

POLITICAL REGIMES, INSTITUTIONS AND THE NATURE OF TAX SYSTEMS

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Political Regimes, Institutions and the Nature of Tax Systems*

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1. Introduction

To the casual observer who does a quick survey of the data, tax systems present a confusing array of structures and forms, particularly if international comparisons are included. To the political economist, the variety of observed forms of taxation presents an interesting research challenge and raises a number of important questions. Can the seemingly confusing array of data be classified in a meaningful way? Is it possible to explain both differences and similarities in tax regimes? How do political factors and institutions influence the nature of observed tax systems? How do such factors interact with the underlying economy in determining the use of different revenue sources? Can the comparison of international tax regimes help in formulating better policy?

In this paper, we assess the contributions of current research in political economy to provide answers to these questions, while also presenting some new statistical results on the relation between tax structure and political regimes. Our discussion of the literature is selective and is empirically oriented. Our primary goal is to give a sense of some of the empirical research possibilities that lie ahead.¹

It is now widely recognized in the literature that observed tax systems reflect the interplay among political forces together with the influence of current and past economic factors. In democratic regimes, they can be modeled as direct outcomes of political competition, tempered by economic factors. In non-democratic countries, a similar logic applies. As pointed out by McGuire and Olson (1996) more than a decade ago, both types of regimes have similar incentives to capture the efficiency gains in designing policy structures for large segments of the population, leading to broad similarities in public sector policies.

In conducting research, it is useful to view tax systems as policy structures with a few essential features that are both identifiable and measurable. We shall refer to the collection of these characteristics, consisting of tax bases, rate structures and special provisions, as the “tax skeleton”. Depending on the level of aggregation, comparisons of different fiscal regimes may focus mainly on tax mix (the relative importance of revenues from different bases), they may include data on both revenue bases and tax rates, or may just deal with rates. Most of the work discussed below deals either with the tax mix, or with tax rates. In rare cases, comparative studies will cover all elements of the skeleton, although the complexity of special provisions found in most political regimes generally forces researchers to use a highly stylized or selective representation of this component of the tax skeleton.

Our discussion proceeds in several steps. In the second section, we present an overview of major questions asked and of the nature of the comparisons that will be examined. This is followed by a brief discussion of the underlying model of political economy.

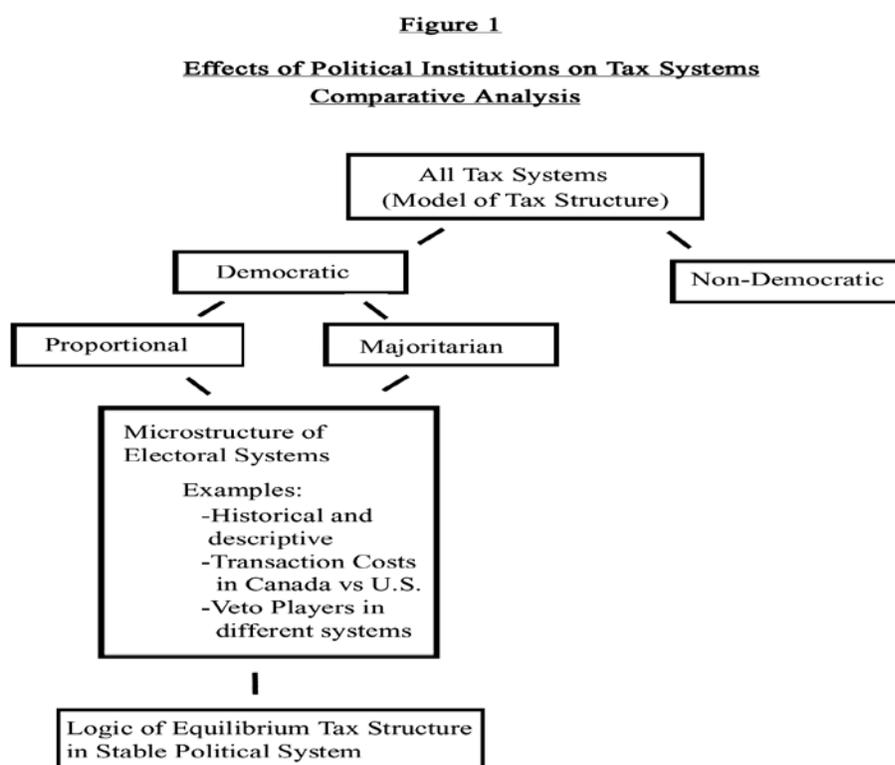
The analysis in the following sections moves from the general to the more detailed, starting with the comparative analysis of the tax mix in democratic and non-democratic political regimes. The focus then turns to comparisons between democratic states that have different electoral

