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**TAX COMPETITION AND INCOME INEQUALITY:
WHY DID THE WELFARE STATE SURVIVE**

Thomas Plümper - University of Essex
Vera E. Troeger - University of Warwick

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Department of Economics

Tax Competition and Income Inequality

Why did the Welfare State Survive?

Thomas Plümer^a and Vera E. Troeger^b

a University of Essex
Department of Government
Wivenhoe Park
Colchester CO4 3SQ, UK
E-Mail: tpluem@essex.ac.uk

B University of Warwick
Department of Economics and PAIS
Coventry CV4 7AL, UK
E-Mail: V.E.Troeger@warwick.ac.uk

Summary:

Contrary to the belief of many, tax competition did not undermine the foundations of the welfare state and did not even abolish the taxation of capital. Instead, tax competition caused governments to shift the tax burden from capital to labor, thereby increasing income inequality in liberal market economies that traditionally redistribute income by relatively high effective capital taxes and relatively low effective labor taxes. In contrast, income inequality did increase little or not at all in social welfare states that dominantly use social security transfers to redistribute income. Governments in social welfare states found it easy to maintain high social expenditures because they increasingly taxed labor, which is relatively immobile, to finance social security transfers. We test the predictions of this theory using a simultaneous equation approach that accounts for the endogeneity of tax policies, fiscal policies, and deficits.

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Tax Competition and Income Inequality

Why did the Welfare State Survive?

1. Introduction

Tax competition did not change the fabric of social welfare transfers and income inequality in OECD countries. The welfare state clearly – and contrary to numerous predictions – survived the abolition of capital controls and the economic rise of new industrial power houses in China, India, Russia, Brazil and Mexico. In many welfare states, social transfers are higher than ever before and where they have declined, they still remain shy off the dire “race to the bottom” predictions of early globalization theories. Income inequality has risen in some countries, most notably in the UK and the US, but not in others. Again, this contradicts the predictions of the early globalization literature that expected larger pressures on continental European welfare states than on liberal market economies.

This article explains these developments. In short, we distinguish between countries that in the late 70s dominantly redistributed income via the tax system and countries that dominantly redistributed income via social security transfers. Of course, these policies of redistribution are not mutually exclusive, but patterns are clear. We will demonstrate that because of tax competition, all governments shifted the tax burden onto labor. However, governments in continental welfare states managed to keep revenues from labor and capital taxation constant or even increased total revenues to maintain the high level of distribution through social security transfers. Countries that profit from tax competition, Ireland and Luxembourg even increase social welfare transfers and reduce income inequality considerably. Apparently, governments in these countries tried to avoid significant cuts into the welfare system and they adjusted tax policies to reach these political aims. In contrast, governments in countries that dominantly redistribute income via the tax system face higher difficulties in avoiding an increase in income inequality. On the one hand, they need to shift tax revenues from capital to

labor to avoid large capital outflows, but this cuts deep into their traditional way of redistributing income and increases income inequality. Governments would have to significantly increase social security transfers, yet while this was acceptable to Ireland and Canada, the UK and the US government did not implement this option. Both countries thus experienced a much larger increase in income inequality than continental welfare states.

From a theoretical perspective, our arguments make clear that labor taxes, capital taxes, fiscal policies and especially social security transfers and public debt need to be analyzed in conjunction. These policies are linked to each other via the public household. Research that exclusively focuses on some of these policies, only applies if governments hold all other policies constant. But usually they do not. The dire predictions of the early models of tax competition did not come true because capital is less mobile than these authors assumed (authors 2010), but also because governments have alternative ways to respond to tax competition, thereby maintaining relatively low levels of income inequality and high levels of redistribution.

Our theory should be tested in a simultaneous equations framework. This is the only method we are aware of that allows us to correctly model the endogeneity of the redistributive policies. Not controlling for endogeneity would lead to largely biased estimates and likely to wrong inferences. Analyzing the choice of tax policies, welfare policies, government spending, and effective income redistribution as well as income inequality in 22 OECD countries between 1980 and 2005 simultaneously, we find sufficient support for our theory. However, we also use descriptive data where needed to illustrate how our theoretical argument is linked to observational processes.

This paper contributes to various literatures: First, it contrasts with previous explanations of the survival of the welfare state. Broadly speaking (and with some simplification) there are two plausible theories that also explain the survival of the welfare state: First, Soskice, Hall, Iversen and others have argued that contrary to the expectations of early globalization scholars, income redistribution and welfare spending is not an inefficient burden to a nation's

competitiveness (Iversen and Soskice 2006; Hall and Soskice 2001). Rather, income redistribution and the welfare state lead to subtle changes in the demand for education, in the comparative advantage of the country, and in the price for capital. Thus, the welfare state survives, because under certain conditions it is more competitive than liberal market economies. Thus, capital-intense corporations with a high demand for skilled workers may decide to stay in welfare state though they have to pay higher taxes. An alternative, second theory has argued that capital competition does not lead to an immediate decline of the welfare state because political institutions and most notably veto-players prevent governments from fully participating in tax competition (Basinger and Hallerberg 2004; Crepaz and Moser 2004). As a consequence, the predicted race-to-the-bottom does not take place.

We argue that though these theories appear convincing, they fail to understand why income inequality rose in large liberal market economies countries while at the same time income inequality remained stable or even declined in continental welfare states. At the same time, these theories also do not explain that effective capital and labor tax rates increased in some countries. Thus, these theories offer an explanation for the survival of the welfare state, but they are not consistent with the cross section of policy changes in OECD countries – changes that guaranteed the welfare states' ability to redistribute income.

And second, we also contribute to the literature on tax competition. While the vast majority of the literature assumes that governments have to change capital taxes when facing tax competition and some studies analyze the effect of tax competition on capital and labor taxes, our analysis is (to our knowledge) the first that governments can respond by changing tax and fiscal policies including a rise in deficits. As we have just explained, our theory explains the (surprisingly moderate) effect of tax competition on income inequality and redistribution by analyzing tax policy reforms, fiscal policy adjustments, and deficits.

2. The Evolution of Welfare State Politics: A Brief Review in Five Arguments

Governments largely influence income inequality. By taxing high income more than low income, by taxing savings, by taxing capital income at a higher rate than labor income, governments can significantly reduce post-tax income. Likewise, welfare transfers to the poor and needy part of the population reduce post-transfer income inequality. The degree to which governments use these political instruments depends on income redistribution, on a combination of political incentives and institutions, the ideology of the incumbent's party and the power of 'labor' (Iversen and Cusack 2000; Birchfeld and Crepaz 1998; Iversen and Soskice 2006; Pontusson 2005, Bradley et al. 2003; Allan and Scruggs 2004; Minnich 2003). However, the historically entrenched social welfare systems came under pressure immediately after governments in OECD countries liberalized capital transfers. According to early proponents of what would become known as globalization theory, tax competition and trade with low wage countries would lead to a race-to-the-bottom in which the social welfare state will erode (Scharpf 1991; Rodrik 1997; Swank 2002, 2006).

Rise of the Welfare State

Scholars explain the rise of the welfare state by growing political influence of labor and social-democratic parties (Iversen and Cusack 2000) and the increasing demand for high-skilled labor. The comparative welfare state literature explains welfare policies by a combination of economic incentives for redistribution and institutional factors that shape the governments' response to these incentives (Galasso and Profeta 2002). Incentives for redistribution stem from overall efficiency gains of redistribution (Samuelson 1958), intertemporal redistributive gains of the majority of voter as the middle aged voters (Browning 1975) coalesce with the old voters, or altruism (Hansson and Stuart 1989). These incentives are shaped by partisan preferences (Allan and Scruggs 2004, Crepaz 2002, Bräuninger 2005), veto-players (Tsebelis and Chang 2004, Ha 2008), and interest-groups (Hicks and Swank 1992).

Globalization and the Welfare State

Interestingly, all these standard arguments of social welfare policies assume that incentives and political preference aggregation mechanisms operate in isolation from the world economy. Neither the government's incentives nor the political aggregation mechanism is influenced by the fact that capital and labor are both mobile and that corporations in welfare states need to be able to compete with corporations that do not pay a wage premium for welfare transfers. This, however, was exactly the argument of the globalization literature, that maintained that capital mobility and trade competition exert a strong negative (Rodrik 1998; Rudra 2002; Rudra and Haggard 2001; Swank 2002; Scharpf 1991) or positive (Cameron 1978; Esping-Anderson 1996; Garrett 1998; Hicks and Swank 1992; Huber and Stephens 2001) effect on welfare transfers, depending on whether scholars looked dominantly at the pressure from global competition or the consecutive demand for social security. Scharpf (1997: 23) predicts that "capital is free to move to locations offering the highest rate of return (...). As a consequence, the capacity of national governments (...) to tax and to regulate domestic capital and business firms is now limited by the fear of capital flight and the relocation of production. Hence all national governments (...) are now forced to compete against each other in order to attract, or retain, mobile capital and firms."

The Survival of the Welfare State

The existence, causes, and consequences of welfare state retrenchment, a discussion that was triggered in the late 1990s by Pierson's work on the new politics of the welfare state (Pierson 1996), remained more controversial. Scholars continue to disagree whether welfare state retrenchment is a mere reaction to the overshooting of the welfare state, whether it is process confined to a limited number of countries in which labor power declined most sharply (Pontussen 2005), or a structure-induced process that is either driven by globalization (Scharpf 1997) or de-industrialization (Iversen and Cusack 2000). Today, it seems hardly controversial to conclude that the welfare state still exists, that redistribution has not declined in most albeit in some OECD countries, and that overall levels of disposable income

inequality as measured by the Gini-index tend to increase in only a subset of industrialized countries though the number of superrich individuals and their wealth tends to rise everywhere. Scholars explain this survival by two theories: the persistence of the welfare state (Hall and Soskice 2001; Iversen and Soskice 2006) and the limits to tax competition (Basinger and Hallerberg 2004).

