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Income inequality and the tax structure: Evidence from developed and developing countries

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Abstract: This paper seeks to examine the effect of income inequality on the structure of tax policies. We first use a simplified theoretical framework which allows us to formalize the testable implications of the relevant literature. Subsequently, our analysis indicates that more unequal economies rely heavier on capital relative to labor income taxation. This relationship remains robust across various alternative measures of income inequality and most importantly through alternative political regimes. In addition, our analysis places the spotlight on the potential reverse causality between income inequality and structure of the tax policies and seeks to address it by making use of the most appropriate data and techniques.

JEL: H10, H23, H26

Keywords: inequality, tax structure, redistribution

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1. Introduction

The interplay between economic and political factors suggests a role for public policies mainly on the side of redistribution through taxation and government spending. Focusing on taxation, political economy literature (see e.g. Persson and Tabellini, 1994; Besley and Coates, 1997) suggests that tax structure is portrayed as the voting outcome in elections with office motivated parties who seek the support of the median voter. In all these models, capital income is more concentrated than labor income and the median voter gains from shifting a large share of the tax burden to capital. This result becomes stronger the lower median income is relative to mean income (i.e. the higher is the income inequality).

The relationship between income inequality and redistribution has been extensively investigated by a large number of empirical studies (see e.g. Alesina and Rodrik, 1994; Persson and Tabellini, 1994; Perotti, 1996; Milanovic, 2000; Karabarbounis, 2011).¹ Most of these studies place the spotlight on total government spending or on specific spending accounts (e.g. social transfers as a share of GDP) and examine the effect of income inequality on the size of government spending. However, to the best of our knowledge there is not any empirical study examining the impact of income inequality on the structure of taxation and the relative tax burden between labor and capital.²

In this paper, we seek to examine the impact of income inequality on the structure of tax policies and whether this effect is affected by the political regime type (i.e. the degree of democracy) within each country.³ To this end, we develop a simple theoretical model

¹ See Borck (2007) for an excellent review of the literature investigating the impact of income inequality on redistribution.

² Perotti (1996) investigates the effect of middle class income share on marginal tax rate but fails to provide a robust relationship whereas Karabarbounis (2011), using a sample of OECD countries, provides evidence that a higher ratio of the gross earnings of the rich (resp. poor) to mean gross earnings is associated with lower (resp. higher) personal income taxes. However, both of these studies examine mainly the effect of income inequality on redistribution through government spending and thereby refraining from examining the impact of inequality on the structure of tax policies.

³ A small but growing number of empirical studies examine the effect of democracy on the size of total tax revenues and the composition of taxation (see e.g. Aidt and Jensen, 2009; Boix, 2001; 2003; Kenny and Winner, 2006; Mulligan et al., 2004; Profeta et al. 2012). The theoretical argument behind the potential impact of democracy on tax policies goes as follows. An extension of the voting franchise increases the number of low-income voters and consequently changes the position of the median voter and the preferences of the electorate concerning redistribution. This implies: (i) an increase in total tax revenues and (ii) a shift of the tax policies away from the preferences of the rich (i.e. an increase (resp. decrease) on

that allows us to formalize the testable implications of the relevant theoretical literature. Then, in the empirical section, we investigate the above mentioned relationship. Concerning the data on tax policies, we employ the high quality data on effective tax rates developed by Djankov et al. (2010) which provide us detailed measures of the tax burden fallen on labor and capital for a world sample of 85 countries. This dataset allows us to employ effective income tax rates for both developed and developing countries and thus gives us the opportunity to examine the impact of inequality on the structure of taxation in countries exhibiting substantial differences in terms of institutional quality and political environment. Concerning the data on income inequality, we employ various alternative economic inequality measures. More precisely, we employ: (i) the Gini coefficient of Texas University Inequality Project (2005), (ii) the Gini coefficient developed by Solt (2009) and (iii) the Deininger and Squire (1996) Gini coefficient obtained from the World Bank.

An important issue raised by numerous scholars (see e.g. Piketty and Saez, 2007; Poterba, 2007) is the potential reverse causation between taxation and economic inequality that may generate an endogeneity problem in the relationship under consideration. According to this rationale, lower degrees of economic inequality may be the contemporaneous result of a more redistributive tax structure (i.e. a tax structure imposing larger tax burdens on capital relative to labor) rather than solely the cause of it.

Our analysis places the spotlight on the potential reverse causality issue and seeks to address it by making use of the most appropriate data and techniques. First, we employ the most accurate data available. Namely, we use the Djankov et al. (2010) tax data which come from experts' surveys on national tax legislation. Since these tax data are experts' calculations of taxes applicable to a standardized enterprise, instead of realized tax rates we can assume that changes in taxation come as a result of changes in income inequality rather than being the cause of it.⁴ This is because these tax data are constructed

direct taxation (resp. indirect taxation)). However, the relevant empirical literature delivers contradicting findings. Aidt et al. (2006) and Boix (2001; 2003) provide empirical evidence of a positive relationship between voting franchise and total tax revenues, whereas Aidt and Jensen (2009) and Kenny and Winner (2006) report a positive and significant effect of democracy on direct -relative to indirect- tax burden. In contrast, Mulligan et al. (2004) and Profeta et al. (2012) fail to establish a robust relationship between democratic institutions (i.e. degree of democracy and civil liberties) and implemented tax policies.

⁴ We note that Djankov et al (2010) dataset of taxes has been constructed –jointly by Pricewaterhouse Coopers accountants and tax lawyers-by computing of all relevant taxes applicable to the same

to reflect the relevant tax legislation and therefore are exogenous to the general economic conditions and to any indirect channel that may affect the realized tax policy. Moreover, concerning the economic inequality data, we choose to rely mainly on pre-tax-and-transfers Gini coefficients instead of post-tax-and-transfers Gini. This decision mitigates somewhat the reverse causality problem since post-tax-and-transfers Gini vary “mechanically” and “economically” with the fiscal system whereas pre-tax-and-transfers Gini coefficients vary solely through the endogenous responses of labor supply or the general equilibrium effect on factor prices (see e.g. Poterba, 2007). Third, we employ measures of inequality of former periods as explanatory of the tax structure in the year 2004. More precisely we employ average of Gini coefficients over the period 1980-2002 as regressors on the estimations of the tax structure in 2004. Last, a part of our analysis relies on Instrumental Variables (IV) estimation techniques.

In sum, our results provide evidence of a positive and strong association between income inequality and capital taxation. On the other hand, our results suggest a negative and robust association between income inequality and (i) labor taxation, (ii) the ratio of labor to capital relative tax burden. Therefore, we conclude that economies characterized by higher income inequality choose to rely heavier on capital relative to labor taxation. This relationship remains robust through various alternative measures of income inequality and most importantly through alternative political regimes. In other words, our analysis fails to establish a clear cut result concerning the effect of the political regime type (i.e. the degree and the quality of democracy within each country) on the relationship between income inequality and tax composition.