¹ In particular, we shall not deal with the origins of the power to tax. Recent work on that topic – an enormous one in its own right – includes Besley and Persson (2009) and North, Wallis and Weingast (2009).

systems, followed by consideration of the role of the microstructure of democratic political institutions. In a further section, we comment on the logic of equilibrium revenue structures in mature democratic states, and draw attention to research that aims to uncover the direct influence on fiscal outcomes of the distributions of relevant characteristics over the electorate. A final substantive section relates the paper's approach to globalization and tax competition.

2. Political Institutions and Tax Structure – An Overview

To understand the logic of the analysis more easily, it is useful to first develop a schematic presentation of related questions. We do so in Figure 1, where the progression of comparisons among regimes is given in the form of a chart.



As in all investigations in empirical research, we need to start with an underlying theoretical model. In this case, we require a model of how tax structure is generated as an outcome of the interaction of political forces that is general enough to suggest hypotheses for all types of tax systems. Such a model will be presented in some detail in Section 3. At this point, we merely identify it as a necessary beginning of the analysis at the top of Figure 1.

Given this starting point, we can identify the relevant comparisons among different types of political regimes or among institutional features that are of most interest. As the table shows, we shall move from broader to more narrowly defined questions. First we concern ourselves with

comparisons of tax structure in democratic versus non-democratic countries. The main question here is this: After controlling for the usual determinants of tax structure suggested by the theoretical model, what effect on fiscal structure can be attributed directly to the degree of democracy?

Although the underlying model yields hypotheses for all types of tax systems, it is most directly applicable to democratic regimes that exhibit a sustained degree of political competition. There are interesting differences in institutions across the democratic countries. A major distinction that has drawn much attention among researchers relates to the nature of electoral systems, namely whether parliamentary decisions are made under proportional or majoritarian rules. In this connection, we want to ask what observable differences in tax structure can be traced to such differences in the nature of democracy, while controlling for other well-known determinants.

Further disaggregation gives rise to additional questions. If we look at the microstructure of electoral systems, we can focus on more specific elements, such as differences in political transaction costs and the role and importance of veto players in a particular political setting. It is also possible to approach the analysis in a more historical or descriptive way, with particular attention being paid to political history and to the influence of pressure groups previously identified in the political science literature.

Research at the micro level also involves the interactions of economic and political characteristics in a general equilibrium analysis of tax structure in a stable democratic system. Because of the necessary complexity of a fully developed general equilibrium model suitable to deal with such interactions, analysis of this type uses simulation techniques rather than the statistical analysis of observed data. Although only limited work has been done in this area, research suggests that, in addition to their average level, higher moments of the distribution of skills, tastes for public goods, and of political influence, have significant impacts on the determination of the tax mix.

