Sources of Inequality and the Size of Government*

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Abstract

The median voter theory of government size predicts that greater inequality leads to greater demand for redistribution and larger government (Meltzer and Richard, 1981). However, this prediction is often rejected empirically. We distinguish between capital income inequality, and inequality based on differences in labor productivity. Whilst the standard argument applies to productivity-induced income inequality, greater capital income inequality leads to smaller government if, as often observed, capital income is difficult to tax. Using data for OECD countries, government size is found to be negatively related to capital income inequality, and positively related to labor income inequality, as originally conjectured. Transfer spending in particular is strongly related to labor income inequality.

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1 Introduction

Neoclassical models of democracy, as articulated by Meltzer and Richard (1981),[1] offer a sanguine prediction: greater before-tax income inequality implies divergence between mean and median income and so, under universal suffrage, raises redistribution. Democracy, in principle, thus provides a corrective to increased inequality, and we should expect increased ex-ante inequality to cause increases in redistribution. However, evidence supporting the Meltzer and Richard (1981) hypothesis is generally weak. For example, the United States and other Anglo-Saxon countries have greater income inequality but lower public sector spending as a share of total GDP, while Scandinavian countries have relatively equal income distributions and a larger government spending share. Perotti (1996), Benabou (1996), Bassett et al. (1999) and Persson and Tabellini (2003) all find an insignificant or even negative link between the size of government and the overall degree of inequality.[2]

In response to this puzzle, new theoretical work has proposed mechanisms through which greater inequality can coexist with smaller government under democracy. For instance, Benabou (2000) identifies a functional role for the government to provide insurance (which implies redistribution) under capital market imperfections. The capacity for society to reach consensus on this role increases as the income distribution becomes more equal and risks become aligned, and so government grows with equality. However, this type of mechanism also implies that government size should be positively correlated with economic growth and the evidence relating to the so-called 'Armey curve' surveyed by Bergh and Henrekson (2011) if anything points to a negative relationship, at least for high income countries.[3]

[1] Romer (1975) and Roberts (1977) are important antecedents.

[2] More recent empirical literature (Mello and Tiongson, 2006; Shelton, 2007; and Muinelo-Gallo and Roca-Sagales, 2013) is also unsupportive.

[3] Other mechanisms are proposed by Persson (1995) and Rodriguez (2004). In the former, utility depends on relative consumption, which leads to an increasing problem of excessive labor supply in more equal

The approach taken in this paper instead revisits Meltzer and Richard (1981) more closely. In the original mechanism, labor is the only source of income and the rich earn more by dint of higher productivity. However, labor is not the only source of income for the rich. Moreover, the labor share of income has declined in recent years (see Azmat et al., 2012; Karabarbounis and Neiman, 2013). Indeed, Piketty (2014) links rising inequality to the declining labor share: if the return to capital exceeds the rate of economic growth, then the capital share grows, and if ownership is concentrated within a small number of dynasties, then inequality inexorably increases. Furthermore, capital income itself has become more unequal as well as more important. Kaymak and Poschke (2016) document considerable increases in the concentration of wealth in the US over the past 50 years.

Hence, we instead ask how inequality stemming from capital income affects government size. Individuals differ in their capital endowment, with a right skewed capital income distribution. If capital-income is not taxed then the capital-rich are relatively less exposed to taxation. In direct contrast to Meltzer and Richard (1981), our key proposition is that increased inequality in capital income leads to smaller government. The reason behind this result is that, when income differences are driven by capital income, the capacity of the median voter to redistribute through the tax system is reduced because the capital-rich supply less (taxable) labor and, *de facto*, face a very low tax burden on their capital income earnings. If capital income inequality increases, the capital-rich supply less labor, and thus the preferred labor income tax rate falls with inequality because the (capital-poor) median voter cannot effectuate redistribution.

societies. Taxes work to eliminate the negative externalities associated with individual labor supply. As in Benabou (2000), greater equality increases the capacity for agreement to tax, which again solves a market failure. Rodriguez (2004) instead models the political power of the rich as increasing with inequality, thereby reducing their obligation to pay tax. The democratic constraint is therefore undermined. An interesting recent alternative is Villamil et al. (2019), in which taxation adversely impacts entrepreneurship within an occupational choice model and, thereby, labor demand. Workers may, therefore, prefer lower taxes.

If as we argue in this paper, (i) capital income inequality and labor income inequality have opposite signed effects on the median voter's demand for redistribution, and (ii) capital and labor income inequality are intertwined, as demonstrated for the United States by Piketty et al (2018) and documented by us in this paper, then using a single measure for total income inequality conflating together income inequality originating from capital income and labor income leads to imprecise estimates of the effects of inequality on government size. The empirical analysis therefore employs separate measures of productivity-induced labor income inequality as distinct from capital income inequality. As we discuss below the two measures are empirically as well as conceptually distinct from one another.

Our work is related to Krusell and Rios-Rull (1999), who study a version of Meltzer and Richard's model that includes inequality not only in labor market productivity but also in wealth and, consequently, capital income. Thus, labor supply and earnings are determined simultaneously by wealth as well as productivity differences. However, we differ from Krusell and Rios-Rull (1999), as we assume capital income cannot be taxed, or at least is harder to tax, for the reasons explained below. The upshot is that if, as documented below, the majority of individuals are endowed with limited (or zero) assets, then increased inequality stemming from changes in the distribution of capital income is unlikely to induce an increase in demand for redistribution that has to be financed by taxes on labor income.

The assumption that capital income is difficult to tax echoes with the view expressed in Landier and Plantin (2017), that rich households avoid taxation with means that are not economically viable for the majority of the population, through sophisticated tax plans and international tax arbitrage. As these authors emphasize, tax avoidance by the rich typically uses capital income as a vehicle, for example, relabeling labor income as capital income and borrowing against capital gains instead of realizing the capital gains. Of course, tax evasion as well as tax avoidance exhibits positive income elasticity, and is much more predominant

among capital income earners. Using a dataset of leaked customer lists from offshore financial institutions (leaked papers from the HSBC Private Bank Switzerland and the "Panama Papers"), matched to Scandinavian administrative wealth records, Alstadsæter et al (2019) compute the amount of taxes evaded on hidden wealth and the associated dividends, interest income and capital gains. They find that the 0.01% richest households evade about 25% of their taxes while by contrast, tax evasion detected in stratified random tax audits is less than 5 percent throughout the distribution.[4] At any rate, this is not a new phenomena. Gordon and Slemrod (1988), using US tax return data from 1983, estimated that the tax revenue loss from eliminating capital income taxation completely would be zero, hence that the tax burden on capital was effectively non-existent.

The relationship between the extent of redistribution and inequality is investigated empirically using a panel of eighteen OECD countries over the period 1960-2013, including new measures of both capital and labor income inequality as additional explanatory variables. We make use of household income data from the Luxembourg Income Survey (LIS). This data has two major advantages for the purpose of this paper. Firstly it explicitly separates out labor and capital income at the household level, thus enabling separate inequality measures for the two types of income. Secondly the LIS encompasses several thousand households within countries, and thus enables separate computation of mean and median income levels, which is the theoretically relevant measure of income inequality in the Meltzer and Richard (1981) model,

[4]The recent "Panama Papers" scandal uncovered how, by benefiting from secretive financial regimens, companies and wealthy individuals can use tax havens to store money and move it across borders, thus avoiding corporate taxes, interest or dividend taxes, capital gains tax, and other forms of capital income taxation (see Trautman, 2016, for a detailed account of the "Panama Papers" leak). The release of the "Panama Papers" led to the following observation by President Barack Obama (April 5, 2016): "Here, in the United States, there are loopholes that only wealthy individuals and powerful corporations have access to. They have access to offshore accounts, and they are gaming the system. Middle-class families are not in the same position to do this. *In fact, a lot of these loopholes come at the expense of middle-class families, because that lost revenue has to come from somewhere.*" (emphasis added)

and indeed any model of redistribution wherein the median voter is pivotal. Consistent with our theory, the size of government is found to be negatively associated with capital income inequality. A one standard deviation increase in capital income inequality is associated with a reduction in the size of government of around 1.9% of GDP. We also find a positive relationship between government size and labor-income inequality, consistent with the original Meltzer and Richard (1981) hypothesis, and in contrast to the voluminous empirical work testing it using broader measures of inequality.

The remainder of the paper is organized as follows. Section 2 theoretically analyzes how the size of government changes with capital income inequality. Section 3 contains the empirical work, and section 4 concludes.

2 The Model

As in Meltzer and Richard (1981), individuals, indexed by i, have preferences defined over consumption c_i and leisure l_i, represented by a strictly concave, continuous and twice-differentiable utility function, $u_i(c_i, l_i)$. Consumption and leisure are both normal goods. Following the original, we first analyze the equilibrium behavior conditional on a given tax policy and then address the tax policy choice itself.