The rest of the paper proceeds as follows; in Section 2, we present the theoretical considerations upon which we base our empirical analysis on; in Section 3, we discuss the empirical methodology and the data; in Section 4 we present the empirical results. Finally, Section 5 concludes.

2. Theoretical Considerations

standardized domestic enterprise called TaxpayerCo, operating in each country. TaxpayerCo is a taxable corporation operating in the most populous city in the country. It is liable for taxes charged at the local, state/provincial and national levels. In many instances, these rates differ sharply from statutory tax rates.

This section elaborates on the theoretical link between income inequality and tax policies so as to formalize testable empirical implications of the relevant theoretical literature. We present a simple model which explains how the tax structure (i.e. tax burden on labor and capital) is determined. This is simplified extension of the Persson and Tabellini (2000) model that allows us to highlight the effect of inequality on the relative tax burden of capital and labor on both democratic and non-democratic regimes.

We have a two period economy, $t = 1, 2$ where a single commodity is produced with a linear technology using only labour. We assume that policy choices are made by the government ahead of any (economic) choices made by the economic agents and that there is full commitment over these choices. The economy is populated by a continuum of consumers indexed by i . Consumers' preferences over consumption in both periods c_t^i , and leisure x^i , are represented as follows:

$$u^i = U(c_1^i) + c_2^i + V(x^i) \quad (1)$$

where $U(.)$ and $V(.)$ are twice differentiable with a positive first and negative second derivatives. In the first period, each individual is endowed with $1 - e^i$ units of wealth, which he can choose to consume at time $t = 1$ or store for consumption in the second period. We assume there is no storage cost, and the gross return to savings equals to unity. In the second period, the consumer has $1 + e^i$ units of time endowment, which can devoted either to labour, l^i , for a gross return (wage) equal to unity or to leisure. This assumption about e^i implies that labour and wealth endowments are perfectly negatively correlated, and thus e^i shows whether individual i has relatively more labour or wealth endowment (since individuals differ only in one dimension). We also assume that e^i is distributed with a c.d.f. $F(.)$ with mean $e = 0$ and median $e^m > 0$, i.e. the majority of the population has relatively more labour than wealth endowment.

The government raises taxes on second period's labour income and stored wealth, i.e. capital, using tax rates $T = (\tau_L, \tau_K)$, in order to finance a given amount of (second period's) government per capita consumption G .

The above imply that the budget constraints for each consumer i are given by:

$$c_1^i + k^i = 1 - e^i \quad (2)$$

$$c_2^i = (1 - \tau_K)k^i + (1 - \tau_L)l^i \quad (3)$$

where k^i is the amount of capital brought in second period by consumer i . It follows that the time constraint of each i can be written as:

$$1 + e^i = l^i + x^i \quad (4)$$

Maximization of (1) subject to the constraints (2), (3) and (4) with respect to l^i and k^i yields the labour and capital supply functions:

$$l^i = L(\tau_L) + e^i \quad (5)$$

$$k^i = K(\tau_K) - e^i \quad (6)$$

where $L(\tau_L)$, $K(\tau_K)$ are the labour and capital supply functions of the average individual (i.e. $e=0$).

Given economic agents' choices, the government chooses the vector of tax rates $T = (\tau_L, \tau_K)$. Furthermore, in order to model the behaviour of the government in a more general way and under alternative political regimes, we follow Acemoglu and Robinson (2006) and assume that government choices result from the maximization of a general social welfare function⁵:

$$W = \lambda V^m(\tau_L, \tau_K) + (1 - \lambda)V^r(\tau_L, \tau_K) \quad (7)$$

⁵ The maximization of a weighted social welfare function as the goal of a government can be given several microfoundations in the public choice literature. For example the standard probabilistic voting model (Hinich, 1977; Hinich and Munger, 1994) is equivalent to maximization of a weighted social welfare function as in equation (7). Similarly the maximization of a social welfare function as a goal of the government can be also derived in general lobbying models (e.g. Coughlin et al., 1990; Grossman and Helpman, 1994). More recently, Acemoglu and Robinson (2006) have shown that in a model with non-democratic politics, the threat of revolution against the elite, equilibrium policies are those that maximize a weighted sum of the indirect utilities of the citizens and the elite.

where $V^m(\tau_L, \tau_K)$ is the indirect utility of the individual with the median ability and $V^r(\tau_L, \tau_K)$ is the indirect utility of the group of individuals that hold enough political power to affect government choices. Therefore, λ captures the influence of the median voter relative to other groups of agents, on government decisions. If $\lambda = 1$ the objective function of the government is exclusively the welfare of the median voter. For $\lambda < 1$, preferences of other minority groups, also matter in the political process. We, thus, conceive λ to be the measure of the degree of democracy in a country.⁶ As λ decreases the government cares less about the welfare of the median voter and more about the welfare of other groups of agents usually holding enough political power to guarantee the survival of the government.

Inserting the labour and capital supply functions (5), (6) for each i into their budget constraints (2), (3) and then into the utility function (1), we get the indirect utility function for consumer i , which in turn is substituted into (7), to get:

$$W = w(\tau_L, \tau_K) + (\tau_K - \tau_L) [\lambda e^m + (1 - \lambda) e^r] \quad (8)$$

Finally, the government's budget constraint is given by:

$$G = \tau_L L(\tau_L) + \tau_K K(\tau_K) \quad (9)$$

Equilibrium policy then is given by the maximization of (8) subject to the government's budget constraint (9). This is a standard optimal taxation problem, which in equilibrium yields the following modified Ramsey rule:

$$\frac{K(\tau_K) - [\lambda e^m + (1 - \lambda) e^r]}{K(\tau_K)} [1 + \varepsilon_L(\tau_L)] = \frac{L(\tau_L) + [\lambda e^m + (1 - \lambda) e^r]}{L(\tau_L)} [1 + \varepsilon_K(\tau_K)] \quad (10)$$

where $\varepsilon_L(\tau_L), \varepsilon_K(\tau_K)$ are the elasticities of labour and capital supply respectively, with respect to the tax rates. Together with (9), this condition gives the equilibrium tax rates

⁶ In a more general setting, parameter λ can be viewed as a measure of the "quality of democracy".

selected by the government. Furthermore, it can be used to discuss the main testable hypotheses of the empirical section.

First, consider the effect of inequality. Departing from equilibrium, higher inequality implies lower e^m , (given that $e = 0$) which in turn means smaller left hand side of (10) compared to the right hand side. Therefore, τ_K should increase and τ_L should decrease in order to restore the equilibrium.⁷ Equation (10) also reveals the effect of international market integration. Higher economic integration implies lower elasticities of capital and labor supply (as workers and capital can move between jurisdictions). As long as capital is more mobile than labor (see e.g. Bucovetsky and Wilson, 1991; Persson and Tabellini, 1992) the right hand side of (10) becomes bigger than left hand side. In order to restore the equilibrium τ_K must fall and τ_L must rise.