Welfare State Persistence

If the competitiveness of liberal market economies increases relative to the competitiveness of coordinated market economies, the exchange between these countries would adjust. The liberal countries exchange-rate would appreciate relative to the currency of the coordinated market economies. And second, Scharpf overlooks that coordinated market economies offer many competitive advantages which are likely to persist despite capital mobility. Hall and Soskice (2001) stress the importance of vocational training, low strike activities, access to low-interest credit, and so on. Together, these institutions guarantee that coordinated market economies in many sectors maintain productivity advantages over liberal market economies. These will not erode with capital mobility and thus the welfare state is able to survive simply because it offers competitive advantages along with some competitive disadvantages. Likewise, Pierson (1996, 1998) argues that the success of the welfare state created commitments, expectations, and interests which in turn made significant cuts into the politics of redistribution unlikely. Policies and institutions are path-dependent and generate the conditions that cause a majority of voters to support redistributive policies.

Moderation of Tax Competition

A second argument explains the survival of the welfare state with the limited severity of tax competition. For example, Basinger and Hallerberg (2004) argue that tax competition has less severe consequences than early models of tax competition – those that predicted a race to the bottom in capital taxation – made many believe. These first generation models of tax competition argued that tax competition will lead to race to the bottom in capital taxation and thus to declining government revenues. These first generation models assumed that capital is

perfectly mobile. If governments do not offer competitively low tax rates, capital would entirely leave a country. But capital is not perfectly mobile, because regulations, infrastructures, and the workforce are not identical across country, and because companies need to be close to their markets – to mention just the most obvious arguments. Recent theories of tax competition, theories that give up the assumption of fully mobile capital, come to conclude that tax competition will not lead to a race to the bottom. Rather, it leaves governments the option to accept capital exports and to tax the remaining immobile capital at higher levels than before to keep revenues constant (Plümper et al. 2011). Tax competition also does not erode revenues from capital taxation because governments are not merely maximizing revenues. Rather, they maximize political support and in doing so they are constraint by the political preferences of their voters, by veto players, and by unions (Hallerberg and Basinger 1998; Basinger and Hallerberg 2004; Hays 2003, 2008; Swank 2002, 2004, 2006). All these moderate changes to the theory of tax competition will alter its predictions. In fact, politically informed models of tax competition predict a moderate convergence of tax policies to moderately lower levels of effective capital tax rates across open economies as well as a shift from capital to labor taxation (Garrett 1998a, 1998b; Rodrik 1998; Genschel 2002; Ganghof 2006; Swank 2006; Swank and Steinmo 2002; Steinmo 1994; Plümper et al. 2009) – predictions which seem much closer in line with the empirical evidence than the predictions of the race to the bottom models. If, however, tax competition has less effect on public revenues, governments can still afford to redistribute income.¹ The

1 And indeed, the empirical verdict on this hypothesis is mixed at best: while proponents of the efficiency hypothesis typically find support (Garrett 1998a; Rodrik 1998; Swank 2002) others show that the relation between tax competition and fiscal policies is insignificant and not robust (Iversen and Cusack 2000; Plümper et al. 2005). Clearly, if the empirical literature is correct and tax competition has little influence on tax revenues, major fiscal policy adjustments are unlikely to occur. Yet, some scholars still argue that it is not the absence of declining revenues but political institutions which prevent governments from cutting deep into social security systems (Ha 2008, Swank 2006). Genschel (2002: 266) claims that tax competition has had a rather limited effect on social policies because welfare states not only faced tax competition but were also confronted with slow growth, sticky budgets, increasing public debt and rising unemployment. In other words, theories claim that tax policies were constrained by the governments' inability to reduce spending – and not by governments' inability to reduce capital tax rates (see also Swank 1998; Ganghof 2004). Perhaps unsurprisingly, political scientists have recently used the very same political factors to explain the survival of the welfare state as they used to explain the survival of capital taxation: veto players, partisan preferences, the organization of labor, and so on. For arguments relating to partisan politics and the welfare state see Allan and Scruggs (2004), Huber and Stephens (1993) as well as Oatley (1999). Franzese

"conventional wisdom" on tax competition, "is too simple and considerably overdrawn" (Garrett 1995: 682).

Discussion

As a consequence, one could feel tempted to go back to the good old world of welfare state research that perceives welfare policies as independent of the global economy. Yet, we believe that this reaction would indeed be wrong. Rather, we argue that the limited empirical support for theories of tax competition explaining changes in welfare policies was ultimately caused by oversimplifying assumptions that did not sufficiently distinguish between different politics of redistribution and completely overlooked that tax competition is beneficial to some countries and harmful to others. Yet, doom theorists argued that globalization in general and tax competition in particular reduces policy autonomy of all governments alike. It does not. If Luxembourg wins tax competition because it has the structural advantage of being small, then Luxembourg can direct more resources to its welfare state. If, in contrast, Germany and France lose tax competition because of their size, then these countries have to adjust either tax policies, or fiscal policies, or both. Thus, looking at all countries as if global economic processes had roughly the same effect and in addition looking at redistributive policies in isolation when in fact tax policy and fiscal policy adjustments are substitutes will not necessarily lead to correct conclusions. In what follows we argue that governments choose very different adjustment strategies to tax competition and countries experienced different trends in income redistribution and income inequality. First, not all governments kept effective capital tax rates stable, some reduced these taxes, other countries, most notably Italy, increased their effective tax rates. And second, not all countries experienced stable levels of income inequality. In fact, income inequality rose in liberal market economies but remained relatively stable in coordinated market economies. Both variations cannot be explained easily

(2002) and Swank (2004) relate public spending to labor market institutions and policy preferences while Birchfeld and Crepaz (1998), Hicks and Swank (1992), as well as Swank (1998, 2002) analyze the effects of institutional settings and constraints on the welfare state in the age of globalization. Iversen (2001) examines the joint effects of trade openness, deindustrialization and party politics on welfare state expansion as well as the impact of wage bargaining patterns and central bank independence (Iversen 1999).

by approaches that solely seek to ‘postdict’ the survival of the welfare state. In fact, political economists need to develop theories and models that go beyond simple, dichotomous categorizations of countries and overgeneralizations of trends.

3. Theory

Tax competition between OECD countries emerged in the 1970s and accelerated in the 1980s with the US government repeatedly lowering capital tax rates.² After the US tax reforms of 1986, which increased the gap between the effective capital tax rates in the OECD world, virtually all governments in OECD countries begun to consider tax reforms and fiscal policy to respond to the predicted decline in revenues from taxing capital.

In brief, we argue that virtually all governments shifted the tax burden onto labor, but not all governments reduced effective capital tax rates. Alternatives existed. Some countries, large and indebted welfare states, even increased the overall capital tax burden to avoid significant cuts into the welfare system. Other governments were able to avoid cuts in social security transfers by choosing a combination of higher labor and lower capital taxes. Neither of these countries experienced a significant increase in income inequality. The welfare state persists because moderate changes in tax policies allowed governments to keep the level of social security transfers stable.

Yet, we also argue that countries that dominantly redistribute income via the tax system, countries that Hall and Soskice (2001) call ‘liberal market economies’, found it much harder to avoid growing income inequality. In principle, governments in these countries could have avoided an increase in inequality by reducing capital taxes, increasing labor taxes significantly and largely increasing welfare spending. But only Ireland and Luxembourg went

² Genschel (2002), for example, compares tax rates in 1985 to tax rates in 1997 – thus implicitly assuming that the US tax reforms triggered tax competition. Looking at the data, however, it seems to make more sense to assume that tax competition started earlier. Not also that the when literature refer to tax competition, it usually implies tax competition between OECD countries. Tax competition between OECD countries and tax havens is older and dates back to the early 1960s.

this way. Governments in other liberal economies and most notably in the US and the UK rather accepted growing income inequality than developing their social welfare program. We discuss the underlying logic of this argument in three steps. First, we argue that with incompletely mobile capital, a race to the bottom in capital taxation is very unlikely to emerge and governments even have the option to raise effective capital tax rates in order to stabilize revenues from capital taxation. In the second step, we discuss the adjustment options governments have to the moderate tax competition that emerges when capital is incompletely mobile and explain why governments from countries with a different established redistribution policy choose different adjustment options. And third, we use this framework to derive predictions on the effects of tax competition on income inequality claiming that this effect was most pronounced in countries that use tax policies to redistribute welfare and did not develop their social welfare system in response to tax competition.

3.1. Tax Competition with Incomplete Capital Mobility

We follow the Meltzer-Richards model in assuming that political support of the government is influenced by the level of income inequality (see Kenworthy and Pontusson 2005 for a broad theoretical and empirical justification). We also assume that voter support depends on the level of public good provision and the degree to which governments can tax capital to finance these public goods. Without tax competition, governments choose a level of income redistribution, which is a function of pre-tax income inequality and the income gap of the mean and the median voter, as well as an optimal combination of capital and labor tax rates to finance redistribution and public good provision. Thus, political support declines in higher labor tax rates and lower redistribution, where ‘higher’ and ‘lower’ are defined by the difference to the levels of taxation and redistribution before tax competition is triggered. As the Meltzer-Richards model suggests, we are not arguing that voters prefer higher levels of redistribution per se.

Tax competition enters the equation in the standard way: if countries have a relatively high effective capital tax rate, they lose a share of their mobile capital base; if they have a

relatively low capital tax base, they attract capital from countries with higher effective capital tax rates so that their capital base increases. However, tax competition reduces the sum of capital tax revenues for all countries – that is the countries losing tax competition lose more revenues than the winners of tax competition gain.