2.1 Economic Environment

Income may be derived from both labor and capital. All individuals possess a unit of time to allocate to labor n_i, or leisure $l_i = 1 - n_i$. Individual labor income $y_i = x_i n_i$ depends on productivity, x_i, as well as hours worked, and is taxed at a linear rate t. Capital income varies

exogenously across individuals and is denoted by R_i. Following Meltzer and Richard (1981), consumption is also financed by lump-sum redistribution, r, common to all individuals, hence:

$$c_i = (1-t)\, x_i n_i + R_i + r. \tag{1}$$

To clarify the argument, capital income is assumed to be untaxed. In practice it is often more difficult to raise taxes on capital than on labor. Capital is often highly mobile internationally, whilst labor is not, and given this Diamond and Mirrlees (1971) show that small open economies should not tax capital income. One consequence of this high mobility is that international tax competition limits counties' capacity to tax capital income. Whilst in practice capital income taxation rates are positive, Gordon et al. (2004) observe lower average rates than for labor income in most countries. Moreover, the academic literature documents considerable difficulties with the collection of capital income taxation, primarily due to different types of capital income being taxed differentially (thereby, enabling arbitrage opportunities), and the fact that interest payments are tax-deductible. Indeed Gordon and Slemrod (1988), using US tax return data from 1983, estimated that the tax revenue loss from eliminating capital income taxation completely would be zero, hence that the tax burden on capital was effectively non-existent. It is an open question quite why the median voter would tolerate such a state of affairs, but conceivably the perceived deadweight and/or capital flight losses from increasing capital income taxation to some extent nullifies it as an instrument. Thus we focus on the choice of the labor income tax.[5]

Each individual chooses labor supply so as to maximize:

$$u_i\left(c_i, l_i\right) = u_i\left(\left(1-t\right) x_i n_i + R_i + r, 1 - n_i\right). \tag{2}$$

[5]The results would all still stand if we instead modeled capital income taxation as fixed (and unresponsive to inequality), as observed from OECD data.

The first-order condition is:

$$(1-t)\,xu_c - u_l = 0, \tag{3}$$

which determines the labor supply, $n\left((1-t)\,x, R, r\right)$, for those who wish to work.[6] Since leisure is a normal good, we have that:

$$\frac{\partial n}{\partial R} = -\frac{(1-t)\,xu_{cc} - u_{cl}}{D} < 0, \tag{4}$$

with $D = [(1-t)\,x]^2 u_{cc} - 2\,(1-t)\,xu_{cl} + u_{ll} < 0$, given the assumption that u is strictly concave. Similarly, since consumption is a normal good we have that:

$$\frac{\partial c}{\partial R} = 1 + \frac{\partial n}{\partial R}\,(1-t)\,x = -\frac{u_{cl}x\,(1-t) - u_{ll}}{D} > 0, \tag{5}$$

a condition which imposes additional restrictions on u_{cl}. Hence, all else equal, people who are relatively capital-rich supply less labor and enjoy higher consumption.

There are two sources of heterogeneity that determine differences in before-tax labor income. Firstly productivity, as analyzed by Meltzer and Richard (1981), and secondly capital income endowments. At the individual level increases in productivity will all else equal increase labor income.[7] On the other hand increases in capital income will all else equal reduce the labor supply and, therefore, labor income. This underpins their proclivity towards taxation of labor income.

[6]For simplicity (but without loss of generality) we henceforth assume that the joint distribution of x and R is such that $n_i > 0$ for all i, so that everyone supplies a strictly positive amount of market work.

[7]Notice that, as in Meltzer and Richard (1981), the sign of

$$\frac{\partial n}{\partial x} = -\frac{(1-t)\,u_c + (1-t)^2\,xnu_{cc} - (1-t)\,nu_{cl}}{D} \tag{6}$$

is indeterminate. Hence, the labor supply could be backward bending as productivity increases. Still, pre-tax labor income may never decline following an increase in productivity. To see this notice that, for any individual

Average labor income can thus be written by integrating:

$$\bar{y} = \int_0^\infty \int_0^\infty xn\left(R, r, (1-t)\,x\right) f\left(x, R\right) \mathrm{d}x\mathrm{d}R. \tag{8}$$

where $f\left(x, R\right)$ is the joint density function of x and R. Individual productivity and capital endowments conceivably are correlated with each other to some extent: if, for example, high productivity individuals simultaneously enjoy high capital income. Finally, the government's balanced budget requirement (in per capita terms) is given by:

$$t\bar{y} = r. \tag{9}$$

Note that analogous to (4), we have:

$$\frac{\partial n}{\partial r} = -\frac{(1-t)\,xu_{cc} - u_{cl}}{D} < 0. \tag{10}$$

Hence for given productivity and capital income endowment, individual labor supply falls with increased redistribution. Therefore:

$$\frac{\partial \bar{y}}{\partial r} = \int_0^\infty \int_0^\infty x\frac{\partial n}{\partial r} f\left(x, R\right) \mathrm{d}x\mathrm{d}R < 0. \tag{11}$$

This establishes that the left-hand side of (9) is strictly decreasing with r. Moreover, $t\bar{y}$ is non-negative and bounded above by $t\bar{x}$, where $\bar{x}$ is average productivity. In turn, the

earning positive labor income, we have

$$\begin{aligned} \frac{\partial y}{\partial x} &= n + x\frac{\partial n}{\partial x} \\ &= -\frac{(1-t)\,xu_c + n\left(u_{cl}\left(1-t\right)x - u_{ll}\right)}{D} > 0, \end{aligned} \tag{7}$$

which must be positive given condition (5).

right-hand side of (9) is strictly increasing with r. Thus, there is a unique value of r to satisfy (9) for any t.

2.2 The Median Voter's Choice of Tax Policy

We now turn to the policy-setting decision. Crucially, the median voter is still a Condorcet winner even though the electorate is heterogeneous on two dimensions. The logic of this is that the preferred tax rate remains a monotonic function of the labor income alone, regardless of the underlying determinants of that labor income. Hence high labor income (whether induced by either high productivity or low capital income) will engender aversion to taxes, whilst low labor income (whether induced by low productivity or a generous capital income inheritance) will engender support for tax-financed redistribution. Formally, the median labor income-earner, m, is the median voter. She sets taxes to maximize utility subject to the budget constraint (2), the government budget constraint (9), and a rational anticipation of how taxation will affect the incentives to supply labor in the economy. The first-order condition for the median voter with respect to the tax rate is:

$$\bar{y} - y^m + t\left(\frac{d\bar{y}}{dt}\right) = 0, \tag{12}$$

where y^m is the labor income of the median voter. Condition (12) yields the following solution for the tax rate chosen by the median voter

$$t = \frac{m - 1 + \eta_r}{m - 1 + \eta_r + m\eta_\tau}, \tag{13}$$

with $\eta_r < 0$ and $\eta_\tau > 0$ the partial elasticities of average income (assumed constant, as in Meltzer and Richard, 1981), and $m = \bar{y}/y^m$. Under a right-skewed labor income distribution

$y^m < \bar{y}$, and $t > 0$.[8]

The key insight of Meltzer and Richard (1981) is that an increase in labor income inequality raises taxation, since an increase in income inequality raises m and from (13) we have that

$$\frac{dt}{dm} > 0. \tag{14}$$

Finally, although we impose almost no restrictions on the joint distribution $f(x, R)$, we wish to guarantee that: i) the chosen tax rate is positive; and that ii) the individuals that are in the top of the capital income distribution are never the decisive voter. Thus, in the sequel we make the following two assumptions:

Assumption 1 *The joint distribution $f(x, R)$ is such that the labor income distribution is right-skewed. Thus, $y^m < \bar{y}$ and the chosen tax rate is positive.*

From (12) we see that Assumption 1 guarantees that the chosen tax rate is positive.