Finally, from the modified Ramsey rule (10) we can also establish that as long as λ is not equal to zero, inequality (i.e. changes in the value of e^m relative to the average ability and e') will always affect the tax structure irrespective of the nature of the political regime. Specifically, as long as $\lambda > 0$, higher inequality will always exert a positive (*resp.* negative) effect on the tax rate of capital (*resp.* labour).

According to the political economics' literature, there are strong theoretical reasons justifying that λ does not equal to one in democratic regimes and does not take the value of zero even in pure autocracies. This is because democratic politics may be affected by the presence of special interest groups (Coughlin, 1992), lobbying activities (Becker, 1983) and partisan politics (Alesina, 1988) that lead national government to diverge from the preferences of the median voter. On contrary, the theoretical literature examining non-democratic regimes concludes that there are various constraints that increase the leader's accountability even in the absence of elections (see e.g. Acemoglu and Robinson, 2006; Bueno de Mesquita et al. 2003; Padro-i-Miguel, 2007; Besley and Kundamatsu, 2008).⁸ Thus, even in non-democracies the leader will cater for the wishes of the median voter –at some extent (i.e. $\lambda > 0$). Summarizing the above, our theoretical

⁷ Given the assumption about $V(.)$ and $U(.)$, the elasticities of labor and capital supplies are negative functions of the respective tax rates.

⁸ The examination of leaders' accountability in the absence of elections dates back -at least- to McGuire and Olson (1996) "stationary bandits" theory. More recently, Acemoglu and Robinson (2006) establish a "revolution constraint" mechanism that serves as constraint for non-democratic leaders.

framework predicts small (if any) differences on the effects of the independent variables on the structure of the tax rates between democracies and non-democracies.

We note that the effect of λ on the structure of taxation is a- priori ambiguous as it depends on the relative position of e^r . Therefore, the effect of democracy on the tax structure can be positive or negative.

3. Empirical Specification and Data.

In this section, we primarily examine the effect of income inequality on the structure of taxation. Then, we investigate whether this relationship is affected by the political regime and the quality of democracy within each country.

3.1 Econometric Model

The baseline specification used to study the relationship between income inequality and tax structure has the following form:

$$TaxRate_i = \alpha_0 + \beta_1 Gini_i + \beta_k controls_i + geographical\ dummies_i + u_i \quad (11)$$

where tax policy in country i , is expressed as a function of income inequality, a set of control variables, geographical dummies and a stochastic term u_i . The dependent variable in equation (11) is the labor or/to the capital employing the data developed by Djankov et al. (2010). We build a cross section dataset of 75 -developed and developing- countries. The dependent and explanatory variables are discussed below. Explicit definitions, descriptive statistics and sources of the variables employed are provided in Appendix A.

3.2 The Data

3.2.1 Data on tax rates

Statutory tax rates in capital and labor can neither capture the complexity of the tax system nor provide a clear indicator of the implied tax policy. This is because the overall tax burden fallen on capital and on labor does not depend solely on the relevant statutory tax rates, but also on what is defined - by the tax legislation - as the tax base. Therefore, we are in need of more elaborate tax measures that take into account changes in the tax base (e.g. changes in deductions and exemptions, depreciation allowances). Previous empirical studies focusing on tax policies seek to overcome this problem by employing effective average tax ratios, based on the methodology developed by Mendoza et al. (1994). Our empirical analysis relies on the tax data developed by Djankov et al. (2010).

The main advantage of the Djankov et al. (2010) tax dataset is that it has been constructed -in cooperation with PricewaterhouseCoopers accountants and tax lawyers- by using a hypothetical standardized enterprise. More precisely, Djankov et al. (2010) assume the existence of a hypothetical enterprise with specific characteristics (e.g. industrial and commercial activities, number of employers, assets, liabilities etc.) and then asked from the PricewaterhouseCoopers experts to calculate the taxes that this enterprise would pay in different countries according to the relevant national tax legislation.⁹ Since these tax data are experts' calculations of taxes applicable to a standardized enterprise, instead of realized tax rates, we can assume that changes in taxation come as a result of changes in economic variables (such as economic growth, economic inequality) rather than being the cause of them. This latter characteristic appears to be in great importance for addressing the potential problem of reverse causality between taxation and economic inequality referred by a large number of scholars (see e.g. Piketty and Saez, 2007; Poterba, 2007).

Concerning the tax rates data, our analysis relies on the corporate tax rates measures - developed by Djankov et al (2010) following the methodology described above- as well as one labor tax. More precisely, we employ: (i) the effective corporate tax rate (denoted as *capital tax rate*) which is the actual first year corporate tax liability of the hypothetical standardized enterprise relative to pre-tax earnings, taking into account all available deductions, (ii) the labor tax rate (denoted as *labor tax rate*) which is the sum of all labor-

⁹ For more details about the characteristics of this hypothetical standardized enterprise see Djankov et al (2010).

related taxes payable by the hypothetical firm including payroll taxes, mandatory social security contributions, mandatory health insurance relative to pre-tax earnings and (iii) the ratio of labor to capital tax rate (*Ratio labor to capital tax*).¹⁰

3.2.2 Data on income inequality

In order to control for income inequality, we rely on three alternative inequality databases and we employ four alternative measures of Gini coefficients. Our benchmark inequality variable, which is employed in most of the specifications, is the Gini coefficient developed by the Texas University Inequality Project [TUIP] (2003) (denoted as *Gini_Texas*). The basic advantage of the *Gini_Texas* indicator is that it is a pre-tax-and-transfers Gini measure and therefore is not expected to vary “mechanically” with the tax policies. This characteristic is important since it mitigates the potential reverse causality problem in the relationship under examination.¹¹

In order to inquire into the robustness of our baseline results we also employ three alternative inequality proxies. Namely, we employ: (i) the pre-tax-and-transfers Gini coefficient developed by Solt (2009) (denoted as *GiniSolt_market*), (ii) the post-tax-and-transfers Gini coefficient developed by Solt (2009) (denoted as *Gini_Solt*) and (iii) the Deininger and Squire (1996) Gini coefficient obtained from the World Bank's World Development Indicators (2010) (denoted as *Gini_DS*). All the alternative inequality measures are averages over the period 1980-2002.

3.2.3 Control variables

To ensure robust econometric identification, we use a number of control variables in the estimated equations. In order to be consistent with the relevant literature, our core set of controls is identical to that employed by the pioneering work of Mulligan et al. (2004) which examines the effect of democracy on implemented fiscal policy.

More precisely, we control for the overall level of productivity and wealth in the economy by employing real GDP per capita (denoted as *gdp_percapita*). Data for this

¹⁰ For more details on tax variables methodology and definitions see Djankov et al (2010).

¹¹ We note pre-tax-and-transfers Gini coefficients vary solely through the endogenous responses of labor supply or the general equilibrium effect on factor prices (see e.g. Poterba, 2007) whereas post-tax-and-transfers Gini coefficients vary - by construction- “mechanically” with the implemented tax policies.

variable originates from the World Banks' World Development Indicators (WDI) (2010). In addition, we account for the presence of economies of scale in the public good provision at the country level by controlling for (i) total population (*population*) obtained by WDI (2010) and (ii) ethno-linguistic fractionalization by employing the Alesina et al. (2003) data on ethnic (denoted as *ethnic*) and linguistic fractionalization (*language*). Higher values of *population* and lower values on *ethnic* and *language* imply larger economies of scale, lower per capita cost of public good and consequently lower levels of taxation (Alesina and Wacziarg, 1998).