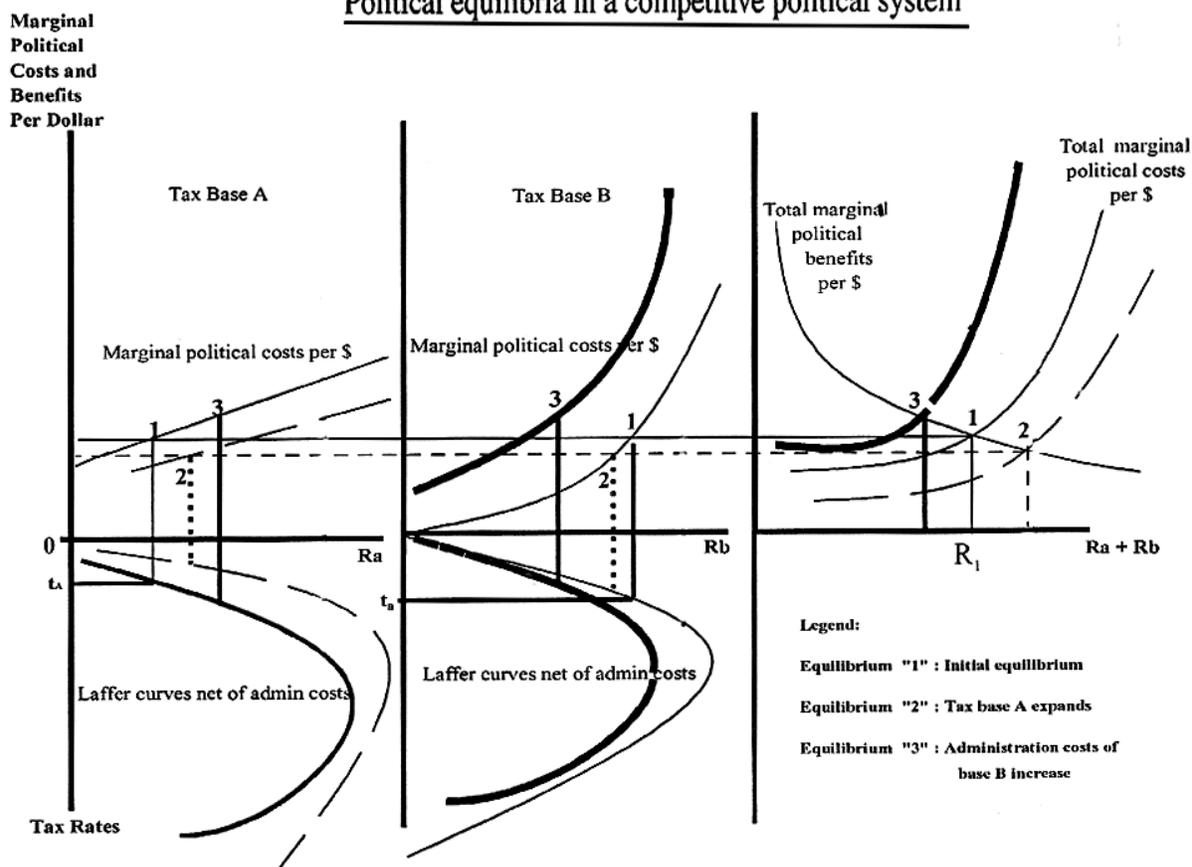
3. A Basic Model of Tax Structure

Tax structure in competitive political systems is part of a broader political and economic equilibrium. In the underlying model, political parties compete for support from a population of heterogeneous voters by offering different policies to the electorate. With regard to tax policy, such competition results in a revenue structure that minimizes the loss in support, or the political costs, associated with the use of different tax bases (Hettich and Winer 1999). The analysis represents an application and extension of the theory of probabilistic voting, a theory that is now employed widely in the literature dealing with equilibrium outcomes in the public sector (see for example Coughlin 1992, Hinich and Munger 1997, Hettich and Winer 1999, Persson and Tabellini 2000, Adams et al 2005, and Schofield and Sened 2006, among others).

To aid the discussion, we present a brief graphical exposition of a model of tax mix in Figure 2 below, based on Hettich and Winer (1988,1999) and developed further in an empirical context in Kenny and Winer (2006). A similar model has been used by several authors including, for example, by Aidt and Dutta (2009), Canegrati (2009), Profeta and Galli (2009), Profeta and Scambrosetti (2009) and Geys and Revelli (2009).

Figure 2

Political equilibria in a competitive political system



(Note. Except by mistake, or in the strenuous pursuit of objectives that necessarily compromise its ability to raise revenue, no government would choose a point on the backward bending part of any rate-revenue (Laffer) curve shown, since this would lead to a marginal political cost that is higher than that implied by the lower tax rate that raises the same revenue.)

Let us assume that the government pursues a sole objective, namely to get re-elected, and that it tries to reach this goal by choosing policies that maximize total expected support from a heterogeneous population of voters. The probability of receiving support is affected negatively by the imposition of taxes needed to finance the public budget, but it is also influenced positively by the provision of public goods. In reacting to the government's policies, voters regard their own tax payments as being independent of the benefits of the public goods and services that they receive, a condition that reflects the difficulty that voters face in the real world in trying to relate marginal individual tax payments to marginal adjustments in public output.