Assumption 2 *The joint distribution $f(x, R)$ is such that the set of individuals $i \in \mathcal{K}$ with capital income R_i above the 50% percentile of the capital income distribution has productivity x_i which is sufficiently high so that $y_i = x_i n_i > y^m$ for all $i \in \mathcal{K}$.*

Figure 1 illustrates the condition imposed by Assumption 2. The locus denoted $y = y^m$ represents productivity and capital income pairs, (x, R), for which labor income y is equal to the median voter's labor income, y^m. To the right of this locus, $y > y^m$, since $\frac{\partial y}{\partial x} > 0$ and $\frac{\partial y}{\partial R} < 0$. The dashed line denoted $\mathcal{Q}_{50\%}$ represents the median of the capital income distribution. (In the data this coincides with the x-axis, i.e. with $R^m = 0$, in many instances.) Assumption 2 is a condition requiring that the set $\mathcal{K}$ of all individuals with capital income

[8] Details are available in the Appendix A.

above $\mathcal{Q}_{50\%}$ is located to the right of the locus $y = y^m$, as shown in Figure 1.[9]

2.3 Capital Income Inequality and Redistribution

We are interested in the consequences of higher capital income inequality. To study this issue we consider an increase in the capital income earned by the individuals in the set $\mathcal{K}$ of all individuals with capital income above $\mathcal{Q}_{50\%}$ (the median quantile). This is represented in Figure 2: the individuals in the set $\mathcal{K}$ that correspond to the original individuals in the top 50% of the capital income distribution receive an exogenous increase in capital income; thus, the set $\mathcal{K}$ shifts upwards in the space (x, R), but still satisfying the restriction imposed by Assumption 2, that guarantees that none of the members of the set $\mathcal{K}$ are the median voter (the new set is represented by the triangle above, in Figure 2).

Notice that this experiment constitutes an increase in conventional measures of capital income inequality, since we maintain the capital income of all individuals below the 50% percentile (and, thus, the median capital income) unchanged. Therefore, the mean capital income is increased relative to the median capital income.[10] As with Meltzer and Richard (1981) demand for redistribution stems from changes in the labor income distribution. However, as an upshot of the increase in capital income inequality, the labor income distribution is also affected, because labor supply depends both on the distribution of capital income as well as the productivity distribution.

[9] Assumption 2, requiring the capital income rich (defined as the individuals earning capital income above the median) to also earn labor income above the median has empirical support. For instance, Saez and Zucman (2016) document that in 2012 the top 0.1% of wealth holders also earned 3.1 % of all labor income (31 times the average labor income).

[10] It is not, however, a mean preserving spread in capital income. But lowering the capital income of the bottom 50% capital income earners (thus lowering the median capital income) in order to preserve the mean capital income would only reinforce our results.

To see the consequences of higher capital income inequality, notice that all the individuals in the set $\mathcal{K}$ will choose to work less, because they enjoy an increase in their capital income and leisure is a normal good. This will tend to lower the average labor income $\bar{y}$, since we have that

$$\bar{y} = p(\mathcal{K})\,\bar{y}(\mathcal{K}) + (1 - p(\mathcal{K}))\,\bar{y}(\sim \mathcal{K}), \tag{15}$$

where $\bar{y}(\mathcal{K})$ denotes the average labor income of the individuals in the set $\mathcal{K}$, $\bar{y}(\sim \mathcal{K})$ denotes the average labor income of the individuals not in the set $\mathcal{K}$, and $p(\mathcal{K})$ is the probability measure of the set of individuals $\mathcal{K}$. Notice that Assumption 2 guarantees that $\bar{y}(\mathcal{K}) > y^m$.

On the other hand, the reduction in $\bar{y}$ implies that the individuals not in the set $\mathcal{K}$ will receive fewer transfers and, therefore, work more. From Assumption 2, the individual earning the median labor income is not in the set $\mathcal{K}$ and, thus, y^m will increase. The upshot is that $m = \bar{y}/y^m$ is decreased. Hence, the effect of the increase in capital income going to the top capital-income recipients is to reduce the gap between *taxable* mean and median labor income. Hence an increase in overall income inequality can coexist with a reduction in labor income inequality. Since $\frac{dt}{dm} > 0$, it follows that an increase in capital income inequality unambiguously lowers the tax rate chosen.

We establish the following Proposition:

Proposition 1 *Suppose the top capital-income recipients are sufficiently productive that they also earn labor income above the median labor income (Assumption 2), and consider an increase in capital-income inequality represented by an increase in the capital income earned by the top capital-income recipients (the individuals earning capital income above the median capital income). Then the labor income tax rate t falls as capital income inequality rises.*

The proof of Proposition 1 is in Appendix B. In direct contrast to Meltzer and Richard (1981)

government size diminishes with increased capital income inequality. If inequality increases such that the share of capital income going to the top income recipients increases, then the preferred tax rate falls because the (capital) rich are supplying less taxable labor income and hence the capacity of the median voter to redistribute is reduced.

The key issue is the extent to which the median voter can effectively redistribute through the tax system. As discussed above there are good reasons to believe that taxation of relatively mobile capital is considerably more difficult than taxation of labor income. If the rich are rich primarily due to capital income, perhaps because of the rising capital share, and perhaps due to successful reclassification of their income streams, then the capacity of the median voter to redistribute is curtailed. Moreover if rising inequality translates into further reductions in the supply of taxable labor then it follows that the demand for redistribution will fall.

3 Evidence

The empirical analysis examines a panel of eighteen OECD countries over the period 1960-2013.[11] Following Pickering and Rockey (2011) and Facchini et al. (2017), the dependent variable is total government outlays as a percentage share of GDP ($OUTLAYS$), extracted from the OECD Economic Outlook database. Figure 3 depicts these data, showing that all countries experienced an upward trend in the earlier years followed by a period of stasis or even slight decline since around 1990. The effects of the 2008/9 Global Financial Crisis are also visible for several countries. Table 1 contains descriptive statistics for this and all other variables used in the analysis.

[11]Specifically the countries included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Spain, Sweden, the United Kingdom, and the United States. Current data availability for the separate labor and capital income inequality measures precludes using other countries.

As observed above, the empirical literature has generally been unsupportive of the original Meltzer and Richard (1981) hypothesis. If the mechanism put forward in the present paper is important, and capital-income inequality and productivity-based inequality are correlated with each other, then previous work suffers from an omitted variable bias. Increases in overall inequality measures will conflate the two mechanisms and the end result is imprecisely estimated. Certainly, increases in labor and capital income inequality are intertwined. For example, the evidence provided by Piketty et al. (2018) regarding the evolution of the income distribution in the United States indicates that the upsurge of top incomes starting in the late twentieth century was first a labor income phenomenon, but has mostly been a capital income phenomenon in recent years.

What is needed are separate measures for both types of inequality. To measure pre-tax labor income inequality we use gross household labor income data, from wages and self-employment, taken from the Luxembourg Income Survey (LIS). Following Meltzer and Richard (1981) labor income inequality is measured as the mean divided by the median. These data ($LABINEQ$) are depicted in Figure 4.[12] The average mean-to-median labor income ratio is around 1.20, though there is a discernible upward trend in the data, consistent with the increases in overall inequality documented by Piketty (2014) and others.[13] The average ratio in 1975 in the sample was 1.1, rising to 1.32 in 2010. There are interesting differences across the countries, for instance stronger recent increases in the English-speaking countries as discussed by Piketty and Saez (2006). Table 1 contains descriptive statistics.

To measure pre-tax capital income inequality we use household capital income data, stemming

[12]Surveys are conducted at irregular intervals within countries. Observations for 'non-survey' years are interpolated.

[13]The LIS surveys for Ireland in 2004 and 2007 reveal it to be a notable outlier, perhaps reflecting its recent move towards tax haven status. The econometric results below do not change when these observations are excluded from the sample.

from interest, dividends and rental income, again taken from the LIS. The capital income inequality ($CAPINEQ$) measure is constructed by taking the ratio of the median to mean capital income, and then subtracting this from one.[14]

Figure 5 graphs these data. The fact that capital income is highly skewed towards the rich is manifest in the fact that median capital income is less than 10% of mean capital income in over 75% of the sample. This strongly contrasts with labor income, where the median is no less than 70% of the mean for over 75% of the sample. Nonetheless, for the rich at least, capital income constitutes an important source of income, and will likely therefore affect their labor supply decision.

The two income inequality measures are correlated with each other (the correlation coefficient is 0.3), indicating the presence of colinearity which we have argued may have undermined previous empirical studies which do not separate the sources of income inequality. On the other hand, the two measures clearly contain separate information. A scatter plot is presented in Figure 6. There are no cases characterized by (relatively) high labor income inequality and low capital income inequality. On the other hand high levels of capital income inequality coexist with both high and low levels of labor income inequality.

The regression analysis includes control variables following Facchini et al. (2017). These include the GDP per capita (in logs) in constant chained PPP US$ (denoted GDP), taken from the Penn World Tables (e.g. see Ram, 1987). Ideology (denoted $IDEO$) and its interaction with income (denoted $INTERACT$) as used in Pickering and Rockey (2011), are also included as standard. Following Facchini et al. (2017) the labor share of income (denoted $SHARE$) from the OECD database is also included to capture cost-push effects. Following

[14]The reason for constructing the measure of capital income inequality in this way (instead of simply using the ratio of mean to median capital income, as we do for labor income) is that median capital income is zero for about 30% of the observations. Therefore, the ratio used as the measure of capital income inequality should not include the median capital income in the denominator.