With imperfectly mobile capital, the elasticity with which capital responds to differences in tax rates is limited. Important differences in the institutional environment such as education and skill levels, wage differences, the wage bargaining structure, as well as environmental and labor market regulations also prevent capital from being fully mobile. Yet, the arguably most obvious reason for immobility is that many corporations produce non-tradable goods and services. As a consequence, business activities of these corporations depend on their presence in a specific market. Unless effective tax rates are prohibitively high and reduce demand for their goods and services to virtually zero, corporations stay in the market even if the domestic effective tax rate is higher than in other countries.

In the absence of perfectly mobile capital effective capital tax rates will not approach zero in equilibrium. Rather, models of tax competition with incompletely mobile capital tax bases predict, firstly, that in equilibrium effective capital tax rates remain positive and, secondly, that different countries choose different tax systems, that is: tax systems do not converge (Plümper et al. 2009). Just like competitions in sports distinguish winners from losers, capital competition increases capital imports in some countries and capital exports in others and these countries, call them winners and losers of tax competition, chose different strategies to deal with the consequences of tax competition.

Whether a country wins or loses tax competition is largely determined by country size and by the government's ability to finance deficits for a limited time. With tax competition, small is competitive. For small countries the tax base effect dominates the tax rate effect: When countries reduce the effective capital rate, revenues from taxing the domestic capital stock decline. This is the tax rate effect. At the same time, however, the country imports capital from countries with higher capital tax rates (or exports less capital to countries with low

capital tax rates). The additional capital will be taxed at the reduced tax rate. This is the tax base effect. Since small countries can import relatively more capital from larger countries than large countries can import from smaller ones, the tax base effect is more likely to dominate the tax rate effect when a country is smaller. Thus, if a country is small enough, revenues from taxing capital may rise when the government significantly reduces the effective capital tax rate because of capital imports. Countries with a relatively large domestic capital stock also attract capital inflows when they reduce the effective capital tax rates. However, revenues generated from this additional capital are far less likely to compensate for the revenue losses caused by the reduction in effective capital tax rates. *Ceteris paribus*, small countries act more aggressively in tax competition because they are much more likely to win tax competition and attract capital inflows from abroad.³

The structural advantages allow small countries to act more aggressively in international tax competition and at the same time generate additional degrees of freedom in setting economic policies unless governments are constrained by high public debt and deficits. For example, small countries can reduce capital taxation, hold effective labor taxation constant and at the same time reduce debt as Ireland has done. Alternatively, they can reduce effective labor taxation and hold effective capital tax rates constant at low levels while at the same time slightly increase social security transfers like Luxemburg has done.

In addition, economic and political constraints to capital mobility allow governments to generate revenue from taxing capital even if other countries offer significantly lower effective tax rates.⁴ Governments can counter the revenue effects of tax competition not only by

3 This argument mirrors the economic research on asymmetric tax competition (Bucovetsky 1991, Wilson 1991, Kanbur and Keen 1993, Peralta and van Ypersele 2005). Proponents of this approach argue that a symmetric account of tax competition eliminates possible terms of trade effects and a conflict of interest between the competing jurisdictions cannot arise. Within the asymmetric tax competition model, the small country faces a more elastic tax base and undercuts the tax level of the large country in an asymmetric Nash equilibrium. The tax base of the small country will thus be larger than in the closed economy case opening the possibility for the small jurisdiction to gain from tax competition. The predictions of asymmetric tax competition find ample empirical support. All else equal, larger countries tend to impose higher tax rates on mobile capital than small countries (Bucovetsky 1991, Wilson 1991, Kanbur and Keen 1993).

4 We are aware that factors other than tax rates (such as infrastructure, the provision of skilled labor etc.) influence the location decision of capital owners. Yet, these factors have been present before tax competition

reducing effective capital tax rates; they can also stabilize revenues by *increasing* effective capital tax. This option is assumed away in traditional models of tax competition with fully mobile capital. However, the relative size of the immobile capital stock affects the degree to which the government needs to care about tax competition. If a country's capital stock was perfectly immobile, the government could set the capital tax rates as to maximize its political support. The larger the share of mobile capital becomes, the more the effective capital tax rates implemented by other countries influence the governments optimal tax policy.

3.2. Determinants of the Adjustment Strategy to Tax Competition

Assume some countries reduce their effective capital tax rate. If the government does nothing, some mobile capital will leave the country and revenues from capital taxation decline. Thus, if the government does nothing, deficits will increase. Yet, the government has four pure adjustment strategies which can be combined to an optimal adjustment strategy:

1. With imperfect capital mobility, the first option is to increase effective capital rates to the extent that higher taxes compensate revenue losses from capital exports.
2. Governments can also substitute revenue from capital taxation by increasing other taxes and most notably labor taxes.⁵
3. Cuts into government consumption, and
4. a reduction of social transfers bring expenditures in line with declining tax revenues.

From a simple accounting balance perspective, tax increases and spending cuts are functional equivalents. From a political economic perspective, these strategies are not identical. Most governments perceive moderate tax reforms to be politically less costly than spending cuts or cuts into the social security system. Indeed, in most countries, voters respond strongly to cuts

started and the US tax reform act of 1986 can be seen as an external shock to the previous equilibrium distribution of capital.

⁵ Since in all OECD countries total tax revenues depend more on taxing labor than on taxing capital, relatively moderate increases in the labor tax rate fully compensates sharp decreases in the capital tax rate. Since revenues from labor taxes on average exceed revenues from corporate taxation by at least factor 2 in most OECD countries (Hines 2006: 343), a 2 percentage point increase in effective labor taxation can compensate for a 4 percentage point cut in effective capital tax rates if we ignore the effect of tax reforms on demand and supply of labor and capital.

in social security systems. With virtually everyone benefiting from some form of welfare redistribution, governments only reluctantly reduce social security budgets. Yet, when capital bases are partly immobile, tax competition does not desiccate revenues from capital taxation. As a consequence, spending cuts necessary to balance modest decreases in revenues remain fairly limited. If governments use fiscal policy reforms to deal with tax competition, welfare state retrenchment could remain fairly moderate.

By ignoring the decline in capital tax revenues and simply allowing higher deficits, governments can significantly delay policy adjustments to tax competition. In doing so, the incumbent can prevent an increase in tax rates and still maintain previous levels of government spending and social transfers. This is a viable strategy in large countries or in countries with a large and popular welfare state where labor taxes already are relatively high. Welfare states are very unlikely to win international tax competition which renders radically cutting capital taxes unappealing. However, governments need relatively low initial levels of public debt to make a deficit strategy both successful and sustainable.

How governments respond to tax competition with imperfectly mobile capital depends on how governments redistribute income. Without reducing the complexity of the real world too much, we assume that governments can choose any combination of two ways to redistribute income. These options are redistribution via the tax system and redistribution via social security transfers. While most countries chose a combination of both options, we claim that continental European welfare states redistribute dominantly by social security transfers, while Anglo-Saxon and Scandinavian countries tend to redistribute more via the tax system. In addition, the overall level of redistribution in Anglo-Saxon countries is lower than in Continental European and Scandinavian welfare states. As a consequence, Anglo-Saxon countries enjoy a larger flexibility.

For this reason, governments in continental welfare states face higher losses in political support when they cut social security transfers. In turn, they have stronger incentives to avoid these cuts and are therefore more likely to use tax reforms and deficits to adjust to tax

competition. In contrast, liberal market economies and Scandinavian welfare states are less inclined to dominantly use tax reforms. This does not imply that continental welfare states *solely* use tax reforms and other countries *solely* fiscal reforms to adjust to tax competition. Quite to the contrary: all governments use a combination of tax reforms, fiscal reforms and deficits to respond to tax competition. However, continental welfare states rely comparably more on tax policy adjustment and thus increasing labor and capital taxes. It is therefore the initial level of social security transfers which determines the political response to tax competition.

Table 1 brings adjustment strategies in relation to countries' initial conditions. We predict the combination of tax and fiscal policies that governments choose in response to tax competition with respect to their ex ante position regarding size, capital mobility, social security transfers and debt. Our argument suggests that larger countries will maintain relative high capital and labor tax rates, higher levels of public debt, and higher social security transfers than smaller countries. This is so because larger countries cannot win tax competition against smaller countries and therefore need to maintain higher tax rates and possibly higher deficits to finance a larger welfare state. The latter point is a mere consequence of the fact that liberal winners of tax competition grow fast and do not need a large welfare state (this will later become a disadvantage when the global economy drops into crisis).

Second, countries with a large share of immobile capital (approximated by the share of the service industry) respond less to tax competition and maintain a relatively high level of capital tax rates. This large service industry also allows governments to implement relatively high capital tax rates because competition in these industries will be low and wages high.

Third, a high initial level of social security transfers coerces governments to increasingly shift the burden of the welfare state on labor. Governments in these countries will increase labor taxation to maintain this relatively high level of social security transfers. Our theory predicts that labor taxes rise, while the governments may hold capital taxes constant or even reduce it, thereby shifting the larger part of the financial burden of the welfare state on labor.

Fourth, initial high levels of public debt coerce the government to maintain high effective capital and labor taxes or even rise these tax rates further, high levels of debt, and (relatively) low levels of transfers.

Fifth, if countries maintain relatively high capital and labor tax rates, they can afford lower debt and higher social security transfer.

In other words, small countries with low initial debt levels are the winners of tax competition. Governments in large countries with high initial levels of debt are most likely to have to respond by increasing capital and labor tax rates.

