles.

Source: Author calculations based on LIS household surveys.

Figure 2 presents the level of FR across countries (Panel A) and the determinants of this variation (Panel B) for ε=1. Panel A shows that FR leads to an increase in welfare of around 30 percent or more in half of the sample countries but then falls off sharply. Panel B shows a clear negative relationship between effort and progressivity, i.e., countries with high effort tend to have low progressivity consistent with a heavy reliance on universal (non-means tested) transfers.[18] Note that FR in countries with a relatively high level of FR (e.g., Italy,

[18] Note that this also means that for countries with high effort and high FR from transfers to have high FR once tax financing is allowed for, the tax financing would need to be very progressive (i.e., low-income groups pay a very low share). Annex I discusses how our results change when we introduce income tax financing.

Serbia, Austria, Poland, Hungary, and Greece) is driven by their relatively high budget *effort* since they also have relatively low *progressivity*.



Note: Budget effort has been multiplied by 10 so, e.g., a level of 2.5 denotes 25 percent of total income.
Source: Author calculations based on LIS household surveys.

Figure 3 shows FR under alternative welfare weights in comparison to ε=1. Panel A shows the comparison with rank welfare weights where the correlation between FR is very strongly positive. Therefore, countries with high (low) FR under ε=1 also have high (low) FR under rank welfare weights. While the comparison of FR for ε=1 and poverty weights in Panel B also shows a positive correlation, this is not as strong and there is much more variation,

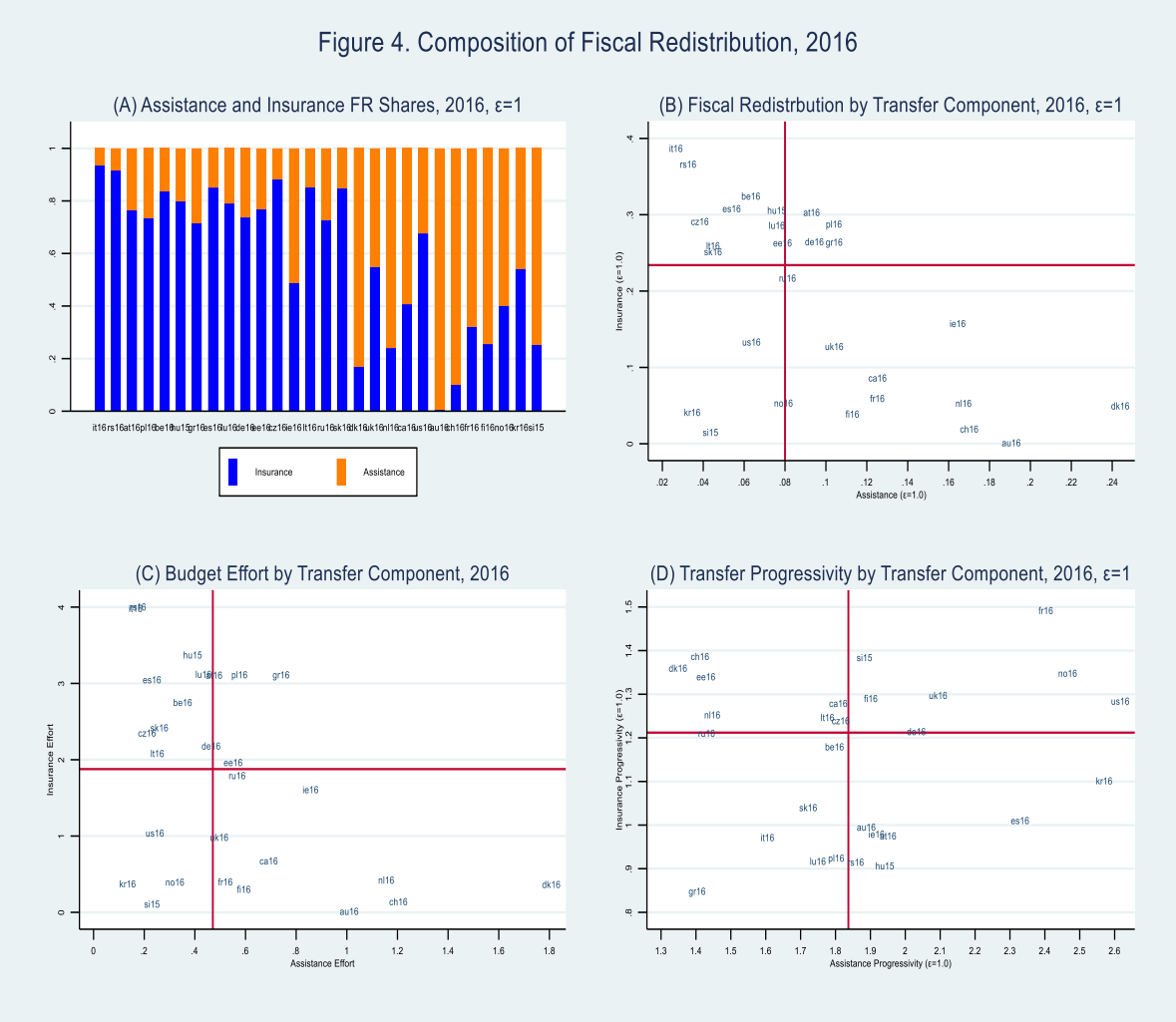
especially among countries with higher FR under ε=1. For example, in terms of FR, the ranking of Italy, Greece, and Spain falls substantially under poverty weights, while the ranking of Finland increases substantially.[19]

Source: Author calculations based on LIS household surveys.

Figure 4 (Panel A) shows the relative contributions of social insurance and assistance transfers to FR across countries for ε=1 with countries ordered by their total FR. On average, insurance transfers account for around 60 percent of total FR. However, there is significant variation across countries, and it is noticeable that countries with high FR tend to be those where a high share comes from social insurance. The share of FR from assistance transfers increases the greater the weight associated with transferring to the poorest deciles. On average, the contribution of social insurance falls to 38 percent when ε=5 and around 56

[19] It is noticeable that France and Norway jump from the bottom to the top of the FR ladder in moving from ε=1 to ε=2 (not shown). This reflects the high level of inequality at the bottom of their income distributions resulting in a very large increase in welfare weights attached to the bottom two deciles and the resulting sharp increase in their transfer progressivity.

percent with poverty weights. Countries with high overall FR tend to be those with relatively high levels of FR from social insurance, and countries with high FR from social insurance tend to have low FR from social assistance and vice versa (Panel B). This, in turn, partly reflects that countries with high social insurance spending tend to have low social assistance spending and vice versa (Panel C). It is also the case that countries with low social insurance effort (such as Denmark, France, Netherlands, Norway, Slovenia, and Switzerland) tend to have high social insurance progressivity consistent with these having relatively strong emphasis on poverty alleviation as opposed to consumption smoothing.