Kau and Rubin (2002) and Winer et al. (2008) female participation (FP) in the labor force is also included. Further controls follow Persson and Tabellini (2003). Demographic effects are encapsulated in the percentage of the population between 15 and 64 years of age and the percentage over the age of 65 (denoted $PROP1564$ and $PROP65$), taken from the World Development Indicators (WDI) database. Following Rodrik (1998) the trade share (the sum of exports and imports as a percentage of GDP, denoted $TRADE$) is also employed in the regression analysis.

Total government outlays in OECD countries vary counter-cyclically. There may also be cyclical movements in inequality. To address this potential problem the regression analysis employs the Persson and Tabellini (2003) cyclical control variables - the output gap (denoted $YGAP$) and oil price effects (depending on whether or not the country is a net oil-exporter or importer, denoted OIL_EX and OIL_IM) are also included in the analysis when annual data are used.

3.1 Panel Estimation

3.1.1 Government size

Table 2 contains estimation results from fixed-effects panel regressions using total outlays as a percentage of GDP as the dependent variable. Column 1a augments the benchmark specification in Facchini et al. (2017) with labor income inequality ($LABINEQ$) and reflects the current consensus, finding it to be imprecisely estimated and, thus, not significantly different from zero. This lack of statistical significance coheres with the findings in Perotti (1996), Persson and Tabellini (2003), Mello and Tiongson (2006), and Shelton (2007). Column 1b further augments this specification with capital income inequality ($CAPINEQ$). The

estimated coefficient for capital income inequality is negative, precisely estimated with a p-value of 1.2%, and the estimated relationship is quantitatively meaningful: an increases in $CAPINEQ$ of 0.1 (just over one standard deviation) is statistically associated with government size which is smaller by about 1% of GDP, consistent with our theory.

The empirical relationship between fiscal policy variables such as total government outlays and alternative measures of inequality is likely to be more complex than a simple contemporaneous relationship in annual data. Government outlays are the outcome of complex political processes including elections and legislative procedures. Typically this would mean long and indeed variable lags between drivers and outcomes. The exact dynamics relating policy and drivers such as pre-tax inequality are also not clear. For example forward-looking voting (for parties standing on particular redistribution policies) might imply that future inequality affects current elections outcomes and subsequent policy. It is also the case that both inequality measures are derived from sporadic (LIS) surveys and in any case are slow moving. Similarly the outlays data are slow moving and subject to cyclical variation.

These considerations suggest averaging the data over long time frames. Results are therefore also presented (in columns 2a and 2b) using five-year averages of the data. The results duplicate those in column 1: government outlays are negatively related with capital income inequality, whilst there is no relationship with labor income inequality.

The estimation results so far follow the specification used in Facchini et al. (2017), who find that increases in the labor share increase the size of government via greater costs in labor-intensive areas of government spending.[15] The positive association is also found in the results reported here. However, the mechanism proposed in the present paper implies a separate relationship between government size and the labor share. If the labor share falls,

[15]For example they find that the labor share is positively associated with components of government expenditure that are intensive in labor, but not with transfers.

then by construction the capital income share rises. Given that capital income is highly concentrated, then increases in capital income (corresponding to reductions in the labor share) will serve to amplify the mechanism proposed in this paper: the capital-rich will withdraw taxable labor supply to a greater extent, hence the tax rate chosen by the median voter will fall. Hence there are two possibilities for explaining the positive relationship between government size and the labor share.

It is also likely that the labor share of income and labor income inequality are co-determined. For example, as proposed by Piketty and others, both the labor share and the pre-tax wage distribution are to some extent the outcome of relative bargaining strength of the rich vs the poor. If the bargaining strength of the rich increases, then the labor share falls while labor income inequality rises.[16] As such, especially given likely measurement error for wage inequality, the labor share potentially captures some of the effect of increased pre-tax wage inequality and the coefficient estimate for $LABINEQ$ is biased downwards. Given these considerations column 3 of table 2 duplicates column 2b, but excludes the labor share. In this specification, the estimated coefficient for labor income inequality is now positive and statistically significant at the 10% level. The estimated coefficient for capital income is negative as before and statistically significant at the 10% level. The finding of a positive relationship between government size and labor income inequality is consistent with the Meltzer and Richard (1981). Nonetheless, statistical significance is still only at 10%, and there remains the possibility that labor income inequality is just picking up the cost-push effect of the omitted labor share.

[16]There is indeed a statistically significant negative correlation between the labor share and pre-tax labor income inequality as measured by $LABINEQ$.

3.1.2 Transfer spending

In Table 3 we follow Facchini et al. (2017) and use as dependent variable the governmental cash transfers to households ($TRANSFERS$), which is arguably a more direct measure of redistribution. The data used are 'Social benefits other than social transfers in kind' from the OECD and again are measured as a percentage of GDP. One advantage of this redistribution measure is that it is much less labor-intensive relative to the other elements of total government outlays, which (as found by Facchini et al.) removes the confounding cost-push effect of the labor share. It is also of interest to investigate how the composition of government spending changes with the different inequality measures. In general the extent to which different types of government spending redistribute from rich to poor (or mean to median) is quite variable. The value to a particular individual of spending on law and order for instance (arguably) increases with the amount of property owned. Education spending may also disproportionately benefit the middle classes. On the other hand cash transfers are typically means-tested hence are a more overt means of redistribution à la Meltzer and Richard (1981).

The columns in Table 3 correspond to those in Table 2, where columns 1 and 2 contain results respectively using annual data and five-year averages. The estimation results this time suggest a positive and statistically significant relationship between transfers and labor income inequality, consistent with the Meltzer and Richard (1981) hypothesis. For example taking the estimation results in column (2b) a one standard deviation increase in the labor inequality measure (0.2) is associated with increased transfer spending by about 1.2% of GDP. This is around 30% of a standard deviation in the raw transfer data.

Roughly speaking the results indicate a strong positive relationship between labor income inequality and transfers, but a weaker relationship (if any at all) between labor income

inequality and total outlays. The Meltzer and Richard (1981) theory considers policy in a single dimension, and so these findings are difficult to reconcile fully with this particular theory. In sum the results imply that labor inequality is more strongly associated with a shift in the *composition* of total government expenditure towards transfers, and away from other types of expenditure.[17] Nonetheless, the inevitable implication that non-transfer spending falls with labor income inequality is somewhat more puzzling.

On the other hand the empirical relationship between transfers and capital income inequality is statistically insignificant. Taken together with the results for total outlays (found to be strongly negatively associated with capital income inequality), the evidence is that capital income inequality is also associated with a compositional change in government spending as well as a reduction in overall spending. Increases in capital income inequality are implicitly associated with reduced spending on non-transfer spending.

It is possible to make some conjectures based on the theoretical arguments as well as the evidence that we do have. Firstly, as proposed above, transfers are conceivably more redistributive than non-transfer spending as they are in most instances specifically targeted at low-income groups. Therefore the finding that spending seems to shift towards transfers when pre-tax labor income inequality increases is consistent with Meltzer and Richard (1981) if, for some other reason, total tax revenue is given. Secondly, we know that capital income is very largely concentrated within the rich. Increases in capital income inequality therefore will perhaps not correspond to visible income inequality within the majority of the electorate. As such the impetus (via electoral demands) for 'pure' redistribution in the form of transfer spending may be muted. Increases in capital income inequality therefore reduce tax revenue as we argue above, and this translates into reductions in services (non-transfer spending) as

[17] On the revenue side Pickering and Rajput (2018) find that the composition of income and expenditure taxes in democracies change with broad inequality measures whilst total tax revenue does not.

opposed to transfer spending, which is instead more responsive to changes in pre-tax labor income inequality.

These conjectures are speculative. A full explanation the findings for the composition of spending requires a model where utilities depend differentially on transfers and the separate elements of non-transfer spending. Nonetheless there is consistent evidence that the composition of spending changes differentially when the two different types of inequality change. Increased labor income inequality is associated with greater spending on transfers. Increased capital income inequality is associated with reduced spending on non-transfers.

3.1.3 Dynamic Panel Estimation

Even using five-year averages the dependent variable still exhibits persistence. Table 4 therefore contains Arellano-Bond dynamic panel estimation results extending the above results to include the lagged dependent variable. Columns 1 and 2 contain estimation results when $OUTLAYS$ is the dependent variable. The estimated negative relationship between government size and capital income inequality holds up (in column 2), and indeed in this instance the coefficient estimate pertaining to labor income inequality is now positive, consistent with the Meltzer and Richard (1981) hypothesis, and significantly different from zero at the 10% level. Similarly the results for $TRANSFERS$ are consistent with the above findings. They are more strongly related for labor income inequality whilst showing no relationship with capital income inequality.