Table 1: Determinants of Policy Adjustment

cause	outcome	capital tax rates	labor tax rates	Public debt	social security transfers
country size		+	+
low capital mobility		+	+
initial transfer level		- .. 0	+	-	+
initial debt		0..+	0..+	+	-
relative capital tax		-	+
relative labor tax		-	+
+ indicates that a 'cause' exerts a positive influence on an 'outcome' - indicates that the influence is negative 0 indicates that the influence is close to zero .. indicates that the model does not make a prediction					

Additional influences have been identified in the ever growing political economic literature of taxation and fiscal policies: Electoral systems influences the number of parties represented in parliament and hence the probability of coalition governments. Since coalition governments spend significantly more than single party governments (Persson and Tabellini 2000, chapter 5), the need to raise large revenues is politically more pressing in proportional systems. This not only leads to higher effective capital *and* labor tax rates before tax competition unfolds its effects, but also makes incumbents more vulnerable to spending cuts (Hays 2003, 2008). These high levels of spending and budget rigidity both provide a crucial obstacle to a country's effective political participation in tax competition. Governments in countries with a high initial level of government consumption caused by social security transfers would have to reduce spending and transfers much more than liberal market economies to become highly

attractive for foreign capital. Yet, welfare state retrenchment is politically more costly if demand for public good provision was high in the first place.

3.3. *Tax Competition, Fiscal Policy Adjustment, and Income Inequality*

Tax competition leads to moderate adjustments in the tax system because governments can choose an adjustment strategy that minimizes the social consequences. Most countries that use the welfare state to redistribute income shift the tax burden towards higher taxes on labor (and other more immobile tax sources). Increasingly, capital taxation becomes a relative irrelevant source of revenue. Since even governments in countries losing tax competition have three options to keep government spending and social transfers stable – higher capital tax rates, higher labor tax rates, higher deficits – tax competition does not bring about significant fiscal policy adjustments in the vast majority of OECD countries.

Since tax competition is less severe than race to the bottom models make believe and since governments have nuanced adjustments strategies, tax competition has a larger impact on taxation than on spending. For this very reason, the social consequences of tax competition differ largely. Countries with an initially high level of social security transfers do not experience much change in income inequality simply because the economic pressure on changing fiscal policies remains moderate.

Governments in welfare states face much less pressure on tax revenues than early globalization theories predicted. Thus, the survival of the welfare state is no surprise. The optimal adjustment strategy for governments in social welfare states was to raise capital and labor tax rates, moderately increase deficit spending, and keep government spending and social transfers at least stable. In effect, the impact on redistribution and inequality remains modest. Large liberal economies choose a combination of cuts in the already weak social security system and higher deficits. At the same time, they shift taxation to labor, which eventually causes a moderate increase in inequality and a further decline in redistribution. New Zealand and to a lesser extent the UK and the US serve as examples for very different strategies. Since initial debt was lower in the US and the UK than in New Zealand, tax increases and spending cuts

remained more moderate in the former countries. In New Zealand the government had to increase labor taxes and reduce social transfers to prevent a severe financial crisis caused by rising debts. As a consequence, income inequality rose significantly.

Our theory further predicts that welfare states respond according to their initial conditions: if debt was already high when tax competition kicked in, the increase in labor taxation was significant. When debt was initially low, the increase in labor taxation remained moderate. In Scandinavian countries, where government consumption was significantly higher than in any other country, governments had a strong incentive to increase effective capital and labor tax rates. With capital mobility, governments are likely to use increases in effective labor tax rates. However, due to initially very high spending levels a stabilization of tax revenues proved to be difficult. Thus, these countries are likely to bring spending closer in line with spending in continental European countries.

Whether policy adjustments exert an influence on income inequality depends on how countries redistribute income. In Anglo-Saxon and Scandinavian countries, redistribution depends on the tax system. Unless these countries profited from significant capital inflows, tax competition had at least a small influence on income inequality. In contribution based social welfare states, the redistribution of income depends much more on government spending and social transfers. Since the pressure on fiscal policies remained weak, governments found it comparably easy to defend the welfare state without having to accept raising income inequality. Table 2 summarizes the main predictions for redistribution and disposable income inequality.

Table 2: Impact of Policy Adjustments on Redistribution and Income Inequality

	redistribution	disposable income inequality
pre-tax income inequality	+	..
social security transfers as compared to initial level	+	-
change in social security transfers*relative effective capital tax rate	+	-
change in social security transfers*relative	-	+

effective labor tax rate		
+ indicates that a 'cause' exerts a positive influence on an 'outcome'		
– indicates that the influence is negative		
0 indicates that the influence is close to zero		
.. indicates that the model does not make a prediction		

4. Data

Available information allows us to analyze time-series cross-sectional data which covers 22 OECD countries over up to 26 years (1980-2005, due to random missing data points we analyze only 537 out of 572 possible observations). We test for the tax competition effect by including the distance (inversed) weighted spatial lag of effective capital tax rates to the right hand side of the capital tax equation. We analyze the theoretical prediction of our model by including the effect of country size (measured by the natural logarithm of GDP), initial levels of social security transfers and debt ratio (in 1975 – well before tax competition started) as well as the size of the non-tradable sector (measured as value added of the service industry). We control for union density and left government portfolio (see appendix 1 for operationalization of variables and data sources). In addition we add an interaction effect between the domestic capital tax rate and union density as well as left cabinet portfolio to the right hand side of the labor tax equation. In the second stage, we estimate the effect of the difference between country *i*'s effective capital tax rate and the weighted mean of *j*'s (instrumentalized) capital tax rates on fiscal policy (debt ratio and social security transfers). According to our argument, countries could abstain from cutting social security transfer if they allowed for higher capital tax rates than other countries. Governments also need to maintain higher tax rates if initial debt rates were high and need to be reduced. Again, we examine the impact of initial levels of social security transfers and debt. In addition we control for trade openness (exports + imports / GDP) which is also capturing country size⁶, EMU

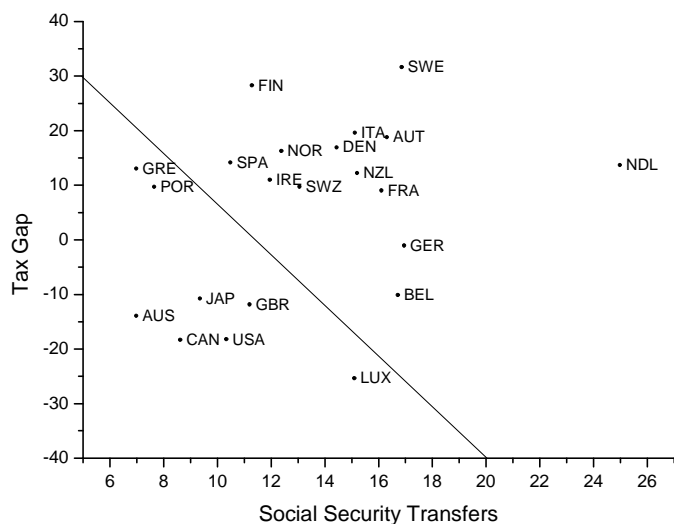
⁶ We do not add the log of GDP to the right had side of the second stage since it is a highly collinear to the trade measure and would thus decrease efficiency. In addition using different specification in the various equations of the simultaneous equation model allows better identification of effects because of overidentification.

membership, partisanship of the government, union density and the electoral system. We also analyze how pressures on the social welfare state such as unemployment and the share of people aged over 65 affect fiscal strategies. In the final third stage we estimate the joint effect of tax and fiscal policies (especially changes in social security transfers as compared to initial levels in 1975) on income redistribution and income inequality. We also test the impact of actual fiscal adjustment strategies (changes in the debt ratio as compared to initial levels) as well as the electoral system, unemployment and the share of elderly people. We do not account for unit fixed effects⁷ since we include the initial conditions for all countries as well as an EMU dummy which are time invariant and capture most of the initial variation.

Thus, with one exception, the specification of the empirical model is standard and so are the data sources we use. The exception is the distinction between countries that dominantly redistribute income via the tax system and countries that dominantly redistribute income via social security transfers. We briefly describe these categories here, but note that we use continuous variables in the data analysis. In 1980, the first group consists of the Australia, Canada, Japan, United States, United Kingdom, and Luxembourg, while the second group consists of continental European and Scandinavian welfare states. Switzerland and Portugal do neither redistribute much welfare via transfers nor via the tax systems. Figure 1 indicates the difference between both groups. “Tax gap” indicates the difference between the effective labor tax rate and the effective capital tax rate. Sweden, for example, has almost 40 percent higher effective labor tax rates than capital tax rates – indicating that labor finances the Swedish welfare state. Note that we would obtain roughly the same pattern if we replaced social security transfers by the sum of social security transfers and government consumption.

7 See Plümper and Troeger 2005, 2007, 2011 for a discussion of the pros and cons of fixed effects.

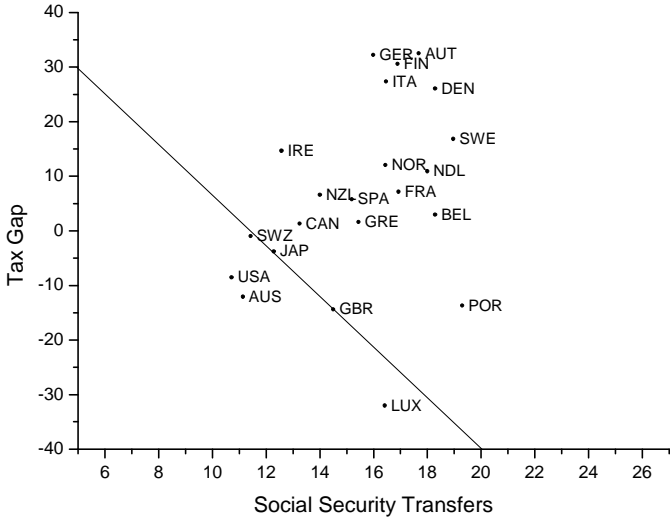
Figure 1: Redistribution in two Dimensions, Average 1975-1980



If early globalization theories were correct, countries should move to the left (they should cut social security transfers) and up (the gap between effective labor and capital tax rates should increase).