In order to control for demographic characteristics we use the proportion of population above 65 years old (denoted as *old*). *old* is a standard demographic variable that is expected to exert a positive impact on tax rates since higher proportion of the economically dependent population generates fiscal needs which in turn increase tax rates. Finally, we employ *openness* to account for international market integration. According to the tax competition theory (see e.g. Zodrow and Mieszkowski, 1986; Bucovetsky and Wilson, 1991) more integrated economies tend to rely heavier on the taxation of labor relative to capital, since the former appears to be relatively immobile factor of production. Thus, *openness* is expected to be positively (resp. negatively) related with labor (resp. capital) tax rates.¹²

4. Estimation and Results

4.1 The effect of income inequality on the structure of taxation: Baseline Results

We start by estimating equation (11) presented in section 3.1, using the data and the empirical methodology outlined in the previous section. The results are reported in Table 1.

[Table 1, here]

¹² According to the benchmark tax competition model (Zodrow and Mieszkowski, 1986) tax competition among different regions leads to suboptimally low capital tax rates and to an inefficiently low level of public goods. Allowing for a second tax instrument (i.e. a labor tax), the local governments find it optimal to rely more on labor taxation to finance the public good (see e.g. Bucovetsky and Wilson, 1991; Persson and Tabellini, 1993).

In columns (1) to (4), *Capital Tax Rate* is regressed on *Gini_Texas* as well as on a set of control variables identical to that employed by Mulligan et al. (2004) (i.e. *gdp_percapita*, *openness*, *government spending*, *democracy*, *ethnic*, *population*, *old*, *legor_uk* and *language*). All regressions are estimated with regional dummies and robust standard errors. The set of regional dummies includes a fixed effect for East Asia (*AsiaE*), North America (*NAm*), Sub-Saharan Africa (*SubAfr*) and Asia and Middle Africa (*AsiaMAfr*).

Clearly, *Gini_Texas* bears a positive and highly significant coefficient which remains qualitatively intact in all alternative specifications. This result indicates that economies characterized by higher income inequality rely heavier on capital taxation. This finding appears to be in accordance with the testable hypothesis driven by our theoretical model. As far as the rest of the explanatory variables are concerned, we observe that *gdppercapita* bear positive and significant coefficients indicating that richer countries tend to increase the tax burden fallen on capital whereas *openness* enters with a negative and significant coefficient highlighting the negative effect of international market integration on capital taxation. This result is in line with the theory of international tax competition (see e.g. Bucovetsky and Wilson, 1991; Persson and Tabellini, 1992) as well as previous empirical studies examining the effect of globalization on capital taxation (see e.g. Bretschger and Hettich, 2002; Adam and Kammass, 2007).¹³

In columns (5) to (8) the dependent variable is *Labor Tax Rate* developed by Djankov et al. (2010) whereas in columns (9) to (12) the dependent variable is the ratio of labor to capital tax rate (denoted as *Ratio labor to capital tax*) which captures the tax burden fallen on labor relative to capital. These two variables are regressed on *Gini_Texas* as well as on the standard set of explanatory variables and regional dummies. All regressions are again estimated with robust standard errors.

As can be seen, in columns (5) to (12) *Gini_Texas* enters with a negative and significant coefficient which remains robust in all alternative specifications. The negative coefficient of *Gini_Texas* on *Labor Tax Rate* (see columns (5) to (8)) highlights the negative effect of increased income inequality on the tax burden fallen on labor whereas the negative coefficient *Gini_Texas* on *Ratio labor to capital tax* (see columns (9) to

¹³ For an excellent survey on international tax competition literature see Leibrecht and Hochgatterer (2012) and for a meta-analysis of the relevant empirical studies see Adam et al. (2013).

(12)) indicates that economies characterized by higher income inequality tend to rely heavier on labor relative to capital taxation. These findings appear to be in clear agreement with the implications driven by the theoretical model presented in Section 2.

Concerning the rest of the explanatory variables, we observe that *gdp_per capita* enters with a negative and significant coefficients indicating that richer countries tend to decrease the tax burden fallen on labor (see columns (5) to (8)) and to rely lighter on labor taxation relatively to capital taxation (see columns (9) to (12)). In contrast, *openness* bears a positive coefficient which appears to be significant in most of the specifications. The positive impact of international market integration on the ratio of labor to capital tax rate is in line with the theory of international tax competition which suggests that increased globalization leads to a transfer of the tax burden from the internationally mobile factor of production (i.e. capital) to the relative immobile (i.e. labor) (see e.g. Persson and Tabellini, 1992). Moreover, this result is also in accordance with previous empirical studies examining the impact of globalization on the structure of taxation (see e.g. Bretschger and Hettich, 2002; Adam and Kammas, 2007). Finally, we note that *legor_uk* enters with a negative and highly significant coefficient indicating that the countries characterized by British legal origin (common law countries) tend to rely lighter on labor taxation compared to the non-British law origin countries.

4.2 The effect of income inequality on the structure of taxation: Sensitivity Analysis

In Tables 2a and 2b, we inquire into the robustness of our baseline results by investigating whether the effect of income inequality on the structure of taxation survives under alternative measures of inequality as well as under alternative estimation techniques.

[Table 2a here]

In Table 2a we re-estimate the benchmark regression using alternative proxies for income inequality. Namely, in columns (1) to (3) we employ the Gini coefficient –before taxes and transfers- developed by Solt (2009) [denoted as *GiniSolt_market*], in columns (4) to (6) the Gini coefficient –after taxes and transfers- developed by Solt (2009) [denoted as

Gini_Solt] and in columns (7) to (9) the Deininger and Squire (1996) Gini coefficient [denoted as *Gini_DS*].¹⁴

Again, all alternative inequality measures bear positive and significant coefficients on the equations related to capital taxation and negative and significant coefficients in equations related to (i) labor and (ii) ratio of labor to capital taxation. Therefore, we conclude that our baseline empirical findings remain robust under different income inequality measures. In other words, countries characterized by higher inequality tend to rely heavier on capital taxation whereas at the same time decrease the tax burden fallen on labor. The parameter estimates on the remaining explanatory variables are largely unchanged.

[Table 2b here]

In Table 2b, we further investigate the robustness of our baseline results by examining whether the effect of income inequality on the structure of taxation survives under alternative estimation techniques. To this end, in columns (1) to (3) we repeat our benchmark estimation keeping intact the set of the controls and excluding solely the regional dummies. As can be easily verified our empirical findings remain qualitatively intact.