In summary, we find consistent evidence that increases in capital income inequality are associated with smaller government size. There is also some evidence of a positive relationship between government size and labor income inequality, as theorized by Meltzer and Richard (1981). We also find that the composition of spending tilts towards transfer spending when

labor income inequality rises, and that it moves away from non-transfer spending when capital income inequality rises.

4 Conclusion

This paper analyzes how inequality in the capital income distribution affects the size of government. Capital income is quite distinct from labor income. We define it as rental income, and also model it as untaxed, hence redistribution is financed solely by taxation applied to labor income. Voters have preferences over the labor income tax rate depending both on their productivity as in Meltzer and Richard (1981), and also their position in the capital income distribution, because greater capital income leads to reduced labor supply all else equal. Despite the fact that there are two underlying sources of heterogeneity in the population, the median voter is still the unique Condorcet winner because tax preferences are monotonic in labor income.

The result relating taxation levels to capital income inequality is novel. In contrast to Meltzer and Richard (1981) increased capital-income inequality now leads to smaller government. Agents who are endowed with capital income are less averse to labor-income taxation. The choice of labor income tax depends on the distribution of capital income: if the share of capital income of the rich increases, then their taxable labor supply falls and the preferred tax rate falls because the median voter has a reduced capacity to redistribute through taxation.

The relationship between the size of government and inequality is tested in a panel of OECD countries, augmenting the analysis of Pickering and Rockey (2011) and Facchini et al. (2017) to include separate measures of capital income inequality and labor income inequality as additional explanatory variables. The measures are derived from the Luxembourg Income

Survey. Consistent with the theory, government size is found to be negatively associated with capital income inequality. Moreover we find a positive relationship between government size and labor income inequality, in line with the original Meltzer and Richard (1981) hypothesis. There is also evidence that the composition of spending changes with changes in the alternative income inequality measures. When labor income inequality increases, transfer spending increases as a share of total government spending. When capital income inequality increases, spending on the non-transfer components of total public expenditure fall.

Appendix

A Derivation of Equations (12) and (13)

The problem of the median voter m is to choose the tax rate so as to maximize

$$u^m(c^m, l^m) = u^m\left[(1-t)\, x^m n^m + R^m + t\bar{y}, 1 - n^m\right], \tag{A.1}$$

and the first-order condition for the median voter with respect to the tax rate is

$$\left(\bar{y} - y^m + t\frac{d\bar{y}}{dt}\right) u_c + \left[(1-t)\, x u_c - u_l\right]\left(\frac{dn^m}{dt}\right) = 0. \tag{A.2}$$

Thus, making use of equation (3), the tax rate chosen by the median voter must satisfy

$$\bar{y} - y^m + t\left(\frac{d\bar{y}}{dt}\right) = 0. \tag{A.3}$$

Changes in the tax rate t affect average income via two channels: its effect on the opportunity cost of leisure, and its effect on transfers (from the government's budget constraint $r = t\bar{y}$). In particular, we have that

$$\begin{aligned} \frac{d\bar{y}}{dt} &= \frac{\partial \bar{y}}{\partial r}\frac{dr}{dt} - \frac{\partial \bar{y}}{\partial \tau}, \\ &= \frac{\partial \bar{y}}{\partial r}\left(\bar{y} + t\frac{d\bar{y}}{dt}\right) - \frac{\partial \bar{y}}{\partial \tau}. \end{aligned} \tag{A.4}$$

with $\tau = 1 - t$. Thus, the total derivative of average income with respect to changes in the tax rate is given by

$$\frac{d\bar{y}}{dt} = \frac{\bar{y}_r \bar{y} - \bar{y}_\tau}{1 - t\bar{y}_r} < 0, \tag{A.5}$$

with $\bar{y}_r = \frac{\partial \bar{y}}{\partial r}$ and $\bar{y}_\tau = \frac{\partial \bar{y}}{\partial \tau}$.

Finally, making use of (A.5) to substitute in (A.3), we obtain

$$\begin{aligned} 0 &= \bar{y} - y^m + t\left(\frac{\bar{y}_r \bar{y} - \bar{y}_\tau}{1 - t\bar{y}_r}\right), \\ &= \left(\bar{y} - y^m\right)(1 - t) + \left[\frac{\eta_r \bar{y}\,(1 - t) - \eta_\tau \bar{y} t}{1 - \eta_r}\right], \end{aligned} \tag{A.6}$$

where $\eta_r = \bar{y}_r\,(r/\bar{y})$ and $\eta_\tau = \bar{y}_\tau\,(\tau/\bar{y})$ are the partial elasticities of average income. Solving the above equation for t, yields

$$t = \frac{m - 1 + \eta_r}{m - 1 + \eta_r + m\eta_\tau}, \tag{A.7}$$

with $m = \bar{y}/y^m$.

B Proof of Proposition 1

We begin with the following decomposition of average income

$$\bar{y} = p(\mathcal{K})\,\bar{y}(\mathcal{K}) + (1 - p(\mathcal{K}))\,\bar{y}(\sim \mathcal{K}), \tag{B.1}$$

where $\bar{y}(\mathcal{K})$ is the average income of the individuals in set $\mathcal{K}$ and $\bar{y}(\sim \mathcal{K})$ is the average income of the individuals not in set $\mathcal{K}$. From Assumption 2 we have that $\bar{y}^{\mathcal{K}} > y^m$.

Taking the total derivative of $\bar{y}$ with respect to $R(\mathcal{K})$, the capital income of the individuals in set $\mathcal{K}$ in equation B.1 we obtain

$$\begin{aligned}
\frac{d\bar{y}}{dR(\mathcal{K})} &= p(\mathcal{K})\left(\frac{\partial \bar{y}(\mathcal{K})}{\partial R(\mathcal{K})} + \frac{\partial \bar{y}(\mathcal{K})}{\partial r}\frac{d\bar{y}}{dR(\mathcal{K})}t\right) + (1 - p(\mathcal{K}))\left(\frac{\partial \bar{y}(\sim \mathcal{K})}{\partial r}\frac{d\bar{y}}{dR(\mathcal{K})}t\right), \\
&= p(\mathcal{K})\frac{\partial \bar{y}(\mathcal{K})}{\partial R(\mathcal{K})} + \frac{\partial \bar{y}}{\partial r}\frac{d\bar{y}}{dR(\mathcal{K})}t, \\
&= p(\mathcal{K})\frac{\partial \bar{y}(\mathcal{K})}{\partial R(\mathcal{K})} + \eta_r\frac{d\bar{y}}{dR(\mathcal{K})},
\end{aligned} \tag{B.2}$$

where we used the fact that $\eta_r = \frac{\partial \bar{y}}{\partial r}\frac{r}{\bar{y}} = \frac{\partial \bar{y}}{\partial r}\frac{t\bar{y}}{\bar{y}} = \frac{\partial \bar{y}}{\partial r}t$. Using (B.2) to solve for $\frac{d\bar{y}}{dR(\mathcal{K})}$, we obtain

$$\frac{d\bar{y}}{dR(\mathcal{K})} = \frac{p(\mathcal{K})}{1 - \eta_r}\frac{\partial \bar{y}(\mathcal{K})}{\partial R(\mathcal{K})} < 0, \tag{B.3}$$

since leisure is a normal good. Thus, average income $\bar{y}$ must fall.

In turn, we have that

$$\frac{dy^m}{dR(\mathcal{K})} = \frac{\partial y^m}{\partial r}\frac{\partial \bar{y}}{\partial R(\mathcal{K})}t > 0. \tag{B.4}$$

Thus, we have established that $\bar{y}$ must fall and y^m must increase following an increase in the capital-income going to the top capital-income recipients. Therefore, $m = \bar{y}/y^m$ falls and the

increase in capital income inequality lowers labor income inequality. The upshot is that the increase in the capital income going to the top capital-income recipients results in a lower t, the labor income tax chosen by the median voter.