Source: Author calculations based on LIS household surveys.

V. EVOLUTION OF FISCAL REDISTRIBUTION

We now turn to the evolution of FR in our sample countries over recent decades.[20] A recent debate in the literature centers around whether FR has changed significantly over recent decades. Causa and Hermansen (2017) have argued that the rise in disposable income (i.e., income after income taxes and transfers) inequality from mid-1990s was due to the decline in FR and "welfare state retrenchment". However, more recent analysis by Caminada and others (2017, 2019)—updating earlier studies by Mahler and Jesuit (2006) and confirming earlier results by Kenworthy and Pontusson (2015) —found that FR actually increased after the mid-1990s. They conclude that tax-benefit systems in 2013 were more effective at reducing inequality than in the mid-1980s and the mid-1990s, especially among the total population compared to the working-age population.

We analyze these trends within our social welfare framework using OLS regression analysis with FR from transfers as the dependent variable and years (time) as the independent variable so that coefficient on time is the average annual change in FR over the period considered. As well as analyzing this trend over a longer period, we also separate the sample into sub-periods to identify different "episodes" of possible increases, decreases, or little change, as well as to map our analysis to the above debate. In total we have 531 country-year databases dating from 1967 to 2020. However, the sample is very unbalanced, being very sparse in early years as new countries were first added slowly reaching 9 countries in the period 1979-1981 and 22 in the period 1994-1996 and 29 in the period 2015-16. Here we focus on the results for a more balanced sample where we construct 6 panels using data around 1980, 1990, 1995, 2004, 2010, and 2016. This results in a total sample of 121 country-years for 24 countries.

[20] See Caminada and others (2017, 2019) for an extensive review of the results and methodologies in the literature on the evolution of FR.

Table 1. Has Fiscal Redistribution Changed Over Time?				
		Average Annual Percentage Point Change in FR		
		1980-2016	1980-1995	1995-2016
(A) Total Transfers (b*100)				
	ε=1	0.170*	0.670**	0.071
	ε=2	0.528***	1.358**	0.316
	Ranks	0.494	2.617**	0.131
	Poverty	0.004	0.058	-0.005
	No. Obs.	121	49	93
		Average Annual Percentage Point Change in FR		
		1980-2016	1980-1995	1995-2016
(B) Total Transfers (b*100)				
	ε=1	0.153	0.667**	0.068
	ε=2	0.421**	1.207**	0.230
	Ranks	0.440	2.657*	0.150
	Poverty	0.002	0.056	-0.002
	No. Obs.	121	49	93

Note: ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels respectively. Panel B also controls for the population dependency ratio calculated as the share of elderly and children in the total population.
Source: Author calculations based on LIS household surveys.

Table 1 presents the results of our regression analysis of changes in FR over time for total transfers with the lower Panel (B) also controlling for the population dependency ratio. We estimate the change in FR for different periods (1980-2016, 1980-1995, and 1995-2016) and using different measures of FR corresponding to different welfare weights. Starting with Panel A and ε=1, the results point to a positive and statistically significant increase in FR over time between 1980 and 2016. For instance, FR increased social welfare on average by 0.170 percentage points per year over this period, equivalent to a cumulative increase of over 7.6 percentage points over these 4.5 decades. This annual average increase appears to have been substantially more pronounced over the period 1980-1995 compared to 1995-2016; while the coefficient is positive over 1995-2016, it is statistically insignificant consistent with very different trends across sample countries. Therefore, we conclude that there is not much evidence of a systematic decrease in FR after 1995 although it has undoubtedly declined in some countries.[21] Although this pattern of results holds when we use other welfare weights,

[21] While the results for the larger unbalanced sample find that FR still increased immediately after 1995 for a decade or so before dropping off, care needs to be taken in interpreting these results some of the changes over time are clearly also

none of the positive coefficients are statistically significant for poverty weights. Also, the pattern of results is robust to controlling for the population dependency ratios (i.e., the share of children and the elderly in the population) consistent with our results being driven by different country policies rather than by different country demographics (Panel B results).

In summary, our results are consistent with the more recent results of Caminada and others (2017) who also find that the level of FR has increased on average since 1980 with most of this increase occurring before 1995. Neither do we find any evidence of a decline in FR after 1995, although the statistical insignificance of the results suggests that trends differ a lot across countries. So, while numerous studies have found that disposable income inequality has increased since the mid-1990s, it seems this is not attributable on average to a decline in FR but rather is driven by increasing market (i.e., before transfers and taxes) income inequality.

VI. THE PARADOX OF REDISTRBUTION

According to the *Paradox of Redistribution* (*PoR*), countries that design narrowly targeted transfer programs to achieve high progressivity and a higher poverty impact end up perversely having lower overall FR since narrow targeting of transfers to the poor leads to a loss of political and public support for FR and thus lower transfer budgets sufficient to decrease FR (see Section III). Our analytical framework helps to clarify the conditions necessary for such a paradox to occur. First, there must be a negative relationship between transfer progressivity and budget effort (i.e., high progressivity is associated with low effort). Second, this negative relationship must be strong enough that the gains from better targeting are more than offset by the decline in budget effort. Note that all transfer programs that target the dominant share of budget resources to a narrow poor group, including through categorical (e.g., the disabled, those unable to work) and means-testing eligibility criteria, will exhibit higher progressivity compared to transfers that are more universally accessible.[22]

attributed to the adding new countries with higher or lower average FR (i.e., a composition effect). In addition, changes will be dominated by countries with more regular datasets.

[22] Korpi and Palme (1998, p661) view targeted social policy as being "organized for the poor only" while universal policy "includes all citizens."