Figure 2 shows the same relation between redistribution by social security transfers and redistribution by taxation. It shows that the two worlds of redistribution have converged, because the level of social security transfers became more similar and the redistribution by the tax system has all but vanished. Yet, social security transfers have converged to middle levels. No country maintained either very low or very high levels of social security transfers. However, we find evidence for the tax competition hypothesis that redistribution via the tax system disappears since the advent of tax competition.

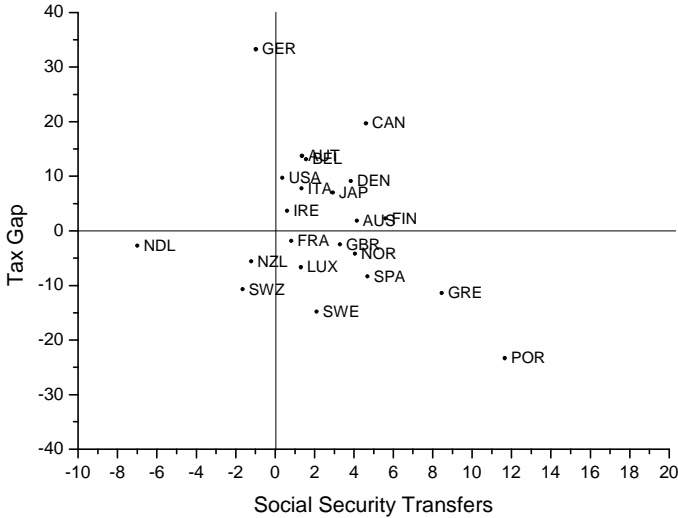
Figure 2: Redistribution in Two Dimensions, Average 2000-2004



The increase in transfers in countries that previously dominantly redistributed income via the tax system, led to a situation in which many countries crossed the arbitrary border between countries with different redistribution mechanism. Nowadays, most countries have a moderate to high level of social welfare transfers while very few countries redistribute income via the tax system. Thus, capital owners and companies have stopped to contribute to income redistribution and this – as we have argued before – is the consequence of tax competition. Only countries like Luxembourg that taxes imported capital can afford to redistribute via the tax system – a clear indication of Luxembourg being a winner of tax competition.

Figure 3 displays the changes between 1980 and 2004 and though this figure is redundant, it highlights the vast differences between countries that adjusted moderately and countries that adjusted significantly. Figure 3 reveals that with the notable exception of the Netherlands, no country significantly reduced social security transfers, and many countries even increasing transfers. The figure also demonstrates that only Germany adjusted policies according to the predictions of the early globalization literature: by shifting taxation towards labor and by reducing social security transfers. Yet, Germany is an outlier.

Figure 3: Changes in social Security Transfers and the Tax Gap



5. Research Design

Our theory suggests three important specification decisions: First, the estimation of tax competition, second, the treatment of the endogeneity of policy variables, and third the specification of dynamics and initial conditions. We briefly discuss each specification decision in turn.

Spatial Econometrics

Franzese and Hays (2007) have argued that early globalization research remains unsatisfactory inasmuch as it models tax competition in a simple linear-additive fashion based on Quinn’s (1997) measure of ‘capital account openness’, because capital account openness may be a necessary condition for tax competition, but it is definitely not a sufficient condition. For example, capital account openness does not account for the fact that economic pressure on capital tax rates are a function of the difference of the tax rates in the country of interest and comparable countries. We therefore follow recent practice (Hallerberg and Basinger 1998, Franzese and Hays 2007, Swank 2006 and Plümper et al. 2009) in specifying tax competition as the dependence of tax policy in country *i* on tax policies in all other countries $-i \neq i$. Tax competition is thus modeled as a classic textbook example of endogeneity:

Tax policy in country i depends on tax policy in countries $-i$ and vice versa. We weight the spatial capital tax lag with inverse distance in order to account for transaction costs of physically moving capital.⁸

Simultaneous Equations

As the theoretical discussion reveals, the effect of globalization and market integration on taxation, social security transfers and redistribution cannot be examined independently. When estimating these effects we are faced with different kinds of co-determination, simultaneity and endogeneity. Governments decide simultaneously about revenue and expenditure and therefore about tax rates, transfers and public good provision. Yet, taxation is not only contingent on domestic factors but also on decisions of policy makers in other countries. To solve these problems and avoid biased estimation results we employ a simultaneous equation approach, which allows tackling the problem of endogeneity in policy decisions. We use an instrumental variable approach to overcome the endogeneity of the spatial capital tax lag and account for the multi-stage nature where redistribution and income inequality depend on decisions about taxation and social spending. We thus estimate six simultaneous equations for effective capital taxation, effective labor tax rates, the debt ratio, social security transfers, relative redistribution and inequality of disposable income (see appendix 1 for the full specification of the simultaneous equation model).⁹ We opt for full system estimation (3SLS) since we assume co-varying error processes across equations and thus 3SLS produces more efficient results. Yet, we are aware of the drawbacks of full system estimation in case one of our equations is miss-specified and therefore conduct single equation 2SLS estimation to check the robustness of our results.¹⁰ For the purpose of our study, we maintain that domestic consti-

⁸ See Plümper and Neumayer (2010) and Neumayer and Plümper (2012) for a discussion of specification issues in modelling spatial dependence. For a discussion of different weighting matrices see Troeger (2009).

⁹ Identification of the system of equations and exclusion restrictions are discussed in appendix 2.

¹⁰ The estimation results are displayed in appendix 3 and show only very minor changes to the point estimates and standard errors which do not change the substantive findings. We also employ other robustness checks such as including a time trend, estimating a model with more parameter restrictions and first order autoregressive processes. None of these alterations change the substantive effects which we discuss here.

tutional and institutional factors as well as country size are exogenous and therefore provide good instruments for the endogenous effective capital tax rate. (Franzese and Hays 2007).

Heterogeneity and Dynamics

We allow the error term to follow a first order autoregressive process (Plümper et al. 2005), which allows for an appropriate estimate of the short-term adjustment processes our theory predicts as well as controlling for serial correlation. Alternatively we include a time trend into the model since existent serial correlation is most probably caused by trends in taxation and government spending.¹¹ We do not account for unit fixed effects¹² since we are interested in the effects of the initial conditions. We also include a time-invariant European Monetary Union dummy. These variables capture most of the initial between-variation. Thus, results do not change significantly when we replace these variables by unit dummies. However, we would lose the ability to analyze the theoretically relevant impact of initial conditions on policy adjustment strategies.

6. Results

We present the results of a single ivse model in three levels: the first stage estimates tax policies, where effective capital taxation of country i depends, *inter alia*, on a distance weighted average of capital taxation in other countries whereas labor taxation is partially determined by domestic decisions on capital tax rates. This captures the notion that tax competition has a tax system effect, e.g. governments shift at least parts of the tax burden on capital towards labor which is less mobile and therefore reacts less elastic to taxation. Note that the reported endogeneity and overidentification tests conclude that the simultaneous equation model overall is appropriately specified and identified.

To maintain readability, we discuss all technical details of the model specification in appendix 1 and 2, which provide a justification of our estimation and identification strategies. We discuss each of the three stages in turn (tables 2, 3 and 4) for better understanding. Note

¹¹ See appendix for results with first order autoregressive process and trend – estimation results remain virtually unchanged.

¹² See Plümper and Troeger 2007, 2011 for a methodological discussion of the pros and cons of fixed effects.

though that the models presented in tables 2, 3 and 4 are the results of a single simultaneous equation estimation with 6 interrelated equations.

Table 2: First Stage: Tax Competition

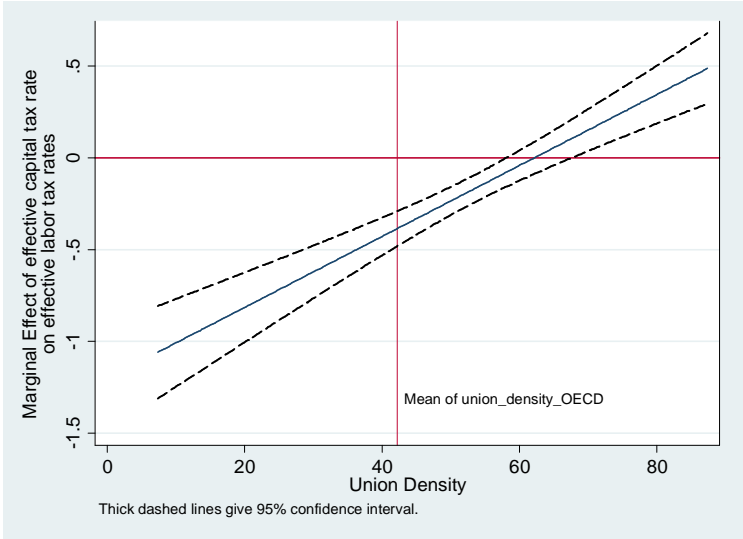
VARIABLES	average effective capital tax rate	average effective labor tax rate
spatial capital tax lag weighted by inverse distance (prediction) / effective capital tax rate (labor tax equation)	270.536** (49.373)	-1.202** (0.147)
total GDP in current US\$, natural logarithm	3.923** (0.414)	1.482** (0.322)
Social Security Transfers as percentage of GDP in 1975	-0.894** (0.131)	0.609** (0.071)
debt ratio in 1975	0.020 (0.015)	0.010 (0.010)
value added of service sector as percentage of GDP	0.283** (0.094)	0.720** (0.058)
Union density (OECD)	0.049+ (0.026)	-0.232** (0.068)
left cabinet portfolio as percentage of all cabinet seats		-0.020 (0.022)
IA effect between capital tax rate and left		0.001* (0.001)
IA effect between capital tax rate and union density		0.019** (0.003)
legal capital mobility (Quinn)	0.437 (0.795)	
Constant	-91.392** (10.535)	-33.757** (7.290)
Observations	537	537
R-squared	0.30	0.54
DWH Chi_sqr Test: Endogeneity of instrumented RHS variables	1.339	1.092
Prob > Chi_sqr	0.247	0.296
Anderson IV Relevance: LR Statistic	1596.00	11.67
Prob > Chi_sqr	0.000	0.000

Standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1, grey shaded cells indicate endogenous, instrumented right-hand-side variables

Table 2 presents the estimation results of the first stage where we analyze the effect of tax competition on effective domestic capital and labor tax rates. We find that a country's effective capital tax rate decreases, if other countries, especially closer ones, reduce their capital tax rate (tax competition effect). When effective capital tax rates decline, labor taxation goes up (tax system effect). However, the burden shift remains moderate if union density is high. Figure 4 displays the interaction effect between domestic effective capital tax rates and union density. Strong unions clearly weaken the burden shift from capital to labor taxation. The influence of left governments appears less strong: left governments shift the

burden not significantly less than conservative governments.