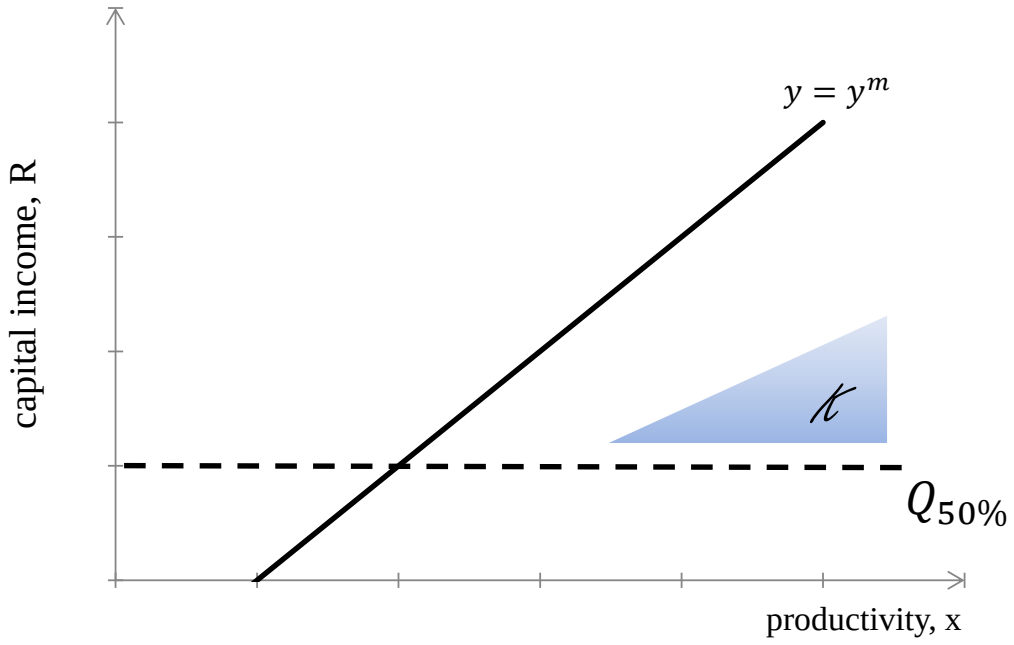

Figure 1: Capital Income and Productivity Joint Distribution (Assumption 2)