Next, in columns (4) to (6), in Table 2b, we examine the robustness of our results by checking whether these are driven by individual outliers and by applying robust regression techniques. As our sample consists of many heterogeneous countries another potential source of worry may be the presence of outliers in the sample. Outliers are observations that lie outside the typical relationship between the dependent and explanatory variables determined by the rest of the observations (Barnett and Lewis, 1994; De Haan, 2007). The standard practice is dropping observations identified as outliers through the residuals of the OLS estimation. However this may in fact be inappropriate: outliers in the space of the explanatory variables (i.e. “good leverage points”, Rousseeuw and Leroy, 1987) are not detected by this method. In order to deal

¹⁴ Note that *GiniSolt_market* is a Gini coefficient before taxes and transfers and therefore is more closely related to the *Gini_Texas* measure which is employed as the benchmark. On the other hand, *Gini_Solt* and *Gini_DS* both consists Gini coefficients after taxes and transfers.

with this issue we apply robust regression techniques. Specifically, we employ the MM-estimator (Yohai, 1987). Following Rousseeuw and Yohai (1987), this class of estimators instead of minimizing the variance of the residuals (as the OLS does) minimizes measures of dispersion of the residuals that are less sensitive to outliers. As can be seen [columns (4) to (6), in Table 2b] our empirical findings remain highly robust under robust regression techniques.

We have already noted the potential reverse causality problem between income inequality and the structure of taxation. This is because lower degrees of economic inequality may be the contemporaneous result of a more redistributive tax structure rather than solely the cause of it (see e.g. Piketty and Saez, 2007; Poterba, 2007).

In our baseline estimations, we have chosen to address the reverse causality problem, by employing the *Gini_Texas* as the income inequality measure, which is a pre-tax-and-transfers- Gini coefficient. Moreover, we have chosen to employ Gini measures which are averages over the period 1980-2002 whereas our dependent variables are tax data from the fiscal year 2004.

In columns (7) to (9), in Table 2b, we treat the potential reverse causality problem by employing an instrumental variables approach. Three obvious choices for instrumenting income inequality are: (i) the primary, (ii) the secondary and (iii) the tertiary gross school enrollment ratios (taken from the World Bank), expressed as the percentage of the population of official education age. Education is expected to affect income inequality (see e.g. Psacharopoulos and Woodhall, 1985) whereas, at the same time, gross school enrollment ratios are not expected to be associated with the structure of taxation.¹⁵ We report the results in Columns (7) to (9). The estimation method is two-stage least squares (2SLS) with geographical dummies and robust standard errors. First stage results (not reported in the Table) indicate that our instruments are significant determinants of income inequality. The good fit of the instruments is also confirmed by the Hansen *J* over-

¹⁵ For a survey on the effect of education on income inequality see Psacharopoulos and Woodhall (1985, pp. 264-70); and Ram (1989). Becker and Chiswick (1966) show that, across regions in the US, income inequality is negatively correlated with the average level of schooling. Chiswick (1971) suggests that earnings inequality increases with educational inequality. Gregorio and Lee (2002) argue that income distribution is closely related to people's average years of school attained and its distribution. Additional empirical works among others that find relationship between schooling and income inequality are Ram (1990), Park (1996) and Thomas et al. (2003).

identification test (i.e. that the over-identification restrictions are valid).¹⁶ As can be verified our empirical findings remain qualitatively intact. *Gini_Texas* enters with a positive and significant coefficient in the estimation of *Capital tax rate* whereas bears a negative and significant coefficient in the estimations of both the (i) *Labor tax rate* and (ii) the *Ratio of labor to capital tax*. Concerning the rest of the explanatory variables, our results remain similar to those presented in the previous tables.

4.3 The effect of the democracy on the nexus between income inequality and the structure of taxation

In this sub-section we place the spotlight on the potential differential effect of the democracy on the nexus between income inequality and the structure of taxation. To identify this channel we estimate the following equation:

$$TaxRate_i = \alpha_0 + \beta_1 Gini_i + \beta_2 Democracy_i + \beta_3 Gini_i * Democracy_i + \beta_k controls_i + \text{geographical dummies}_i + u_i \quad (12)$$

Specifically; we introduce a variable capturing the political regime type (*Democracy*) and an interaction term (*Gini*Democracy*). To allow interpreting the impact of β_1 and β_2 at their mean values, we mean-center the corresponding variables and compute the multiplicative term of the transformed variables.¹⁷

Specifically, we introduce the multiplicative variables: (i) *Gini_Texas_dif*Democracy_dif* [see columns (1) to (3) in Table3], (ii) *Gini_Texas_dif*Rule_Law_dif* [see columns (4) to (6)], and (iii) *Gini_Texas_dif*Accountability_dif* [see columns (4) to (6)]. The variable *Gini_Texas_dif* is the mean-centered of the *Gini_Texas*. Similarly, *Democracy_dif* is the mean-centered of the democracy measure developed by Polity IV (2004) database with higher values denoting more democratic regimes. Finally, the

¹⁶ For more details on these issues see Baum et al. (2007).

¹⁷ By taking differences from the mean (mean-centered variables), we avoid the potential problem of multicollinearity between the constitutive terms and the interaction term, whereas our results do not change qualitatively.

Rule_Law_dif and the *Accountability_dif* are the mean-centered measures of the “Rule of Law” and “Voice and Accountability” variables developed by Kaufmann et al. (2010).¹⁸

By introducing these interaction terms we allow the effect of *Gini_Texas* to vary across countries characterized by different political regimes. According to our theoretical priors the degree of democracy is not expected to affect the relationship between income inequality and the composition of taxation. Thus, we anticipate a statistically insignificant coefficient in all these interaction terms.

[Table 3, here]

The results indicate that all three alternative interaction terms (i.e. *Gini_Texas_dif*Democracy_dif*, *Gini_Texas_dif*Rule_Law_dif* and *Gini_Texas_dif*Accountability_dif*) bear statistically insignificant coefficients in all alternative specifications. These findings are in line with the implications driven by our theoretical model. Namely, the positive (resp. negative) effect of income inequality on the tax rate of capital (resp. the tax rate of labor) is not affected by the political regime type and the corresponding quality of democracy within each country.

Our empirical findings appear to be in accordance (although not directly related) with the conclusions driven by the empirical studies of Mulligan et al. (2004) and Profeta et al. (2012) which also fail to establish a robust relationship between the degree of democracy and the composition of taxation. Specifically, Mulligan et al. (2004) shows that democracy does neither affect total tax revenue (as a share of GDP) nor corporate tax rates. Similarly, the analysis of Profeta et al. (2012) fails to provide evidence of a significant relationship between democratic institutions and implemented tax policies - when controlling for country fixed effects. Therefore, our analysis contributes to the existing literature by highlighting that income inequality is the major driving force behind the design of the tax system despite the degree and the quality of democracy within each country.