Figure 4: Interaction effect between capital tax rates and union density on labor tax rates



Our estimates also support our prediction that tax rates especially on labor remain relatively high in countries in which the initial fiscal conditions were not very favorable to tax competition. However, in countries with high initial levels of social security transfers a government’s ability to aggressively reduce capital taxes in order to attract foreign capital depends on its ability to shift the tax burden towards labor, especially high salaries (initial conditions effect). Similarly and regardless of the initial fiscal conditions, large countries (measured by GDP) find it difficult to fully compete with small countries for internationally mobile capital. Large countries ceteris paribus implement higher tax rates on capital than smaller countries since the tax rate effect outweighs the tax base effect of possible capital inflows (country size effect).

Our theory rests on the assumption that capital is not fully mobile. In order to turn this assumption into a testable hypothesis, we operationalize this de facto capital mobility by the size of the non-tradable service sector. The larger the non-tradable sector the less the average de facto mobility of capital and the easier it is for governments to implement higher tax rates. Indeed the empirical results support this notion – the larger the value added of the service sector the higher average effective capital tax rates remain. Once we control for actual capital

mobility by including the size of the service sector, the Quinn measure for de jure capital mobility turns out to be insignificant.

At the second level (table 3), the fiscal policy adjustments, we generally observe substantively weaker effects. In other words, the effect of tax competition on fiscal policies remains moderate. We find that governments use higher labor taxes to maintain high levels social security transfers. However, while governments use capital taxation to stabilize government spending, we observe a positive but not significant contribution of capital taxation to social security transfers and an increase in the importance of labor taxation for social security transfers.¹³ In addition, governments need to maintain higher capital taxes in order to reduce initially high debt ratios. Country size affects fiscal policy mostly indirectly through taxation, the trade volume (which also captures a size effect) does not exert a significant impact on its own.

13 We find mostly expected results for our controls. First, countries with majoritarian electoral systems have both lower social security and debt levels, which is consistent with previous results (Persson and Tabellini 1999). Second, though we cannot solve the 'old' discussion between the compensation and the efficiency hypotheses, we find more support for the former: Openness to trade has a positive but not quite significant effect on social security transfers and public debt (*compensation hypothesis*). Third, higher unemployment rates and a larger dependency ratio increase the debt and social security spending equally. Fourth, EMU membership reduces a country's debt ratio.

Table 3: Second Stage: Fiscal Policy

VARIABLES	debt ratio	social security transfers
difference between domestic capital tax rate and mean of capital tax rate in other countries	-0.263** (0.062)	0.018 (0.012)
difference between domestic labor tax rate and mean of labor tax rate in other countries	1.218** (0.147)	0.355** (0.029)
Social Security Transfers as percentage of GDP in 1975	-2.407** (0.221)	0.082+ (0.044)
debt ratio in 1975	0.747** (0.021)	-0.024** (0.004)
Union density (OECD)	-0.514** (0.061)	-0.097** (0.012)
left cabinet portfolio as percentage of all cabinet seats	-0.077** (0.015)	-0.016** (0.003)
EMU membership	-9.662** (1.711)	0.263 (0.342)
Majoritarian system (DPI)	-7.365** (2.036)	-3.598** (0.405)
unemployment rate (WDI)	1.940** (0.166)	0.120** (0.033)
share of population above 65	3.102** (0.295)	0.222** (0.059)
trade ((imp+exp)/gdp)	0.035 (0.027)	0.007 (0.005)
Constant	28.786** (7.835)	16.084** (1.561)
Observations	537	537
R-squared	0.80	0.63
DWH Chi_sqr Test: Endogeneity of instrumented RHS variables	29.88	4.461
Prob > Chi_sqr	0.000	0.107
Anderson IV Relevance: LR Statistic	121.3	121.3
Prob > Chi_sqr	0.000	0.000

Standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1, grey shaded cells indicate endogenous, instrumented right-hand-side variables

Table 4 reports the relevant estimates and relates them to our theoretical predictions as summarized in table 1. We find that most estimated coefficients support our theory, though governments apparently use relatively high capital tax rates to keep public debt low and relatively high labor tax rates to keep social security transfers high. We did not expect that governments make this clear distinction between different sources of revenue, but these results are still broadly in line with our prediction that governments increasingly use labor taxes to finance social security transfers.

Table 4: Determinants of Policy Adjustment

	capital tax rates	labor tax rates	Public debt	social security transfers
country size	+ 3.9 (±0.4)	+ 1.5 (±0.3)

low capital mobility	+	+
	0.3 (± 0.1)	0.7 (± 0.1)		
initial transfer level	- .. 0	+	-	+
	-0.9 (± 0.1)	0.6 (± 0.1)	-2.4 (± 0.2)	0.1 (± 0.0)
initial debt	0..+	0..+	+	-
	0.02 (± 0.02)	0.01 (± 0.01)	0.7 (± 0.0)	-0.2 (± 0.0)
relative capital tax	-	+
			-0.2 (± 0.1)	0.0 (± 0.0)
relative labor tax	-	+
			0.0 (± 0.0)	0.4 (± 0.0)

Finally, at the third level (table 5), our results suggest that tax competition exerts a small but not negligible effect on income redistribution and income inequality though governments used relatively high tax rates to keep the fiscal policy adjustments moderate. However, this effect is contingent upon initial levels of social security and welfare spending.

Table 5: Third Stage: Relative Redistribution and Disposable Income Inequality

VARIABLES	relative redistribution	disposable income inequality
difference between domestic capital tax rate and mean of capital tax rate in other countries	-0.003** (0.000)	0.001** (0.000)
difference between domestic labor tax rate and mean of labor tax rate in other countries	0.006** (0.001)	-0.002** (0.000)
Majoritarian system (DPI)	-0.011 (0.008)	0.005 (0.004)
unemployment rate (WDI)	-0.002* (0.001)	0.001+ (0.000)
share of population above 65	-0.007** (0.002)	0.003** (0.001)
market income inequality (gini)	0.778** (0.120)	0.299** (0.052)
change in social security transfers as compared to 1975	0.006** (0.001)	-0.002** (0.000)
change in debt ratio as compared to 1975	-0.000 (0.000)	0.000 (0.000)
IA effect between mean difference in capital taxation and change in social security transfers†	0.014 (0.009)	-0.006 (0.004)
IA effect between mean difference in labor taxation and change in social security transfers†	-0.033** (0.011)	0.014** (0.005)
Constant	0.157** (0.052)	0.090** (0.023)
Observations	537	537
R-squared	0.37	0.34
DWH Chi_sqr Test: Endogeneity of instrumented RHS variables	22.47	23.73
Prob > Chi_sqr	0.000	0.000
Anderson IV Relevance: LR Statistic	375.2	375.2
Prob > Chi_sqr	0.000	0.000

Standard errors in parentheses; ** p<0.01, * p<0.05, + p<0.1, grey shaded cells indicate endogenous, instrumented right-hand-side variables; † coefficients and standard errors shown times 100 – for better readability

Countries which redistribute income mostly via social transfers will use higher tax rates on capital to redistribute from capital owners to wage earners and thereby reduce income inequality or at least do not allow disposable income inequality to rise – figure 5 illustrates this effect. Thus, when social welfare states implement relatively high capital and labor tax rates, fiscal policy adjustments will be moderate and the effect of tax competition on redistribution and inequality small. The same cannot be said for countries that dominantly redistribute via a progressive tax system. Even if these countries kept relatively high capital and labor taxes, income redistribution declined and inequality increased (see figures 5 and 6). Thus, social security transfers offered a better way to prevent an increase in income inequality. This finding, of course runs counter the doom theories of tax competition, which predicted that governments have to abandon the welfare state to prevent capital flight.