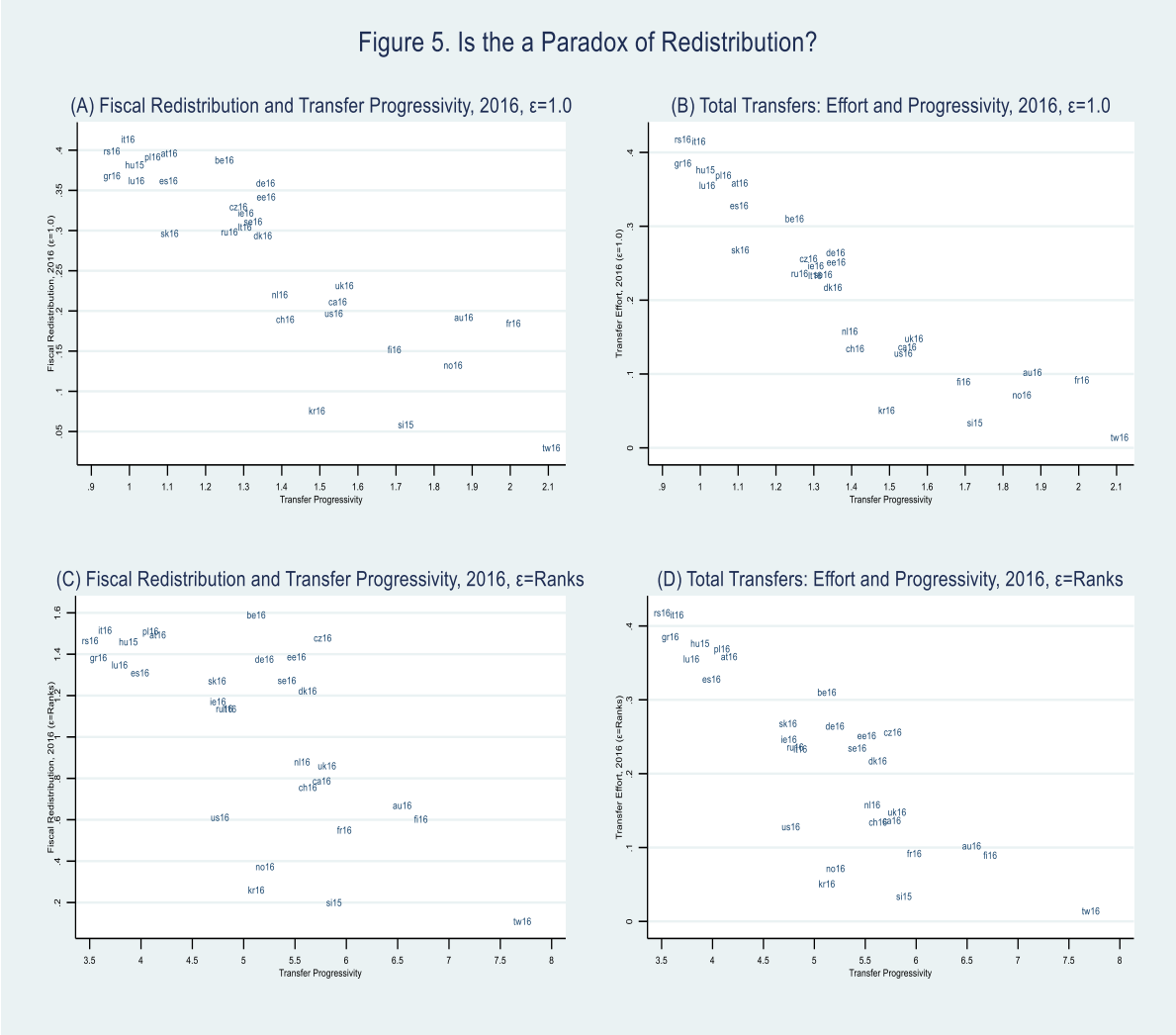
We test this claim using regression analysis where FR from transfers is the dependent variable and transfer progressivity is the sole independent variable. For the paradox to systematically hold, the coefficient on progressivity should be negative and statistically significant. Table 2 presents results for different welfare weights: ε=1, ε=2, rank weights, and poverty weights. Since the latter two weights do not vary with the intensity of income differences between deciles (i.e., are distribution independent) they act as a control to ensure that differences in market income inequality (and thus in the social returns to targeting) alone are not driving our results. For example, if budget effort is significantly negatively correlated with targeting performance, then the share of *total* income being transferred to lower income groups could also decrease along with better targeting performance. However, if targeting returns are high due to high (or higher) income inequality, then FR under ε=1 and ε=2 could in principle still actually increase.

For a *PoR* to exist, the first condition that must be met is that progressivity must be strongly negatively correlated with budget effort. We can start by looking at the relevant variables behind the results for 2016 described above in Figure 1. Figure 5 shows that for ε=1 and rank weights the first condition seems to hold with a very strong negative relationship between progressivity and budget effort (Panels B and D). For ε=1 weights this relationship seems to be strong enough to result in lower overall FR. For rank weights, the negative impact on FR seems also to hold but is somewhat statically weaker.

The results of the corresponding regression analysis are presented in Table 2 for this 2016 database and for the more balanced panel database for years 2016, 2010, 2004, 1995, 1990, and 1980, both separately, pooled, and controlling for country-level fixed effects to zone in on the within-country relationship over time.[23] Note that in all cases the underlying statistical relationship between effort and progressivity (not shown) is negative and almost always statistically significant at the 1 percent level. The first panel of Table 2 presents the results for total transfers. For all years and ε=1 and rank weights, the coefficient on progressivity is

[23] To create a more balanced panel we focus on a smaller set of countries compared to the set of countries used in Figure 2 above. We drop Estonia, Lithuania, Serbia, and South Korea because of the absence of sufficient data for a balanced panel. For each "central" year (2016, 2010, 2004, 1995, 1990, and 1980) we take the data for each country for that year if available, if not we take the database available one year before or after and then two years before or after. This results in a more balanced, but not completely balanced database.

strongly negative and very significant. However, the coefficients for ε=2 and poverty weights are mostly positive and, especially for the latter, statistically insignificant. So, for total transfers, the strong support for a *PoR* when ε=1 weights and ranks weights does not seem to carry over to ε=2 and poverty weights which put relatively more weight on FR to the poorest two deciles. We return to this finding below.



Source: Author calculations based on LIS household surveys.

The bottom two panels of Table 2 help us determine if this relationship holds for both the insurance and assistance components of FR. Since the coefficients for insurance transfers are nearly always negative and, with the exception of poverty weights, highly statistically significant, the results point to the relationship for total transfers being driven exclusively by insurance transfers, which are dominated by public pensions. Although the coefficient is

insignificant for both 1990 and especially 1980, it is notable that there is a large decrease in the number of sample countries for these years. The coefficients in the pooled sample are always negative and strongly statistically significant for all weights, again with the exception of poverty weights. Since the coefficient in the fixed effects regressions, which focus more on within-country variation over time, are positive and often insignificant, this points to the pooled regressions being driven by the cross-country relationship between progressivity and FR. These results are also very robust to controlling for demographic composition calculated as the share of children and the elderly in the population.