Taxation reduces the disposable income of voters and, in addition, it creates a welfare loss because of economic adjustments made by voters in response to tax laws. The resulting consequences for the relationship between tax rates, the size of tax bases and tax revenues are summa-

rized in Figure 2 by the rate-revenue relationships or Laffer curves in the bottom part of the first two panels.

The loss in disposable income combined with the welfare burden of taxation create a loss in full income for taxpayers which motivates their opposition to taxation. The marginal political cost functions in the upper part of the panels corresponding to the two tax bases show how the loss in full income at various tax rates is translated into political opposition or into reduced support, with marginal political cost being expressed per dollar of revenue raised.

Individuals are affected differently by taxation, depending on the taxable activities in which they engage and their willingness and abilities to make adjustments in economic behavior in order to escape tax liabilities. In addition, they face unequal costs in organizing political opposition. Regarding public output, voters have different tastes for and evaluations of public goods and services. As a result of these factors, individual marginal political cost curves, as well as marginal political benefit curves, will differ among them. In the figure, these individual marginal curves have been added vertically into total marginal political cost functions associated with each revenue source and into a total marginal benefit function. As shown by the curves passing through the points labeled as "1", the resulting marginal political cost per dollar functions differ across bases, reflecting the fact that voters as a group have different evaluations of the economic effects of taxation levied on a particular activity, and different ways of translating their evaluations into political opposition.

The third panel of Figure 2 shows the determination of budget size. The desired initial budget is at point "1" where total marginal benefit per dollar of expenditure equals total marginal cost per dollar raised. The implications for fiscal structure are then readily understood if we realize that any government, in its attempt to maximize political support, will minimize total political costs for any given level of revenue collected. To achieve this, marginal costs per dollar raised must be equalized across bases. Given two bases, the government will tax both and will do so at different rates. One such equilibrium is represented in Figure 2 by the point labeled "1" with associated tax rates t_A and t_B and a total budget size of R_1 .

It is important to point out that the rate-revenue curves are defined net of administration curves. By doing so, we are able to incorporate the resource costs of taxation, consisting of the costs of administering, monitoring and enforcing tax collections as well as compliance costs, directly into the graphic analysis, thus making them part of the budgetary equilibrium.

Different versions of Figure 2 can be used to investigate the effects of exogenous shocks on budget equilibrium and to derive testable hypotheses in this manner. Three types of shocks have proven particularly important in the empirical literature, namely those related to the size of tax bases, to changes in administration costs and to differences in the scale of the public sector.

Base effects. Figure 2 illustrates the effects of an exogenous increase or growth in the size of Base A on tax mix and on government size. Such a change will lead to an outward shift of the associated Laffer curve and, as a result, a downward shift in the marginal political cost function (now represented by the dotted line). This is so because any level of revenue for Base A can now be collected at a lower rate than before, thus reducing the loss in full income per dollar raised for

affected taxpayers. In addition, given the fixed costs of organizing opposition, the incentive to generate such opposition per dollar is now reduced. The new equilibrium in the panel for Base A is represented by point “2”, indicating a higher amount of revenue collected from this source. The shift also has implications for total budget size (see point “2” in the third panel) and for collections from Base B. As shown in the graph, total budget has increased, while revenue from Base B is now lower than before.

Administration cost effects. An exogenous increase in the costs of administering taxation on Base B is depicted in Figure 2 by a leftward shift in the Laffer curve for this base (defined net of such costs). The new equilibrium is labeled as “3”, indicating less total collection from Base B. As before, adjustments will also occur in the other two panels. In this case, collections from Base A will increase in relation to the starting point of the analysis, while total budget or government size will decrease.

Scale effects. While not shown explicitly to make the figure easier to view, an upward shift in the political benefit curve in the third panel, which obviously leads to an increase in the equilibrium size of the public sector, will also normally lead to increased reliance on *all* tax sources. (To see this, draw an imaginary line backwards from this new intersection in panel 3 to the marginal cost functions in the first two panels).

The graphic analysis in Figure 2 is limited to the tax mix. Although this model can in principle be expanded to include the other components of the tax skeleton (see Hettich and Winer 1999), we shall not do so here since the empirical work reported later focuses mainly on variations in the mix of tax sources.