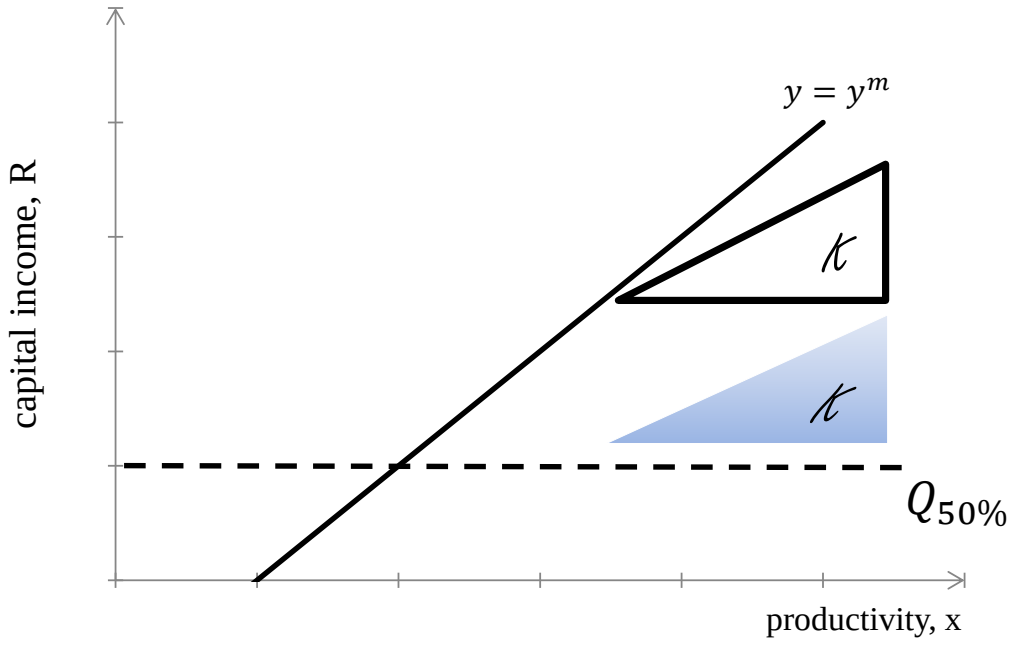

Figure 2: Increase in Capital Income Inequality

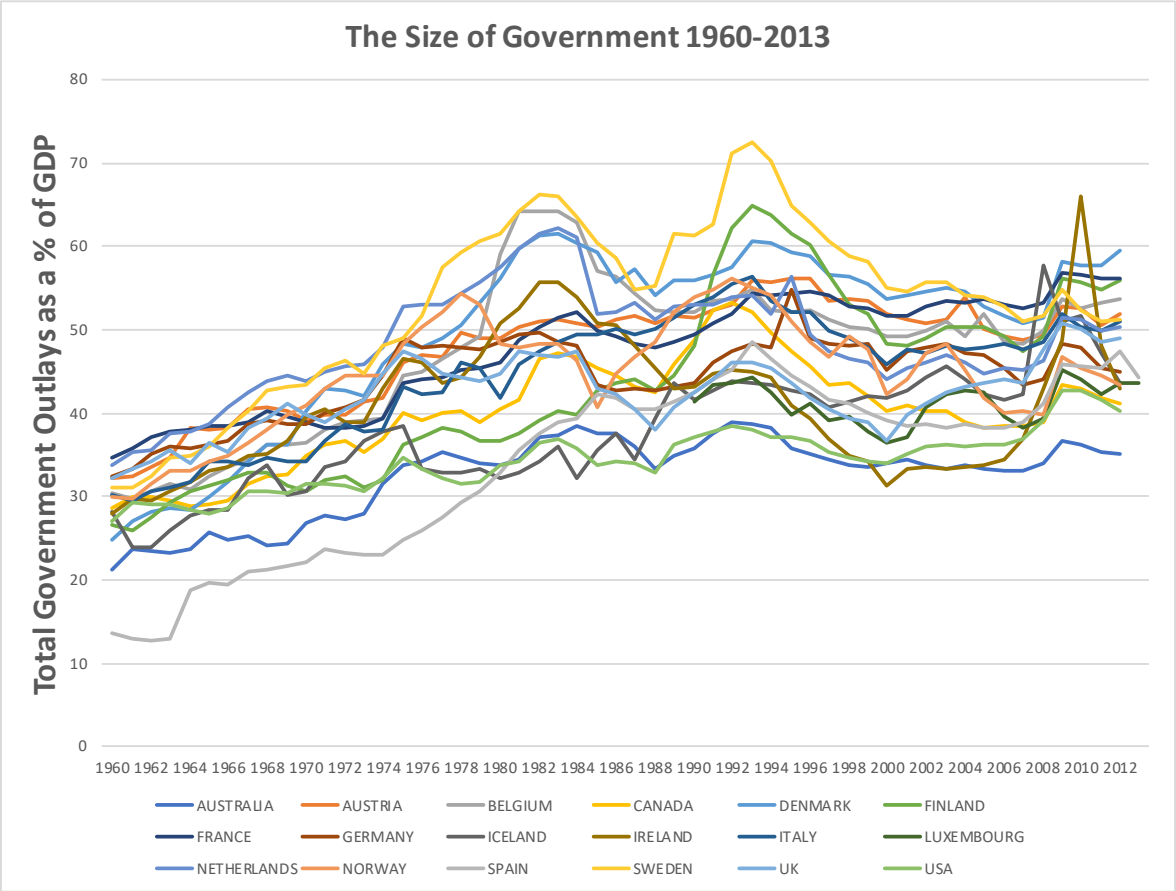

Figure 3: The Size of Government, 1960-2013

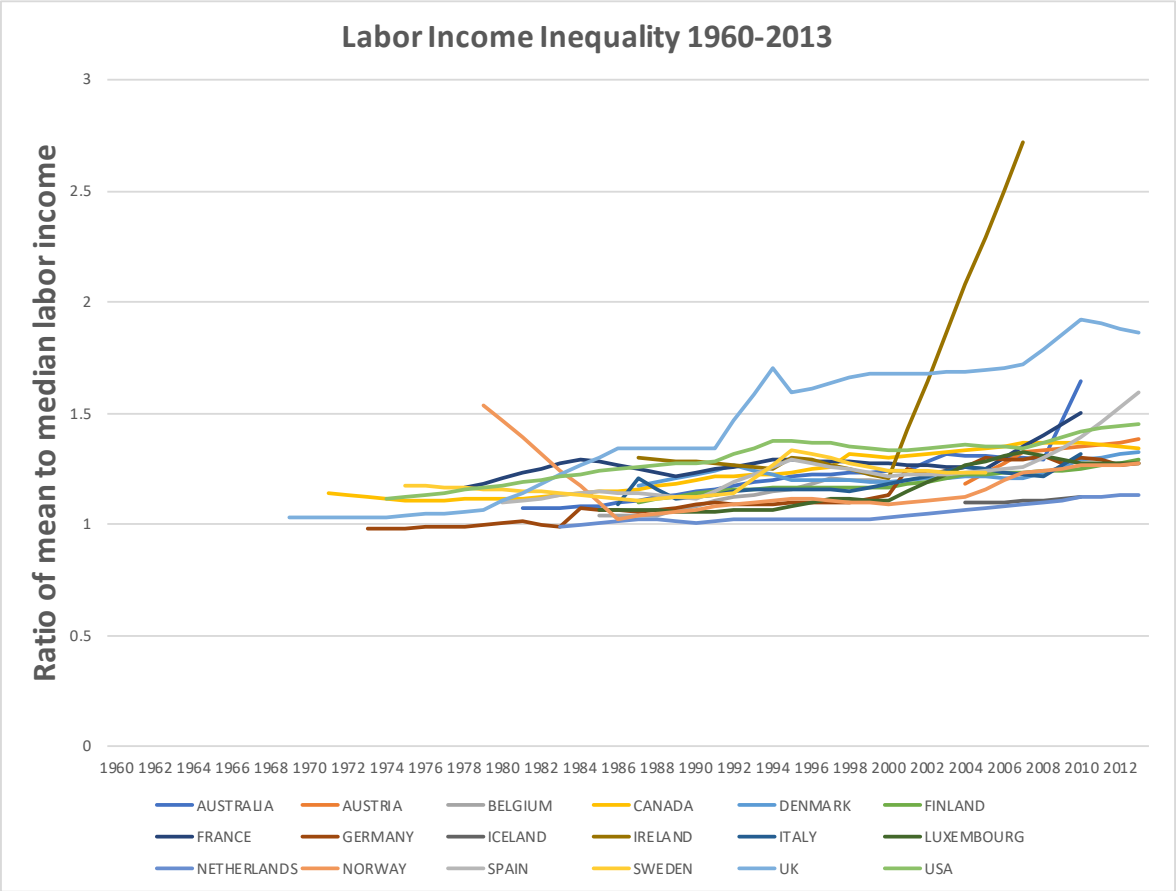

Figure 4: Labor Income Inequality, 1960-2013

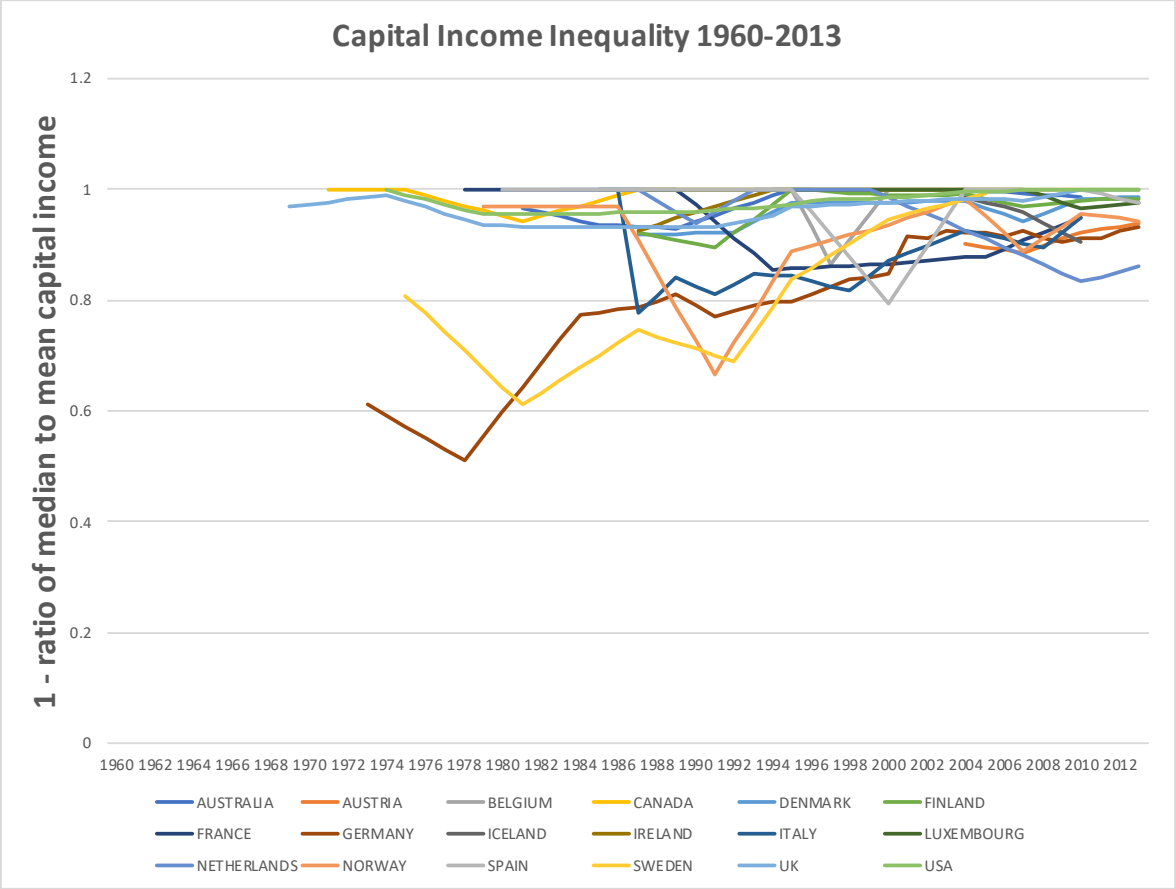

Figure 5: Capital Income Inequality, 1960-2013

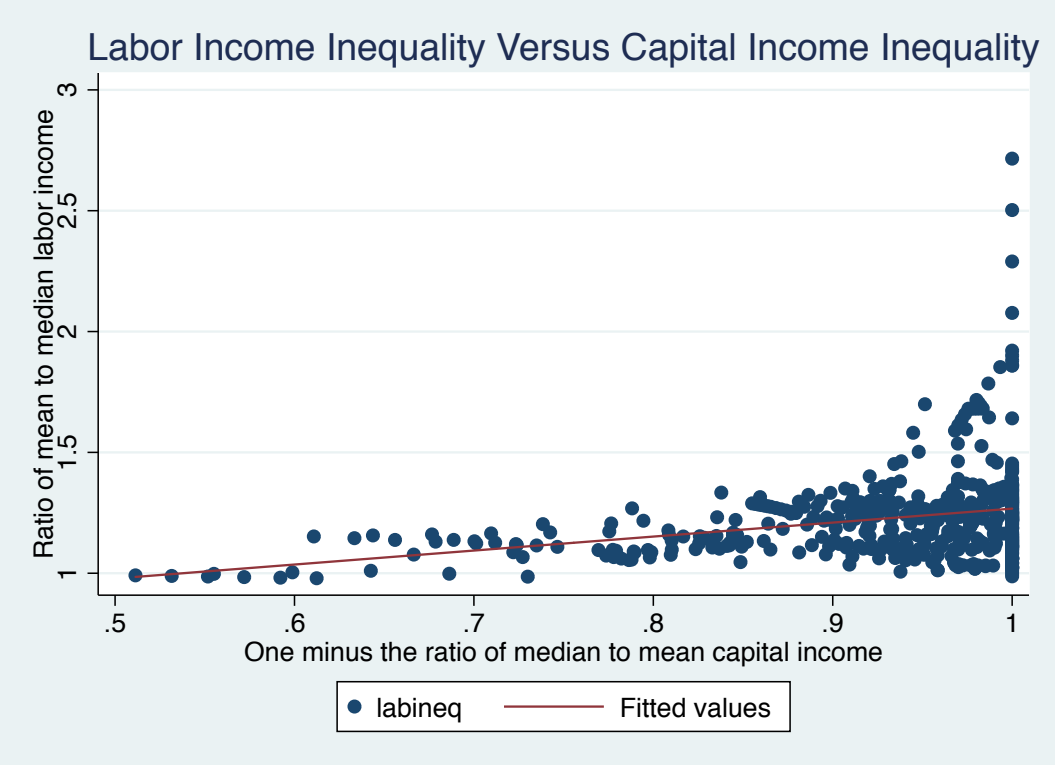

Figure 6: Labor Income Inequality and Capital Income Inequality, 1960-2013

Table 1: Descriptive Statistics

	obs	mean	std. dev.	min	max
OUTLAYS	1,169	41.32	10.18	12.8	72.4
TRANSFERS	671	13.03	4.02	3.48	23.10
LABINEQ	574	1.23	0.188	0.979	2.72
CAPINEQ	574	0.943	0.087	0.511	1
SHARE	811	65.51	8.98	21.45	82.10
FP	1,041	58.35	13.21	25.20	84.33
GDP	1,248	2.94	0.522	1.30	4.42
IDEO	1,162	0.028	0.113	-0.266	0.337
*PROP*1564	1,296	65.01	2.98	52.88	69.89
*PROP*65	1,296	12.85	3.38	3.15	25.08
TRADE	1,265	65.62	44.68	5.73	371.44
YGAP	1,279	-0.005	1.57	-7.23	6.79
OIL_EX	1,272	3.96	14.07	0	99.57
OIL_IM	1,272	21.95	24.58	0	99.57