¹⁸ According to Kaufmann et al. (2010) *Rule of law* captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, and the courts, as well as the likelihood of crime and violence. *Voice and accountability* captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

5. Conclusions

In this paper we specify a theoretical framework which allows us to investigate the effect of income inequality on the structure of tax policies and whether this effect depends on the political regime and the quality of democracy within each country. The analysis is carried out on a cross section dataset of 75 developed and developing countries. Backed by strong empirical results, obtained from several different specifications and sensitivity analyses, we contend that economies characterized by higher income inequality rely heavier on capital taxation whereas at the same time they tend to lessen the tax burden fallen on labor. This result is unaffected by the political regime type and the quality of democracy.

To the best of our knowledge this is the first study that examines the relationship between income inequality and tax structure for a sample of developing and developed countries. Therefore, our findings contribute to the well established agenda studying the implemented fiscal policy in developing countries and examining potential differences between developing and developed countries concerning this issue (see e.g. Persson and Tabellini, 2003; Kenny and Winer, 2006; Keen and Lockwood, 2010). Moreover, our findings could also be related to the literature that examine the effects of alternative political regimes on implemented policies (see e.g. Aidt and Jensen 2009; Deacon, 2009; Mulligan et al., 2004; Profeta et al., 2012). Clearly, these findings and their potential policy implications call for a deeper understanding of the inter- and intra-country mechanisms that create this pattern and this is an issue definitely warrants future research.

Appendix A: Data sources and descriptive statistics

Variable	Description	Obs.	Mean	Std. Dev.	Min	max	Source
<i>Capital tax rate</i>	Effective (1 years) tax rate on capital.	80	17.733	6.247	4.14	39.87	Djankov et al. (2010)
<i>Labor tax rate</i>	Labor tax rate	80	15.533	9.339	0.61	37.65	Djankov et al. (2010)
<i>Ratio(labor to capital tax)</i>	Ratio of labor tax to effective (1 year) tax rate on capital.	80	1.157	1.158	0.027803	6.330918	Own calculations based on Djankov et al. (2010)
<i>Gini_Texas</i>	Gini coefficient	73	40.385	6.052	24.46	53.27	Texas University Inequality Project (2003)
<i>GiniSolt_market</i>	Gini coefficient (before taxes and transfers)	80	43.610	7.068	29.38	66.12	Solt (2009)
<i>Gini_Solt</i>	Gini coefficient (after taxes and transfers)	80	37.196	10.129	21.58	62.07	Solt (2009)
<i>Gini_DS</i>	Gini coefficient	76	38.496	9.202	21.61	58.93	World Bank Development Indicators (2011)
<i>old</i>	Population ages 64 and above (% Total Population)	80	28.613	3.652	18.45	37.28	World Bank Development Indicators (2011)
<i>gdp_percapita</i>	GDP per capita (constant 2000 US\$).	80	7147.227	8965.816	141.34	32321.34	World Bank Development Indicators (2011)
<i>population</i>	total population	80	7.244	0.589	6.3	9.06	World Bank Development Indicators (2011)
<i>democracy</i>	Polity Democracy Index	78	4.214	5.443	-7.2	10	Polity IV (2004) Database
<i>Rule_Law</i>	Rule of Law	80	0.250	0.940	-1.38	1.94	Kaufmann et al. (2010)
<i>Voice_Accountability</i>	Voice and Accountability	80	0.296	0.858	-1.43	1.63	Kaufmann et al. (2010)
<i>ethnic</i>	Ethnic Fractionalization.	80	0.408	0.255	0	0.93	Alesina et al (2003)
<i>openness</i>	Imports plus Exports (%GDP)	80	56.084	36.68362	15.07	293.33	World Bank Development Indicators (2011)
<i>language</i>	Linguistic Fractionalization.	80	0.352	0.288	0	0.92	Alesina et al (2003)
<i>legor_uk</i>	Dummy variable taking the value of one if a country has British Legal Origin	77	0.285	0.454	0	1	La Porta et al. (2008)
<i>Public Spending</i>	Total Government Spending (%GDP)	75	28.793	10.774	8.77	56.38	World Bank Development Indicators (2011)

<i>Prim_enrolment</i>	Gross school enrolment ratio. Primary.	79	99.710	15.568	33.63	138.61	World Bank Development Indicators (2011)
<i>Sec_enrolment</i>	Gross school enrolment ratio. Secondary. All programmes.	79	73.246	31.379	5.04	149.73	World Bank Development Indicators (2011)
<i>Tert_enrolment</i>	Gross school enrolment ratio. Tertiary (ISCED 5 and 6).	79	26.393	18.115	0.42	79.28	World Bank Development Indicators (2011)

Table1: The effect of income inequality on the tax structure. Baseline Results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	<i>Capital tax rate</i>	<i>Capital tax rate</i>	<i>Capital tax rate</i>	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Labor tax rate</i>	<i>Labor tax rate</i>	<i>Labor tax rate</i>	<i>Ratio labor to capital tax</i>	<i>Ratio labor to capital tax</i>	<i>Ratio labor to capital tax</i>	<i>Ratio labor to capital tax</i>
Gini_Texas	0.568*** (3.621)	0.459*** (3.421)	0.453*** (3.552)	0.456*** (3.156)	-0.782*** (-3.618)	-0.797*** (-3.964)	-0.732*** (-2.747)	-0.447* (-1.781)	-0.110*** (-4.899)	-0.102*** (-4.625)	-0.097*** (-3.958)	-0.092*** (-3.089)
gdp_percapita	0.001*** (2.870)	0.001** (2.391)	0.001** (2.178)	0.001** (2.663)	-0.001** (-2.307)	-0.001 (-1.468)	-0.001* (-1.773)	-0.001** (-2.041)	-0.001*** (-3.865)	-0.001** (-2.544)	-0.001*** (-2.953)	-0.001** (-2.584)
openness		-0.065*** (-3.685)	-0.055** (-2.582)	-0.047* (-1.967)		-0.020 (-0.911)	-0.002 (-0.061)	0.077** (2.538)		0.006* (1.859)	0.009* (2.000)	0.010** (2.172)
democracy		0.246 (1.196)	0.240 (0.959)	0.271 (1.143)		-0.364 (-1.346)	-0.083 (-0.282)	0.248 (0.793)		0.015 (0.343)	0.050 (0.934)	0.053 (1.017)
legor_uk			1.920 (0.891)	1.314 (0.596)			-7.262*** (-4.360)	-9.544*** (-3.735)			-0.792*** (-3.151)	-0.872*** (-2.855)
Public Spending			-0.128 (-1.438)	-0.083 (-0.860)			0.040 (0.285)	0.171 (1.248)			0.011 (0.766)	0.008 (0.417)
old			0.374 (1.077)	0.348 (1.042)			-0.213 (-0.489)	0.294 (0.666)			0.007 (0.167)	0.018 (0.359)
population				1.604 (0.928)				8.546*** (3.390)				0.042 (0.133)
Ethnic				5.225 (1.119)				0.008 (0.001)				-0.674 (-0.718)
Language				-0.619 (-0.142)				-2.838 (-0.589)				0.506 (0.741)
Regional Dummies	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
obs	75	73	67	67	75	73	67	67	74	73	67	67
R2	0.17	0.37	0.44	0.46	0.38	0.40	0.48	0.60	0.37	0.41	0.50	0.51

Notes: The table presents estimated coefficients and *t*-statistics in parentheses. All regressions are estimated with regional dummies and robust standard errors (except otherwise noted). The set of regional dummies includes a fixed effect for East Asia (*AsiaE*), North America (*NAm*), Sub-Saharan Africa (*SubAfr*) and Asia and Middle Africa (*AsiaMAfr*). In Columns (1)-(4), the dependent variable is the *Capital Tax Rate* data developed by Djankov et al. (2010). In Columns (5)-(8) the dependent variables is the *Labor Tax Rate* data developed by Djankov et al. (2010). Finally, in Columns (9) and (12) the dependent variable is the *Ratio of labor to capital tax*. The *, ** and *** marks denote statistical significance at the 10%, 5% and 1% respectively.