Insurance transfers are dominated by pension benefits. It is common to categorize pension systems into those that emphasize consumption smoothing over the life cycle and are strongly linked to past earnings (and thus contributions), and those that emphasize poverty alleviation among the elderly and have a much weaker link to earnings. More progressive pension transfers will therefore have relatively flatter transfers across income groups. According to Korpi and Palme (1998, p661), "the more concerned we are with creating equality via equal public transfers to all" by weakening the link between pension benefits and earnings "the less likely we are to reduce poverty and inequality". Our results therefore suggest that countries that design their pension systems with a high weight given to redistribution to lower-income groups (i.e., flatter, more progressive, transfers) as opposed to consumption smoothing over the life cycle also end up transferring less resources to these lower-income groups. This could be rationalized by the reduced insurance role of such pension systems for higher-income groups resulting in lower political support from middle- and upper-income groups. Therefore, pension systems that are strongly linked to past earnings tend to also benefit lower-income pensioners more. Note also that the absence of evidence for a *PoR* in the context of poverty weights (i.e., the share of total income transferred to the bottom 20 percent of the population does not vary significantly across income groups) is consistent with the design of pension systems placing more emphasis on redistribution towards the middle and bottom rather than solely towards the bottom.

Table 2. Is there a *Paradox of Redistribution* ?

		Coefficient on Progressivity				
Total Transfers		ε=1	ε=2	Ranks	Poverty	Obs.
	2016	-0.284***	0.025**	-0.293***	0.045	25
	2010	-0.279***	0.016	-0.299***	0.034	25
	2004	-0.295***	0.035***	-0.281***	0.033	24
	1995	-0.234***	-0.004	-0.163	0.098*	24
	1990	-0.204***	0.066***	-0.246*	0.011	16
	1980	-0.171***	0.001	-0.181*	-0.003	10
	Pooled	-0.245***	0.031***	-0.252***	0.036**	124
	Fixed Effects	-0.151***	0.060***	-0.099*	-0.065***	124
		Coefficient on Progressivity				
Insurance Transfers		ε=1	ε=2	Ranks	Poverty	Obs.
	2016	-0.437***	-0.071**	-0.244**	0.005	25
	2010	-0.418***	-0.084***	-0.397***	-0.037	25
	2004	-0.302***	-0.091***	-0.357***	-0.026	24
	1995	-0.304***	-0.091***	-0.284***	-0.025	24
	1990	0.038	0.011	0.057	0.063	16
	1980	-0.013	-0.017	-0.018	-0.004	10
	Pooled	-0.180***	-0.063***	-0.145***	-0.015	124
	Fixed Effects	0.001	0.009	0.021	0.042***	124
		Coefficient on Progressivity				
Assistance Transfers		ε=1	ε=2	Ranks	Poverty	Obs.
	2016	-0.057*	0.028***	-0.078	0.016	25
	2010	-0.012	0.033***	-0.001	0.024	25
	2004	-0.012	0.017***	0.057	0.040**	24
	1995	-0.049	0.006	0.011	0.011	24
	1990	0.011	0.041***	0.057	0.025	16
	1980	-0.012	0.019	-0.233**	-0.040*	10
	Pooled	-0.018	0.021***	-0.001	0.019***	124
	Fixed Effects	-0.030***	0.020***	-0.111***	-0.012	124

Note: FR is the dependent variable and progressivity the independent. The results are very robust to also controlling for demographics through the inclusion of the dependency ratio calculated as the share of children and the elderly in the population as an additional independent variable. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels respectively.
Source: Author calculations based on LIS household surveys.

Turning to assistance transfers, the coefficients are often *positive* and often statistically significant. It seems then that the paradox does not apply at the cross-country level for assistance transfers. While categorical transfers (such as universal child benefits or social pensions) can help to increase progressivity when these groups are found disproportionately among the poor, the progressivity they can achieve is typically quite limited. Increasing the progressivity of assistance transfers requires the use of some degree of means testing. Indeed,

the rationalization of the *PoR* in the context of social assistance spending typically appeals to the underlying political economy of means testing where middle-income groups are less likely to benefit from narrowly targeted transfer programs and therefore also less likely to support higher spending on these programs.

The relationship between spending levels and means testing differs in important ways across our sample countries (Figure 6a,b,c). Over recent decades, many countries with high initial assistance spending levels have increased the share of transfers that is means, often in the context of reforms aimed at containing the increase, or even decreasing, total assistance spending. Some Nordic countries substantially decreased their spending from relatively high levels after 1990, including through increasing the share of means-tested spending (e.g., Denmark and Finland). The share of means-tested spending also increased in some countries that did not substantially cut assistance spending (e.g., Belgium, Germany, Portugal, and the UK), possibly as a way of containing spending increases. On the other hand, other countries decreased their share of means-tested transfers while increasing spending, often as part of expansion of coverage of low-income households in the context of high levels of informality which makes means testing very difficult to implement[24] (e.g., Czech Republic, Lithuania, Italy, and Spain).

Note that very different trends can give rise to a similar relationship between targeting and budget effort. Reducing spending by increasing the use of means testing results in higher progressivity and lower effort, resulting in a negative relationship between progressivity and effort. Similarly, increasing spending while reducing the share of means tested spending decreases progressivity while increasing effort, also giving a negative relationship between progressivity and effort. Yet each likely reflects very different underlying political and economic dynamics. In addition, the underlying political dynamics are unlikely to be instantaneous and may also change over a longer time horizon.[25] Therefore, it is very unlikely

[24] See Coady, Jahan and Matsumoto (2012) and Tesliuc and others (2014) for more detailed discussions of these trends.
[25] Note that the dynamics of the political process underlying the relationship between budget effort and progressivity could also result in non-linearities (or "political cycles") with, for example, an initial period of increased means testing together with decreasing effort and poverty impact resulting in growing concern for rising poverty which in turn leads to a period of decreasing means testing (rising universalism), rising effort, and falling poverty. This seems to be consistent with the evolution of social transfer spending in the UK as discussed in Timmins (2023).