Notes: $OUTLAYS$ denotes the total government outlays as a percentage of GDP, taken from the OECD Economic Outlook database. $TRANSFERS$ denotes governmental cash transfers to households s a percentage of GDP. $LABINEQ$ is the ratio of mean to median household labor income, and $CAPINEQ$ is equal to one minus the ratio of median to mean household capital income - both data are taken from the Luxembourg Income Study Database. $SHARE$ is the business sector labor share - taken from the OECD database. FP is the female labor force as a percentage of the female population between 15 and 64 - also taken from the OECD database. GDP is real GDP per capita in \$000s of 2005 prices (in logs), taken from the Penn World Tables. $IDEO$ is ideology used in Pickering and Rockey (2011). $PROP1564$ and $PROP65$ are respectively the proportion of the population aged between 15 and 64, and 65 and above - taken from WDI database. $TRADE$ is the sum of exports and imports as a percentage of GDP. $YGAP$ is the difference between the actual output and its trend value in percentage - also taken from WDI database. OIL_EX and OIL_IM are respectively the oil price times a dummy variable equal to 1 if net exports of oil are positive; and the oil price times a dummy variable equal to 1 if net exports of oil are negative - taken from US Energy Information Administration.

Table 2: Panel Estimation Results - The Size of Government

	(1a)	(1b)	(2a)	(2b)	(3)
CAPINEQ		-10.919**		-12.849**	-9.709*
		(3.861)		(5.571)	(5.580)
LABINEQ	1.177	1.235	3.223	3.351	5.217*
	(2.864)	(3.010)	(3.625)	(3.838)	(2.641)
SHARE	0.082	0.085	0.238	0.243*	
	(0.010)	(0.086)	(0.145)	(0.135)	
FP	-0.026	-0.093	-0.126	-0.237	-0.071
	(0.160)	(0.155)	(0.168)	(0.164)	(0.163)
GDP	-19.748**	-17.821**	-15.056	-11.719	-14.853*
	(7.815)	(7.372)	(9.566)	(9.168)	(8.184)
IDEO	1.520	2.859	-4.318	-0.914	8.497
	(14.359)	(15.149)	(21.069)	(20.884)	(16.911)
INTERACT	0.169	0.068	0.277	0.122	-0.098
	(0.376)	(0.335)	(0.562)	(0.505)	(0.410)
*PROP*1564	-0.059	-0.077	-0.031	-0.050	-0.526
	(0.472)	(0.456)	(0.499)	(0.499)	(0.464)
*PROP*65	-0.293	-0.352	0.044	0.117	-0.179
	(0.364)	(0.340)	(0.384)	(0.341)	(0.389)
TRADE	0.024	0.030*	0.030	0.039*	0.026
	(0.020)	(0.017)	(0.026)	(0.022)	(0.020)
YGAP	-0.325*	-0.312*			
	(0.178)	(0.171)			
OIL_EX	0.206***	0.160**			
	(0.065)	(0.070)			
OIL_IM	0.266***	0.226***			
	(0.065)	(0.072)			
Obs	467	467	111	111	128
Countries	18	18	19	19	21
Data	Annual	Annual	5-year averages	5-year averages	5-year averages
Fixed effects?	Yes	Yes	Yes	Yes	Yes
Period dummies?	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.633	0.656	0.579	0.615	0.553

Notes: Panel regressions of government outlays as a percentage share of GDP including fixed effects and time effects, $SHARE$, FP, GDP, $IDEO$, $INTERACT$, $PROP1564$, $PROP65$, $TRADE$, $YGAP$, OIL_EX, OIL_IM as control variables. Column (3) contains results when $SHARE$ is excluded. Robust standard errors are shown in parentheses. Standard errors are clustered by country. *, **, and *** respectively denote significance levels at 10%, 5% and 1%.

Table 3: Panel Estimation Results - Transfers

	(1a)	(1b)	(2a)	(2b)
CAPINEQ		5.426		0.031
		(4.226)		(9.154)
LABINEQ	4.251***	4.032***	5.808***	5.806***
	(1.453)	(1.377)	(1.551)	(1.721)
SHARE	-0.064	-0.073	-0.120	-0.120
	(0.060)	(0.056)	(0.087)	(0.085)
FP	-0.204	-0.193*	-0.208*	-0.208*
	(0.118)	(0.105)	(0.116)	(0.107)
GDP	-10.329**	-10.235**	-10.172**	-10.171**
	(3.906)	(3.838)	(4.477)	(4.487)
IDEO	8.198	9.147	15.273	15.279
	(8.531)	(8.047)	(11.745)	(11.111)
INTERACT	-0.216	-0.195	-0.372	-0.372
	(0.250)	(0.249)	(0.294)	(0.307)
*PROP*1564	0.155	0.138	0.080	0.080
	(0.247)	(0.226)	(0.220)	(0.203)
*PROP*65	0.059	0.046	0.223	0.223
	(0.372)	(0.353)	(0.333)	(0.365)
TRADE	0.030	0.028	0.033	0.033
	(0.022)	(0.021)	(0.028)	(0.029)
YGAP	-0.168*	-0.160*		
	(0.092)	(0.091)		
OIL_EX	-0.074*	-0.048		
	(0.042)	(0.048)		
OIL_IM	-0.055	-0.031		
	(0.039)	(0.046)		
Obs	375	375	91	91
Countries	18	18	19	19
Data	Annual	Annual	5-year averages	5-year averages
Fixed effects?	Yes	Yes	Yes	Yes
Period dummies?	Yes	Yes	Yes	Yes
R^2 (within)	0.645	0.658	0.595	0.595

Notes: Panel regressions of transfer payments (social benefits other than social transfers in kind as a % share of GDP) including fixed effects and time effects, $SHARE$, FP, GDP, $IDEO$, $INTERACT$, $PROP1564$, $PROP65$, $TRADE$, $YGAP$, OIL_EX, OIL_IM as control variables. Robust standard errors are shown in parentheses. Standard errors are clustered by country. *, **, and *** respectively denote significance levels at 10%, 5% and 1%.

Table 4: Dynamic Panel Estimation Results

	(1)	(2)	(3)	(4)
Lagged Dep. Var.	0.442***	0.441***	0.345***	0.328***
	(0.091)	(0.083)	(0.110)	(0.115)
CAPINEQ		-20.720***		3.893
		(5.223)		(3.365)
LABINEQ	3.317	3.521*	5.578***	5.214***
	(2.346)	(2.122)	(1.164)	(1.144)
SHARE	0.320**	0.294**	-0.028	-0.052
	(0.125)	(0.115)	(0.080)	(0.080)
FP	0.173	0.061	-0.183***	-0.193***
	(0.115)	(0.109)	(0.054)	(0.054)
GDP	-5.984	-3.464	-7.559**	-5.809
	(6.445)	(5.927)	(3.746)	(3.578)
IDEO	20.699	17.664	17.140**	18.348**
	(14.706)	(13.416)	(7.989)	(7.891)
INTERACT	-0.583	-0.578	-0.485**	-0.510**
	(0.448)	(0.405)	(0.217)	(0.216)
*PROP*1564	-0.578	-0.657**	-0.115	-0.198
	(0.365)	(0.333)	(0.252)	(0.249)
*PROP*65	-1.120***	-1.389***	-0.031	-0.127
	(0.429)	(0.393)	(0.238)	(0.238)
TRADE	0.004	0.001	0.014	0.011
	(0.026)	(0.023)	(0.016)	(0.016)
Obs	91	91	60	60
Countries	18	18	18	18
Data	5-year averages	5-year averages	5-year averages	5-year averages
Estimation	Arellano-Bond	Arellano-Bond	Arellano-Bond	Arellano-Bond
Period dummies?	Yes	Yes	Yes	Yes

Notes: Table 4 contains Arellano-Bond dynamic panel estimation results extending the above results to include the lagged dependent variable. Columns (1) and (2) contain estimation results when $OUTLAYS$ is the dependent variable. Columns (3) and (4) contain estimation results when $TRANSFERS$ is the dependent variable. Robust standard errors are shown in parentheses. Standard errors are clustered by country. *, **, and *** respectively denote significance levels at 10%, 5% and 1%.

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