Table2a: The effect of income inequality on the tax structure. Sensitivity Analysis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>
GiniSolt_market	0.236** (2.329)	-0.342** (-2.655)	-0.061*** (-3.591)						
Gini_Solt				0.253** (2.646)	-0.417*** (-3.548)	-0.071*** (-4.336)			
Gini_DS							0.221** (2.110)	-0.299** (-2.402)	-0.065*** (-3.763)
gdp_percapita	0.001 (1.549)	-0.001*** (-2.928)	-0.001*** (-2.972)	0.001* (1.915)	-0.001*** (-3.734)	-0.001*** (-3.365)	0.001 (1.663)	-0.001*** (-3.417)	-0.001*** (-3.320)
openness	-0.058** (-2.379)	0.077*** (2.693)	0.011*** (2.820)	-0.056** (-2.282)	0.073** (2.579)	0.011*** (2.846)	-0.054** (-2.167)	0.076** (2.499)	0.011*** (2.827)
democracy	0.075 (0.376)	0.443* (1.762)	0.090* (1.868)	0.112 (0.555)	0.403* (1.763)	0.081* (1.800)	0.128 (0.613)	0.532** (2.489)	0.103** (2.109)
legor_uk	2.589 (1.103)	-9.574*** (-4.136)	-0.914*** (-3.047)	2.317 (0.935)	-8.950*** (-3.947)	-0.800*** (-2.797)	3.145 (1.177)	-9.576*** (-3.945)	-0.840*** (-2.708)
Government spending	-0.102 (-1.014)	0.175 (1.397)	0.017 (0.952)	-0.059 (-0.595)	0.102 (0.800)	0.004 (0.254)	-0.093 (-0.848)	0.140 (1.065)	0.005 (0.263)
old	0.268 (0.715)	0.194 (0.510)	0.011 (0.218)	0.339 (0.886)	0.067 (0.183)	-0.015 (-0.339)	0.336 (0.906)	0.190 (0.493)	0.000 (0.005)
population	1.843 (1.196)	8.149*** (3.385)	0.167 (0.594)	1.730 (1.148)	8.327*** (3.632)	0.213 (0.858)	2.359 (1.294)	8.204*** (3.505)	0.148 (0.539)
Ethnic	6.215 (1.182)	-2.028 (-0.343)	-0.826 (-0.951)	3.534 (0.692)	2.602 (0.445)	-0.026 (-0.034)	2.223 (0.407)	2.920 (0.480)	0.057 (0.071)
Language	-0.327 (-0.083)	-3.638 (-0.807)	0.113 (0.190)	1.050 (0.272)	-6.209 (-1.348)	-0.319 (-0.564)	1.151 (0.295)	-2.034 (-0.418)	-0.006 (-0.011)
Regional Dummies	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
obs	72	72	71	72	72	71	69	69	68
R2	0.40	0.58	0.52	0.42	0.61	0.57	0.42	0.61	0.58

Notes: The table presents estimated coefficients and *t*-statistics in parentheses. All regressions are estimated with regional dummies and robust standard errors (except otherwise noted). The set of regional dummies includes a fixed effect for East Asia (*AsiaE*), North America (*NAm*), Sub-Saharan Africa (*SubAfr*) and Asia and Middle Africa (*AsiaMAfr*). In Columns (1), (4) and (7) the dependent variable is the *Capital Tax Rate* data developed by Djankov et al. (2010). In Columns (2), (5) and (8) the dependent variables is the *Labor Tax Rate* data developed by Djankov et al. (2010). Finally, in Columns (3), (6) and (9) the dependent variable is the *Ratio of labor to capital tax*. In Columns (1) to (3) the Gini coefficient –before taxes and transfers- developed by Solt (2009) [denoted as *GiniSolt_market*] is employed as proxy of income inequality. In Columns (4) to (6) the Gini coefficient –after taxes and transfers- developed by Solt (2009) [denoted as *Gini_Solt*] is employed as proxy of income inequality. In Columns (7) to (9) the Gini coefficient developed by Deininger and Squire (1996) [denoted as *Gini_DS*] is employed as proxy of income inequality. The *, ** and *** marks denote statistical significance at the 10%, 5% and 1% respectively.

Table2b: The effect of income inequality on the tax structure. Sensitivity Analysis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>
Gini_Texas	0.513*** (3.494)	-0.423* (-1.958)	-0.093*** (-3.786)	0.320** (2.508)	-0.490* (-1.707)	-0.080*** (-3.711)	1.094* (1.738)	-1.774* (-1.836)	-0.288*** (-2.594)
gdp_percapita	0.001** (2.422)	-0.001*** (-3.543)	-0.001*** (-3.116)	0.001* (1.698)	-0.001 (-1.527)	-0.001** (-2.238)	0.001* (1.709)	-0.001** (-2.112)	-0.001** (-2.433)
openness	-0.038 (-1.585)	0.077*** (2.673)	0.008** (2.148)	-0.097*** (-2.635)	0.064* (1.824)	0.006** (2.359)	-0.050 (-1.008)	-0.016 (-0.219)	0.002 (0.263)
democracy	0.209 (1.013)	0.444* (1.839)	0.065 (1.573)	0.359* (1.682)	0.105 (0.269)	-0.013 (-0.549)	0.398 (1.567)	0.234 (0.633)	0.035 (0.656)
legor_uk	0.610 (0.304)	-10.754*** (-4.396)	-0.890*** (-3.274)	-0.190 (-0.059)	-10.113*** (-3.537)	-0.636** (-2.435)	-0.883 (-0.324)	-6.806* (-1.788)	-0.350 (-0.920)
Government spending	-0.084 (-0.974)	0.239* (1.992)	0.014 (0.827)	-0.009 (-0.071)	0.178 (0.949)	0.032* (1.673)	0.103 (0.613)	-0.051 (-0.197)	-0.036 (-0.979)
old	0.188 (0.749)	0.494 (1.442)	0.015 (0.420)	0.260 (0.879)	-0.008 (-0.013)	-0.002 (-0.080)	0.576* (1.935)	0.116 (0.228)	-0.027 (-0.474)
population	1.629 (0.908)	8.855*** (3.739)	0.074 (0.243)	0.853 (0.454)	7.334*** (2.673)	0.468 (1.334)	3.365 (1.273)	4.495 (1.147)	-0.532 (-1.061)
Ethnic	0.734 (0.164)	1.674 (0.278)	-0.085 (-0.106)	2.467 (0.664)	-1.695 (-0.273)	-0.009 (-0.021)	1.268 (0.204)	6.033 (0.876)	0.358 (0.419)
Language	0.018 (0.005)	-4.661 (-0.870)	0.271 (0.402)	1.212 (0.312)	-0.633 (-0.136)	-0.172 (-0.357)	-1.598 (-0.373)	1.459 (0.265)	0.995 (1.271)
Regional Dummies	<i>No</i>	<i>No</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
obs	67	67	67	67	67	67	66	66	66
R2	0.40	0.57	0.48				0.34	0.37	0.18
Hansen <i>J</i>							12.34 (0.1946)	3.46 (0.9433)	3.39 (0.9466)