Figure 5: Interaction effect between mean difference in capital tax rates and change in social security transfers on disposable income inequality

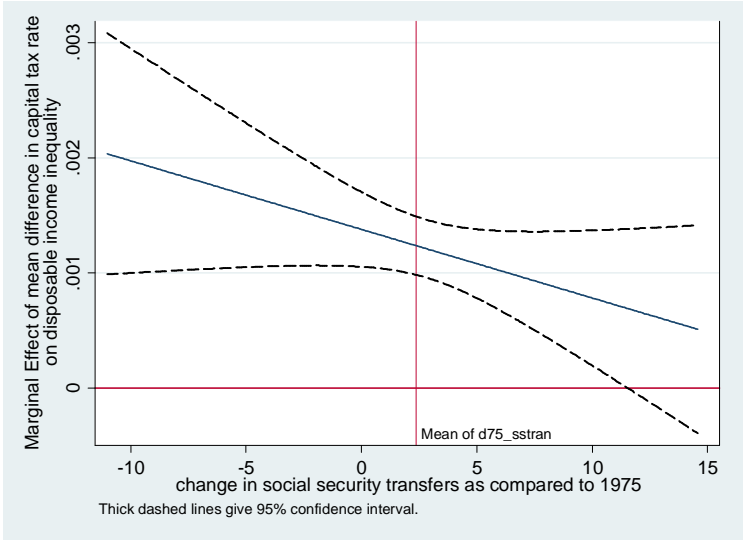
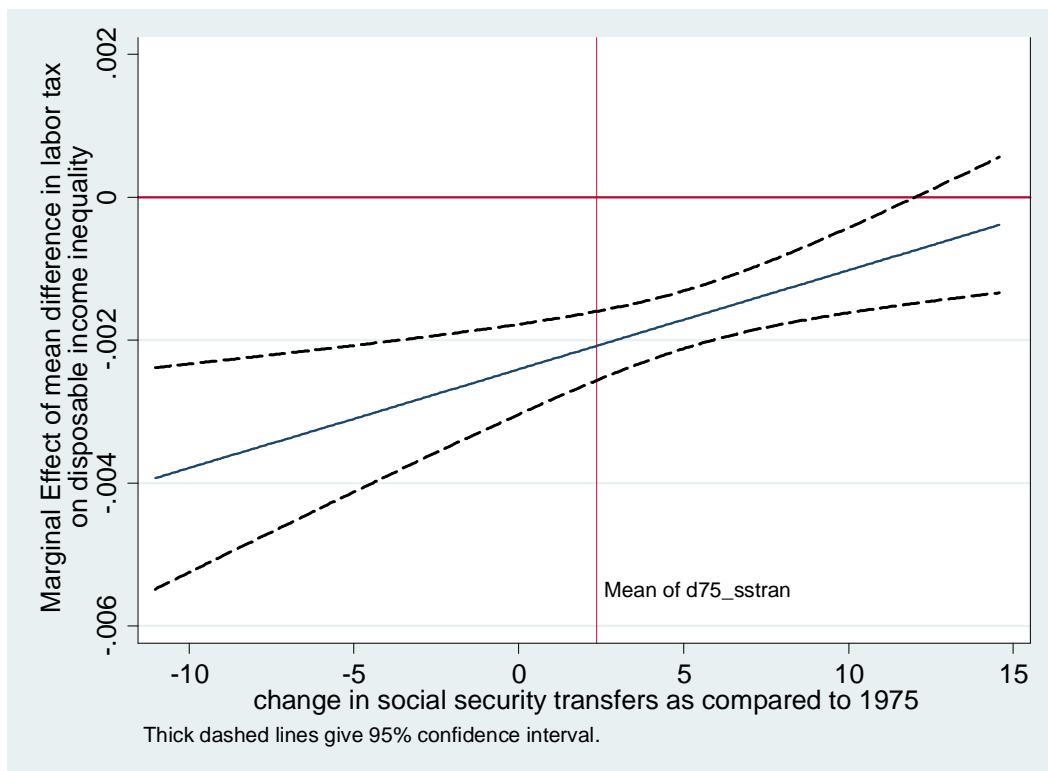


Figure 6: Interaction effect between mean difference in labor tax rates and change in social security transfers on disposable income inequality



Most of the empirical findings – even cautiously interpreted – supports our theoretical arguments. We find a non-negligible and significant tax competition effect in addition to a strong tax system effect, a shift from capital to labor taxes, which is damped by political institutions such as strong unions. Moreover we find support for asymmetric tax competition, a significant country size effect. Small countries implement both lower tax rates on capital and labor. They are able to do so because the tax base effect of inflowing capital outweighs the tax rate effect of lowering capital tax rate. Yet, tax rates are not completely determined by competition since capital is not fully mobile: our results show that where de facto capital mobility is low – the size of the non-tradable sector large – tax rates on capital remain comparatively higher.

In countries with noncompetitively high tax rates, tax revenues are used to lower initially high debt and maintain social security spending. Governments in large welfare states did not reduce the initially high social security transfers but managed to keep social welfare spending on a comparatively high level. However, initially large public debt forced government to reduce social security transfers at least slightly.

Finally, the effect of tax rates on redistribution and inequality is conditioned on changes in

welfare state spending: countries predominantly redistributing via progressive taxes experience an increase in inequality because of the tax competition effect, while countries which redistribute mainly via social spending reduce disposable income inequality or at least keep it stable. Table 6 compares the theoretical predictions with the empirical findings of the last stage.

Table 6: Impact of Policy Adjustments on Redistribution and Income Inequality

	redistribution	disposable income inequality
pre-tax income inequality	+ 0.778 (± 0.120)	..
social security transfers as compared to initial level	+ 0.006 (± 0.001)	- -0.002 (± 0.000)
change in social security transfers*relative effective capital tax rate	+ 0.014 (± 0.009)	- -0.006 (± 0.004)
change in social security transfers*relative effective labor tax rate	- -0.033 (± 0.011)	+ 0.014 (± 0.005)

7. Conclusion

When confronted with tax competition, governments in different countries choose different policy adjustment strategies. Surprisingly, neither empirical tests of tax competition, nor empirical tests of globalization theories, nor existing tests of explanations for the survival of the welfare state take into account that global competition does not affect all countries in the same way.

We have argued that tax competition affects countries that redistribute via the tax system differently from countries that redistribute via social security transfers. Indeed, quite to the contrary of the predictions of early globalization theories of welfare state retrenchment, we argue and find that liberal market economies that use the tax system to redistribute income found it more difficult to adjust to tax competition. Most welfare states merely shifted revenues from taxing capital onto labor and maintained high levels of social security transfers. Thus, tax competition influences tax and fiscal policies, but not in the simple, homogeneous fashion predicted by previous theories. Rather, the absence of perfect capital mobility leads to

‘separating equilibria’, some governments compensated for capital outflows by maintaining high capital and even higher labor tax rates. An increase in debt and cuts in social security transfers are used as alternatives to increasing capital and labor tax rates.

These initial conditions and the choice of policy adjustment strategies ultimately explained why income inequality rose more in liberal market economies than in Continental welfare states. While the latter countries could maintain a high level of social security transfers, the liberal economies had to cut down on tax-based redistribution and to increase social security transfers. Not all governments in liberal market economies were able or willing to do so. Accordingly, income inequality increased most in liberal economies whose governments did not or very little increase social security transfers: the US and the UK.

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Appendix 1: Operationalization and Data Sources

Table A1: Variable Description

Variable	Description	Source
captax	Average effective tax rate on capital	Calculations from OECD Revenue Statistics based on formula provided by Volkerink and DeHaan (2002)
labtax	Average effective tax rate on labor	Calculations from OECD Revenue Statistics based on formula provided by Volkerink and DeHaan (2002)
captax _{i,-i}	Difference between domestic capital tax rate and average capital tax rate in all other countries in the same year	Own calculations base don the above variables
captax _{-i}	inverse distance weighted spatial lag of average effective capital tax rates	estimated in an instrumental variable equation
labtax _{i,-i}	Difference between domestic labor tax rate and average labor tax rate in all other countries in the same year	calculated based on average effective labor tax rates
debt	Debt as percentage of GDP	OECD Main Economic Indicators
idebt	Initial Debt ratio (1975)	
di75_debt	change in debt ratio as compared to 1975	
socsec	Social Security Transfers as percentage of GDP	OECD Main Economic Indicators
isocsec	Initial Social Security Transfers as percentage of GDP (1975)	
di75_socsec	change in social security transfers as compared to 1975	
loggdp	Natural Logarithm of GDP	world development indicators, world bank
trade	Trade openness measured as (exports+imports)/GDP	
unemp	Unemployment rate	
pop65	Share of population aged 65 and over	
ud	Union Density	OECD labor market statistics
left	Left cabinet portfolio as percentage of all cabinet portfolios	Swank 2002
nt	Size of the non-tradable sector, measure as value added of the service sector as percentage of GDP	OECD National Account Statistics
maj	Electoral system: Plurality (1), Proportional (0)	Beck et al. 2005: World Bank database of Political Institutions
emu	Member of the European Monetary Union	
ginidi, ginipsi	income inequality, disposable income, private sector income	Mahler and Jesuit 2006, Luxembourg Income Study
reldis	difference between pre-tax and post-tax income inequality	
quinn _i	legal capital account openness	Quinn 1997
quinn _{-i}	inverse distance weighted spatial lag of legal capital account openness	
ginipsi _{-i}	inverse distance weighted spatial lag of private sector income inequality	Mahler and Jesuit 2006, Luxembourg Income Study
gdppc _{-i}	inverse distance weighted spatial lag of per capita GDP	World Bank World Development Indicators
govcon _{-i}	inverse distance weighted spatial lag of Government consumption	FDI inflows form WDI
trade _{-i}	inverse distance weighted spatial lag of trade openness: (exports+imports)/ GDP	
pop _{-i}	inverse distance weighted spatial lag of total population	

Appendix 2: Estimation of the System of Simultaneous Equations

We estimate six simultaneous equations with correlated error processes across all equations. In addition, we include a spatial capital tax lag in order to account for the tax competition arguments. This spatial lag is weighted substantively by the inverted distance in order to account for higher impact of closer countries and instrumented by the equally weighted spatial lags of domestic variables (Franzese and Hays 2007; Plümper and Neumayer 2009). Our theory predicts endogeneity issues since the labor tax depends on capital taxation (tax system effect), fiscal policies (debt ratio and social security transfers) depend on capital and labor taxation and redistribution as well as income inequality are partially determined by a combination of taxation and fiscal policies. We thus estimate the system of equations by a combination of three stage least squares and two stage least squares (for the spatial tax lag) procedures.