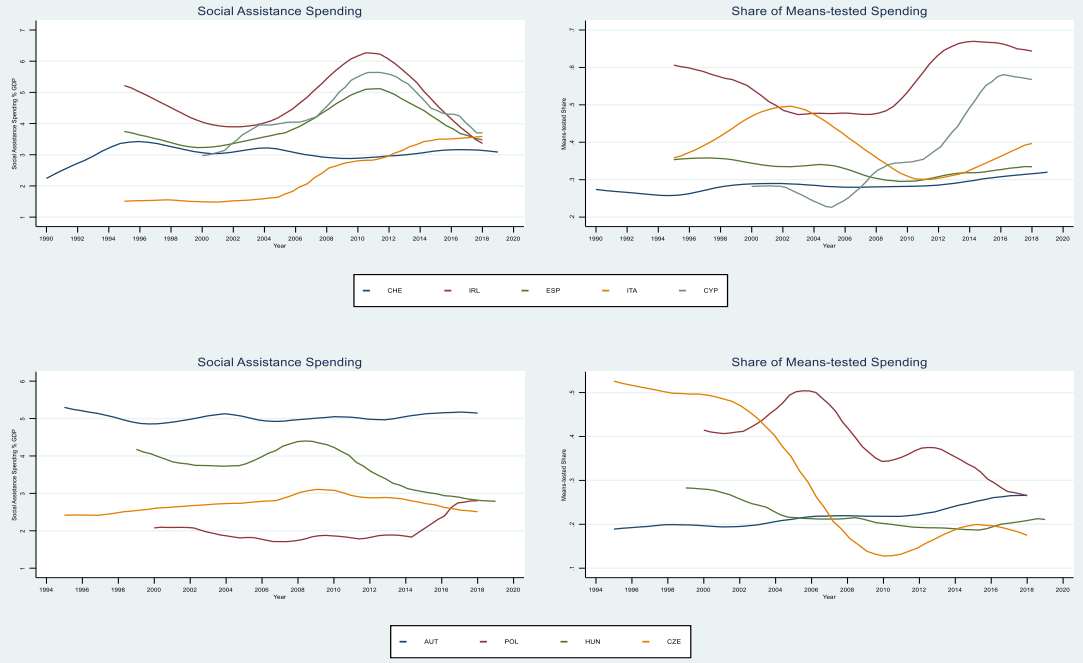
that static regression analysis is capable of adequately capturing and interpreting such complex dynamics. This suggest that, when searching for empirical support of a *PoR* in the context of social assistance transfers, a country case study approach is better suited to provide a richer, and indeed adequate, understanding of the political and economic dynamics behind changes in assistance spending and progressivity.[26] In other words, while a negative relationship between transfer progressivity and budget effort is a necessary conditions for establishing the existence of a *PoR*, it is not sufficient. However, the broad analysis in this paper can provide a useful starting point for identifying possible country candidates for further deeper country-level analysis.

Figure 6a. Level and Composition of Social Assistance Spending

[26] This is what Gugushvili and Laenen (2021, p113), who discuss and review in detail the possible institutional and political dynamics influencing redistributive outcomes, seem to have in mind when they argue that any analysis of the existence of *PoR* should "move beyond a simple test of the "end product" (i.e. are selective systems less redistributive than universal ones?) to a much more sophisticated examination of its underlying, in-between mechanisms." Garcia Fuente (2022) also emphasizes the importance of focusing on dynamics and finds that many HICs started with relatively low budget effort and relatively progressive transfers but subsequently increased coverage and effort resulting in less progressivity but higher fiscal redistribution. Consistent with the *PoR*, this generated a negative relationship between progressivity and redistribution: in the period where FR was lower, progressivity was higher!

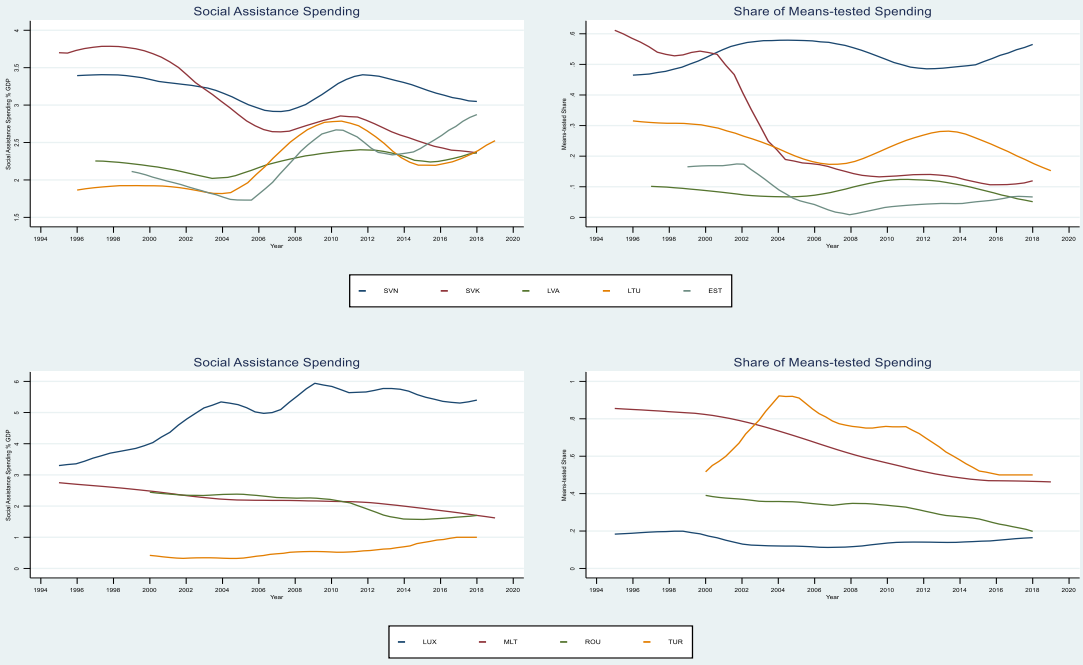
Source: Author calculations based on OECD SOCX Database.

Figure 6b. Level and Composition of Social Assistance Spending



Source: Author calculations based on OECD SOCX Database.