Notes: The table presents estimated coefficients and *t*-statistics in parentheses. All regressions are estimated with regional dummies and robust standard errors (except otherwise noted). The set of regional dummies includes a fixed effect for East Asia (*AsiaE*), North America (*NAm*), Sub-Saharan Africa (*SubAfr*) and Asia and Middle Africa (*AsiaMAfr*). In Columns (1), (4) and (7) the dependent variable is the *Capital Tax Rate* data developed by Djankov et al. (2010). In Columns (2), (5) and (8) the dependent variables is the *Labor Tax Rate* data developed by Djankov et al. (2010). Finally, in Columns (3), (6) and (9) the dependent variable is the *Ratio of labor to capital tax*. In Columns (1) to (3) the regressions are estimated without regional dummies. In Columns (4) to (6) the regressions are estimated with robust regression analysis using the MM- estimator (Yohai et al., 1987). In Columns (7) to (9) the regressions are estimated with two-stage least squares (2SLS). The *, ** and *** marks denote statistical significance at the 10%, 5% and 1% respectively.

Table3: The effect of Democracy on the nexus between income inequality and tax structure.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>	<i>Capital tax rate</i>	<i>Labor tax rate</i>	<i>Ratio (labor to capital tax)</i>
Gini_Texas	0.395*** (2.762)	-0.469 (-1.546)	-0.093*** (-3.000)	0.475*** (2.924)	-0.559** (-2.255)	-0.111*** (-3.670)	0.441*** (2.852)	-0.589*** (-2.776)	-0.106*** (-3.985)
democracy	0.303 (1.214)	0.259 (0.814)	0.054 (0.987)						
Gini_Texas_dif*Democracy_dif	0.021 (0.986)	0.007 (0.211)	0.001 (0.122)						
Rule_Law				-0.473 (-0.334)	0.433 (0.153)	-0.043 (-0.148)			
Gini_Texas_dif *Rule_Law_dif				-0.170 (-0.865)	0.250 (0.911)	0.047 (1.305)			
Voice_Accountability							0.106 (0.058)	-0.381 (-0.160)	0.181 (0.531)
Gini_Texas_dif * Voice_Accountability_dif							-0.059 (-0.348)	0.325 (1.419)	0.040 (1.297)
gdp_percapita	0.001*** (2.901)	-0.001** (-2.116)	-0.001** (-2.622)	0.001*** (3.158)	-0.001 (-1.070)	-0.001* (-1.679)	0.001*** (3.378)	-0.001 (-0.892)	-0.001** (-2.100)
openness	-0.048* (-1.997)	0.077** (2.504)	0.010** (2.154)	-0.059*** (-2.860)	0.064** (2.580)	0.007** (2.156)	-0.059** (-2.546)	0.057** (2.166)	0.008* (1.946)
legor_uk	1.203 (0.539)	-9.584*** (-3.716)	-0.875*** (-2.784)	1.477 (0.728)	-9.109*** (-3.633)	-0.688*** (-2.784)	1.527 (0.755)	-9.210*** (-3.741)	-0.727*** (-2.961)
Government spending	-0.083 (-0.840)	0.172 (1.237)	0.008 (0.415)	-0.080 (-0.803)	0.159 (1.131)	0.011 (0.575)	-0.098 (-0.924)	0.209 (1.416)	0.011 (0.531)
old	0.389 (1.123)	0.308 (0.672)	0.019 (0.355)	0.196 (0.570)	0.310 (0.710)	0.011 (0.232)	0.259 (0.719)	0.279 (0.641)	0.020 (0.395)
population	1.333 (0.723)	8.451*** (3.290)	0.036 (0.108)	1.158 (0.608)	7.418*** (2.907)	-0.194 (-0.515)	1.096 (0.578)	6.798*** (2.715)	-0.095 (-0.281)
Ethnic	4.781 (1.024)	-0.148 (-0.024)	-0.684 (-0.702)	5.387 (1.124)	0.341 (0.060)	-0.631 (-0.781)	5.622 (1.174)	-0.262 (-0.045)	-0.560 (-0.691)
Language	0.271 (0.061)	-2.525 (-0.507)	0.526 (0.714)	-0.143 (-0.034)	-1.398 (-0.314)	0.709 (1.040)	0.057 (0.013)	-0.738 (-0.170)	0.661 (0.985)
Reg. Dummies	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
obs	67	67	67	68	68	68	68	68	68
R2	0.47	0.60	0.51	0.46	0.60	0.52	0.45	0.61	0.51

Notes: The table presents estimated coefficients and *t*-statistics in parentheses. All regressions are estimated with regional dummies and robust standard errors (except otherwise noted). The set of regional dummies includes a fixed effect for East Asia (*AsiaE*), North America (*NAm*), Sub-Saharan Africa (*SubAfr*) and Asia and Middle Africa (*AsiaMAfr*). In Columns (1), (4) and (7) the dependent variable is the *Capital Tax Rate* data developed by Djankov et al. (2010). In Columns (2), (5) and (8) the dependent variables is the *Labor Tax Rate* data developed by Djankov et al. (2010). In Columns (3), (6) and (9) the dependent variable is the *Ratio of labor to capital tax*. In Columns (1) to (3) we have introduced the interaction term *Gini_Texas_dif***Democracy_dif* which consists of the *Gini_Texas_dif* that is the mean-centered of the *Gini_Texas* and the *Democracy_dif* which is the mean-centered of the democracy measure developed by Polity IV (2004) database with higher values denoting more democratic regimes. In Columns (4) to (6) we have the interaction term *Gini_Texas_dif***Rule_Law_dif* where the *Rule_Law_dif* is the mean-centered measure of the “Rule of Law” measure developed by Kaufmann et al. (2010) with higher values denoting more accountable regime. Finally, in Columns (7) to (9) we have introduced the multiplicative variable *Gini_Texas_dif***Accountability_dif* where *Accountability_dif* is the mean-centered measures of “Voice and Accountability” variable developed by Kaufmann et al. (2010) with higher values denoting more accountable regime. The *, ** and *** marks denote statistical significance at the 10%, 5% and 1% respectively.

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