Table A2: System of equations

Stage 1:
 $\text{captax}_i = a + \text{captax}_{i-1} + \text{loggdpi} + \text{ud}_i + \text{left}_i + \text{nt}_i + \text{isocsec}_i + \text{idebt}_i + \text{quinn}_i + e_i$
 with
 $\text{captax}_{i-1} = a + \text{quinn}_{i-1} + \text{gini}_{i-1} + \text{gdppc}_{i-1} + \text{govcon}_{i-1} + \text{trade}_{i-1} + \text{population}_{i-1} + e_{i-1}$
 as instrumental equation.

$$\text{labetax}_i = a + \text{captax}_i + \text{loggdpi} + \text{ud}_i + \text{left}_i + \text{captax}_i * \text{ud}_i + \text{captax}_i * \text{left}_i + \text{isocsec}_i + \text{idebt}_i + e_i$$

Stage 2:
 $\text{debt}_i = a + \text{captax}_{i-1} + \text{labetax}_{i-1} + \text{ud}_i + \text{left}_i + \text{maj}_i + \text{unemp}_i + \text{pop65}_i + \text{trade}_i + \text{emu}_i + \text{isocsec}_i + \text{idebt}_i + e_i$
 $\text{socsec}_i = a + \text{captax}_{i-1} + \text{labetax}_{i-1} + \text{ud}_i + \text{left}_i + \text{maj}_i + \text{unemp}_i + \text{pop65}_i + \text{trade}_i + \text{emu}_i + \text{isocsec}_i + \text{idebt}_i + e_i$

Stage 3:
 $\text{redis}_i = a + \text{captax}_{i-1} + \text{labetax}_{i-1} + \text{captax}_{i-1} \cdot \text{di75_socsec}_i + \text{labetax}_{i-1} \cdot \text{di75_socsec}_i + \text{maj}_i + \text{di75_debt}_i + \text{di75_socsec}_i + \text{ginipsi}_i + \text{unemp}_i + \text{pop65}_i + e_i$
 $\text{ginidi}_i = a + \text{captax}_{i-1} + \text{labetax}_{i-1} + \text{captax}_{i-1} \cdot \text{di75_socsec}_i + \text{labetax}_{i-1} \cdot \text{di75_socsec}_i + \text{maj}_i + \text{di75_debt}_i + \text{di75_socsec}_i + \text{ginipsi}_i + \text{unemp}_i + \text{pop65}_i + e_i$

Subscripts denote countries (i) other countries (-i).

Appendix 3: Identification and Exclusion Restrictions

Given this set of endogenous variables we need at least 42 exclusion restrictions for the 6 equations to be just identified (without relying on cross equation identification). Each of the 6 equations has one normalization restriction because one variable is taken to be the left-hand-side explained variable. Thus, each equation in our system is autonomous because it has substantive meaning in isolation from the other equations in the system. Since we have enough exclusion restrictions within each structural equation we do not need to rely on cross equation restrictions to achieve identification of our system. Table A2 shows that we have 117 exclusion restrictions from which 32 are simultaneous. Thus, we have 85 exclusion restrictions throughout the system which are distributed in a way so that every single equation is at least identified under the condition that all variables labelled exogenous are indeed uncorrelated with any of the error terms of the seven equations.

We used standard (but often not very powerful) overidentification and exogeneity tests. Overidentification of all equations in the system allows for a more efficient estimation of the structural parameters. However, since the exclusion restrictions imply that the coefficients of these variables are zero in the equations from which they are excluded, misspecification leads to biased parameter estimates. A more reliable test is to compare the 3-SLS results to a set of independent 2-SLS estimates. If all equations in the system are correctly specified, system procedures are asymptotically more efficient than a single-equation procedure such as 2SLS. Yet, single equation models are more robust with respect to miss-specification. We estimate a 2SLS version of our model which turns out to give substantively identical results. Neither tests suggest that our model is misspecified.

Appendix 4: Robustness

Table A4a: 3 Stage Least Squares: Trend included

	average effective capital tax rate	average effective labor tax rate	debt ratio	social security transfers	relative redistribution	disposable income inequality
spatial capital tax lag weighted by inverse distance (prediction) / effective capital tax rate (labor tax equation)	255.544** (45.962)	-0.960** (0.154)				
total GDP in current US\$, natural logarithm	3.237** (0.387)	1.123** (0.316)				
Social Security Transfers as percentage of GDP in 1975	-1.231** (0.126)	0.697** (0.076)	-1.934** (0.220)	0.115* (0.046)		
debt ratio in 1975	0.016 (0.014)	0.007 (0.010)	0.765** (0.020)	-0.024** (0.004)		
value added of service sector as percentage of GDP	0.859** (0.105)	0.633** (0.083)				
Union density (OECD)	0.025 (0.024)	-0.150* (0.069)	-0.322** (0.064)	-0.081** (0.013)		
left cabinet portfolio as percentage of all cabinet seats		0.007 (0.022)	-0.073** (0.014)	-0.015** (0.003)		
IA effect between capital tax rate and left		0.001 (0.001)				
IA effect between capital tax rate and union density		0.016** (0.003)				
legal capital mobility (Quinn)	4.362** (0.813)					
difference between domestic capital tax rate and mean of capital tax rate in other countries			-0.169** (0.062)	0.034** (0.013)	-0.004** (0.000)	0.002** (0.000)
difference between domestic labor tax rate and mean of labor tax rate in other countries			1.064** (0.140)	0.342** (0.029)	0.003** (0.001)	-0.001** (0.000)
EMU membership			-5.061** (1.747)	0.626+ (0.363)		
Majoritarian system (DPI)			-6.852** (1.917)	-3.513** (0.397)	-0.015* (0.008)	0.007* (0.003)
unemployment rate (WDI)			1.977** (0.156)	0.112** (0.032)	-0.003** (0.001)	0.001** (0.000)
share of population above 65			2.020** (0.332)	0.130+ (0.069)	0.001 (0.002)	-0.000 (0.001)
trade ((imp+exp)/gdp)			-0.069* (0.029)	0.002 (0.006)		
market income inequality (gini)					1.057** (0.115)	0.178** (0.050)
change in social security transfers as compared to 1975					0.006** (0.001)	-0.003** (0.000)
change in debt ratio as compared to 1975					0.000* (0.000)	-0.000+ (0.000)
IA effect between mean difference in capital taxation and change in social security transfers†					0.000** (0.000)	-0.000** (0.000)
IA effect between mean difference in labor taxation and change in social security transfers†					-0.000 (0.000)	0.000 (0.000)
trend	-0.786** (0.079)	0.058 (0.058)	0.596** (0.095)	0.048* (0.020)	-0.004** (0.001)	0.002** (0.000)
Constant	-98.074**	-27.731**	18.509*	15.251**	0.026	0.146**

	(9.799)	(7.314)	(7.497)	(1.553)	(0.051)	(0.022)
Observations	537	537	537	537	537	537
R-squared	0.38	0.58	0.82	0.64	0.44	0.41

Table A4b: 3 Stage Least Squares: Lagged Residuals

	average effective capital tax rate	average effective labor tax rate	debt ratio	social security transfers	relative redistribution	disposable income inequality
spatial capital tax lag weighted by inverse distance (prediction) / effective capital tax rate (labor tax equation)	259.636** (14.782)	-1.207** (0.037)				
total GDP in current US\$, natural logarithm	3.577** (0.131)	1.266** (0.110)				
Social Security Transfers as percentage of GDP in 1975	-0.942** (0.041)	0.568** (0.026)	-2.489** (0.081)	0.031+ (0.018)		
debt ratio in 1975	0.022** (0.005)	0.011** (0.004)	0.754** (0.009)	-0.025** (0.002)		
value added of service sector as percentage of GDP	0.323** (0.030)	0.734** (0.021)				
Union density (OECD)	0.037** (0.008)	-0.231** (0.017)	-0.558** (0.022)	-0.108** (0.005)		
left cabinet portfolio as percentage of all cabinet seats		-0.031** (0.007)	-0.080** (0.006)	-0.015** (0.001)		
IA effect between capital tax rate and left		0.002** (0.000)				
IA effect between capital tax rate and union density		0.019** (0.001)				
legal capital mobility (Quinn)	0.977** (0.236)					
difference between domestic capital tax rate and mean of capital tax rate in other countries			-0.327** (0.025)	0.020** (0.005)	-0.003** (0.000)	0.001** (0.000)
difference between domestic labor tax rate and mean of labor tax rate in other countries			1.349** (0.048)	0.385** (0.011)	0.005** (0.001)	-0.002** (0.000)
EMU membership			-11.073** (0.680)	0.137 (0.150)		
Majoritarian system (DPI)			-7.810** (0.814)	-3.841** (0.179)	-0.016* (0.007)	0.007* (0.003)
unemployment rate (WDI)			2.054** (0.066)	0.090** (0.015)	-0.003** (0.001)	0.001** (0.000)
share of population above 65			3.072** (0.115)	0.218** (0.025)	-0.007** (0.001)	0.003** (0.001)
trade ((imp+exp)/gdp)			0.015 (0.011)	0.006** (0.002)		
market income inequality (gini)					0.981** (0.102)	0.212** (0.043)
change in social security transfers as compared to 1975					0.005** (0.001)	-0.002** (0.000)
change in debt ratio as compared to 1975					0.000 (0.000)	0.000 (0.000)
IA effect between mean difference in capital taxation and change in social security transfers†					0.000+ (0.000)	-0.000+ (0.000)
IA effect between mean					-0.000** (0.000)	0.000** (0.000)

difference in labor taxation and change in social security transfers†					(0.000)	(0.000)
ar1: lagged residuals	0.926** (0.014)	0.943** (0.017)	0.972** (0.018)	0.927** (0.019)	0.486** (0.027)	0.495** (0.027)
Constant	-85.523** (3.364)	-27.521** (2.692)	33.214** (2.796)	17.666** (0.627)	0.075+ (0.044)	0.124** (0.019)
Observations						
R-squared	513 0.93	513 0.94	513 0.97	513 0.93	513 0.58	513 0.57