Figure 6c. Level and Composition of Social Assistance Spending

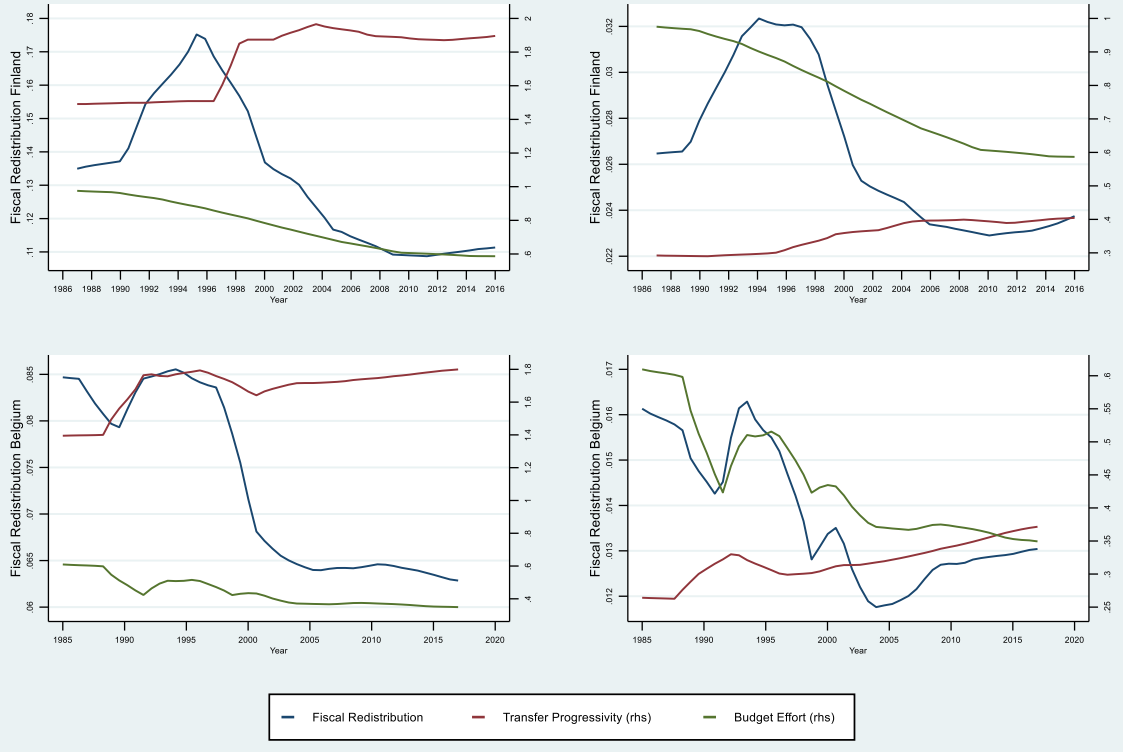


Source: Author calculations based on OECD SOCX Database.

To illustrate this, we identify possible "episodes" of *PoR* in two countries, Finland and Belgium, where periods of increasing progressivity are accompanied or followed by declining assistance spending that is sufficiently large to offset the positive impact of enhanced targeting on poverty alleviation resulting in declining FR and a lower overall poverty impact. We focus on two alternative measures corresponding to ε=1 and poverty welfare weights since these can help to focus the narrative on the what's happening to FR towards the very bottom of the income distribution (Figure 7). Note that while progressivity under both typically follows a similar path, they can differ when: (i) the increase in the share of transfers to the bottom decile evolves very differently from the share to the second poorest decile, and (ii) the social returns to targeting to the poorest decile relative to the second poorest increases because the ratio of their incomes changes significantly over time.

Figure 7. Evolution of Fiscal Redistribution from Assistance Transfers

Finland and Belgium (ε=1 and ε=Poverty)



Source: Author calculations based on LIS household surveys.

Assistance spending in *Finland* reached a peak of around 10 percent of total income at the end of the 1980s, among the highest in HICs, before falling sharply over subsequent decades. Despite this decline, FR initially increased reflecting increasing progressivity consistent with the disproportionate decline in non-means-tested spending.[27] However, although progressivity continued to increase, FR started to decrease after 1995 as assistance spending continued to decline. By 2010, FR had decreased to 11 percent from a peak of 17.5 percent in 1995. Between 1985 and 2015, assistance spending in *Belgium* decreased from 6 to 3.5 percent of total income. Following a sharp decline, FR recovered to its initial level of 8.5 percent as progressivity increased. However, although progressivity continued to increase, continued cuts in spending resulted in FR falling to below 6.5 percent in 2005.[28] However, while both country examples are suggestive of a possible *PoR*, a more detailed analysis of political and economic developments would be needed to confirm this conclusion.

VII. SUMMARY

This paper evaluates the extent and nature of FR in 28 HICs over recent decades using LIS harmonized household survey data. The analysis is embedded in the standard social welfare framework, which allows for a transparent and integrated analysis of FR and its determinants. In particular, the framework makes explicit the value judgements that underlie such evaluations and thus easily facilitates analysis of the sensitivity of findings to alternative value judgements.

Our analysis focuses primarily on FR through social transfers, including social insurance (primarily public pension) transfers and social assistance transfers. For 2016, the most recent year with a critical mass of household surveys, we find that differences in FR across countries are driven by difference in budget effort rather than in transfer progressivity in so far as countries with high FR tend to be those with relatively high effort and low progressivity. High FR tends also to be driven by social insurance spending, which is

[27] According to Eurostat data, assistance spending reached a peak of 9.5 percent of GDP in 1995 to just under 6 percent in 2008 before recovering to reach around 7 percent in 2015. The share of means-tested spending increased from 17 percent in 1990 to 22 percent in 2000. After a small decline, it continued to increase reaching 28 percent in 2018.

[28] According to Eurostat, assistance spending increased from just above 6 percent of GDP in the mid-1990 to just below 7 percent in 2010, before declining to 5 percent in 2018. The share of means-tested spending increased from a relatively low level of 5 percent in 1995 to 15 percent by 2018.

substantially higher than social assistance spending, although also much less progressive. Countries with low social insurance spending are typically those with high insurance spending progressivity reflecting an emphasis on poverty alleviation rather than consumption smoothing.

Our analysis of trends in FR over time finds that it has increased since 1980, with most of this increase happening before 1995. After 1995, the trend is on average also positive although never statistically significant consistent with very different trends across countries. So, we do not find any support for the findings in some earlier studies that the increase in disposable income inequality since 1995 is due to a decline in FR, i.e., to "welfare state retrenchment". This finding is robust to controlling for country demographics suggesting that increasing FR is driven at least partly by fiscal policies.

Our results are also consistent with the existence of a *PoR* whereby countries that narrowly target transfers at lower-income groups to achieve a larger redistributive impact end up with less FR as public support for redistribution falls resulting in lower budget effort. This cross-section result is driven by social insurance spending, which is dominated by public pension transfers. While the underlying assumption that cross-section variation reflects different steady-state equilibria across countries seems more valid for insurance spending given the mature nature of their public pension systems and the fact that such spending tends to be slow moving, this is less likely the case for social assistance transfers. Indeed, for the most part, we find that higher assistance progressivity is positively associated with higher FR. However, since the relationship between assistance effort and progressivity is likely to be dynamic, with a lagged adjustment over time, static regression analysis is unlikely to adequately capture this relationship. We therefore argue that more detailed and richer country case studies are a more appropriate approach to testing for such a relationship to adequately capture the contributing roles of political and economic dynamics underlying such a relationship. However, the broad-brush analysis of FR and its determinants presented in this paper can still provide a useful starting point for identifying possible episodes of a *PoR* in some countries for further study. To illustrate, we identify two countries (Finland and Belgium) where there appears to be a strong dynamic negative relationship between social

assistance progressivity and FR with increasing progressivity eventually being associated with declining effort sufficient to result in an overall decrease in FR.

Annex I. Fiscal Redistribution Under Proportional and Actual Tax Financing

The analysis in the paper focuses on fiscal redistribution (FR) from social transfers. A key finding is that countries with high FR tend to have high budget effort but low progressivity. This, in turn, is an important factor in our finding that high progressivity is associated with low FR, consistent the *Paradox of Redistribution* (*PoR*). Our focus on FR from social transfers is partly motivated by the desire to test for the possible existence of a *PoR*. However, some previous studies that also test for a *PoR* incorporate the need for tax financing and, unlike our paper, do not find any supporting evidence (Caminada and others, 2017; Coady and others, 2021, 2022). We show here that this is likely due to the incorporation of financing into the analysis and the focus on "net FR".

Source: Author calculations based on LIS household surveys.

Figure A1 below compares our results with and without proportional income tax financing. This comparison clearly demonstrates the very different ranking under both sets of results. For example, many countries that rank highest in terms of FR from transfers actually rank

among the lowest in terms of net FR (Serbia, Italy, Greece, Hungary, Luxembourg, Poland, Austria, Spain). As indicated above, these countries had high budget effort but low progressivity so that allowing the financing side, which typically has much less progressivity than the transfer side, substantially reduces their FR. Indeed, allowing for proportional financing results in three of these countries (Serbia, Italy, and Greece) having negative FR.

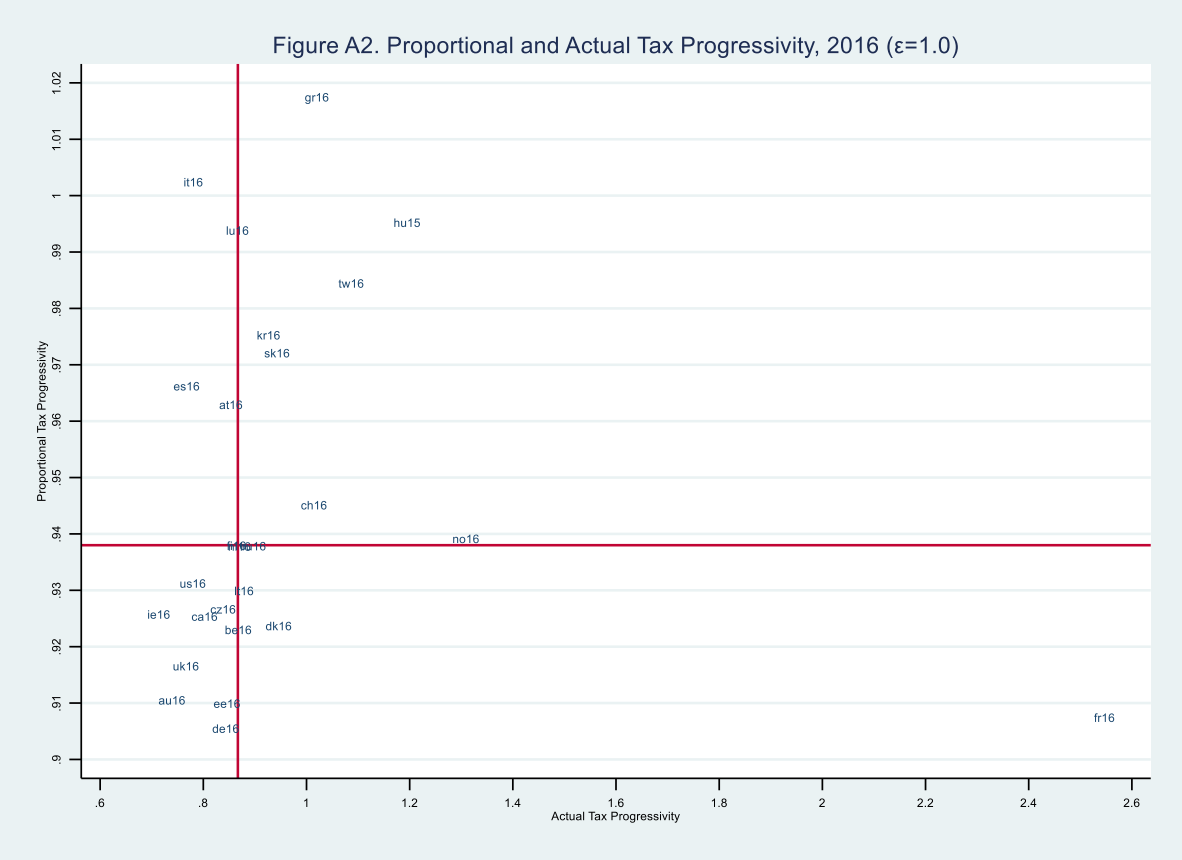
This reversal of relative FRs also results in the disappearance of results consistent with a *PoR* (Table A1). Not only does the negative relationship disappear but all the coefficients on net transfer progressivity are now positive and all statistically significant at the 1 percent level. For this strong result to be overturned would require not only that tax financing be substantially more progressive that the proportional financing assumed here, but also that it be substantially more progressive than in countries with high transfer progressivity. Indeed, using EUROMOD decile-level household data on both transfers and taxes (scaling taxes so that they sum to total transfers), Coady and others (2022) test for such a *Paradox of Net Redistribution* and find results very close to those reported here (Table A1). It is therefore important when testing for the possible existence of a *PoR* to be clear about whether one believes the hypothesis applies when, for example, individuals vote on transfer spending levels given transfer progressivity or for an overall net tax and transfer scheme. In other words, do voters vote separately and independently on transfers and their financing?

Table A1. Is there a *Paradox of Net Redistribution* ?

	Coefficient on Progressivity				
Total Transfers	ε=1.0	ε=2.0	Ranks	Poverty	Obs.
2016	0.075***	0.069***	0.102***	0.103***	25
2010	0.078***	0.074***	0.098***	0.107***	25
2004	0.062***	0.065***	0.091***	0.097***	24
1995	0.099***	0.071***	0.140***	0.148***	24
1990	0.071***	0.099***	0.081**	0.082***	16
1980	0.069***	0.058***	0.089**	0.077***	10
Pooled	0.077***	0.074***	0.103***	0.103***	124
Fixed Effects	0.091***	0.076***	0.168***	0.109***	124

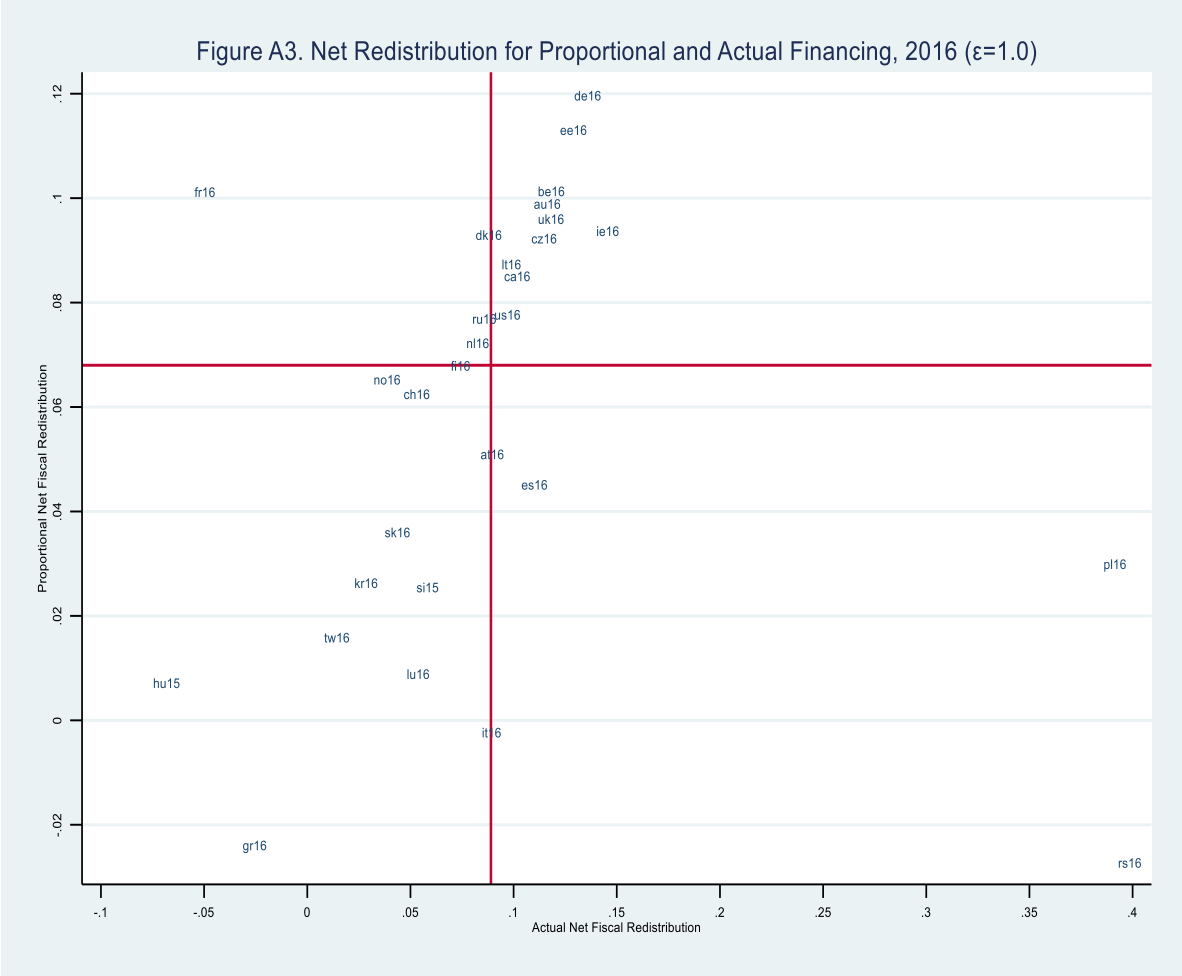
Source: Author calculations based on LIS household surveys.

Table A2 compares actual tax progressivity using harmonized LIS data to our simulated proportional tax progressivity, excluding three countries (Poland, Serbia, and Slovenia) with zero actual tax progressivity (presumably reflecting the absence of the required tax information in the associated LIS databases). Note that a lower number is consistent with greater progressivity with, for example, a lower share of tax revenues coming from lower-income groups, so that we will refer to the negative when talking about progressivity. The median actual tax progressivity at -0.867 is substantially higher than the median proportional tax progressivity at -0.938, so that actual taxation is more progressive than proportional taxation for the vast majority of countries. The exceptions are France, Norway, Hungary, and Taiwan, where actual tax progressivity is lower than proportional tax progressivity. Indeed, over half of countries have actual tax progressivity above the maximum proportional tax progressivity, which is just above -0.9.



Source: Author calculations based on LIS household surveys.

Figure A3 compares net FR under proportional and actual taxation. Three countries have negative net FR under proportional tax financing (Greece, Italy, and Serbia) as well as under actual tax financing (France, Hungary, and Greece). Ignoring the few outliers (including Poland, Serbia, France, and Hungary), there is a clear strong positive correlation between net FR under both proportional and actual tax financing. For these countries, regressing actual progressivity on proportional progressivity yields a coefficient of 0.86, which is significant at the 1 percent level. Since the 95 percent confidence interval spans [0.59-1.14], one cannot reject the hypothesis that proportional taxation is a good approximation for actual taxation for this set of countries (i.e., with a coefficient of 1.0).



Source: Author calculations based on LIS household surveys.

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Figure A1. Google Ngram Search for Usage of Term "Paradox of Redistribution"

Source: Search by author.

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