As mentioned in the introduction, there are good arguments for applying the approach represented by Figure 2 also to non-democratic regimes, even though the model was initially developed for competitive democracies. As McGuire and Olson (1996) point out, all types of regimes, and especially those which expect to survive for some time, will attempt to capture efficiency gains and thus will experience similar scale, base and administration cost effects. In addition, work by Wintrobe on dictatorship (1990 and 1998) suggests that at least some types of authoritarian regimes may have incentives to minimize the costs of raising given levels of revenue, even though he does not specifically analyze the tax mix. In any case, it is clear that all types of regimes will have to face rate-revenue relationships for particular tax bases, although these relationships may assume different shapes for dictatorial and democratic societies, since dictatorships may of necessity emphasize enforced rather than voluntary compliance of taxation. In fact, empirical research does lend support to the proposition that democratic regimes rely more heavily on taxes requiring voluntary compliance, thus implying that the degree of democracy itself is a relevant variable in explaining observed differences in tax structure across democratic and non-democratic regimes.

4. Taxation in Democratic and Authoritarian Regimes: Does Consent Matter?

We return to the question posed earlier: After controlling for the usual determinants of tax

structure, what effect on the tax mix can be attributed to the degree of democracy? By the degree of democracy, we are referring to the extent to which there is effective political competition for governmental power.

Table 1 presents a record of the average tax revenue raised from various sources for 100 democratic and non-democratic regimes between 1975 and 1992, for each of three ranges of the combined Gastil index of liberal-democracy (Freedom House). This combined index adds together the Gastil indexes of civil liberties and of political rights. Each component goes from 1 for the most liberal-democratic regime to 7 for the least, so that 2 is the best score and 14 the worst. The countries of the OECD tend to be in the group with a combined Gastil index of less than 5. The table deliberately excludes the period after the collapse of the Soviet Union and the resulting political and economic transition.

The table shows clearly that in the advanced democracies, where the combined Gastil index of civil liberty and political rights has a value of less than 5, relative reliance on personal income taxation (including social security and payroll taxes) is higher. More precisely, the share of revenue coming from personal income taxation in advanced democracies is 2.6 times the share found in less democratic regimes. The advanced democracies - where rule of law applies to everyone including elites, and competitive forces in both politics and economics are impersonal and robust – raise just over 40 percent of total tax revenues from individual income and from social security and payroll taxes. On the other hand, both tinpot and totalitarian regimes, to use Wintrobe's (1998) terminology concerning non – democratic regimes, rely less than half as much on this tax source.²

Table 1: Tax Structure Across 100 Democratic and Non Democratic Regimes, 1975 - 1992*

<i>Revenue Sources</i>	<i>Combined Gastil Index</i>		
	<i>2.0-4.9</i>	<i>5.0-9.9</i>	<i>10-14</i>
	<i>Revenue Shares</i>		
CORPORATE	0.105	0.126	0.130
INDIVIDUAL INCOME	0.218	0.092	0.080
SOCIAL SECURITY & PAYROLL	0.195	0.069	0.060
GOODS & SERVICES(Domestic)	0.241	0.265	0.216
TRADE	0.109	0.228	0.271
PROPERTY	0.020	0.017	0.017
NONTAX SOURCES	0.109	0.195	0.216
RATE OF INFLATION	16.64	33.83	21.32
NUMBER OF OBSERVATIONS = 269	97	74	98

* Based on data from Kenny and Winer (2006). Observation numbers refer to averages over three, 5 to 7 year periods from 1975 to 1992, used in the empirical work reported below. Combined Gastil = sum of indexes of civil liberties (1 to 7) and political rights (1 to 7): Most democratic = 2; least democratic = 14. See Kenny and Winer (2006, Table 2) for exact definitions and sources of data. Tax data is from the IMF: see Kenny and Winer (2006) and Woldemariam (1995).

² Wintrobe (1998) defines tinpots as those regimes that just want to stay in power and consume as much surplus as possible, while totalitarians want to maximize power. The practical division between regime types using the Gastil indexes is based on Islam and Winer's (2004) test of Wintrobe's model. Wallis et al (2009) consider both of these types to be what they call natural states, which are ruled by elites and may be stable, but in which the rule of law does not extend to elites and where interference by elites in the 'democratic' process often occurs.

The personal income tax is hard to collect compared with forms of taxation that do not tax income directly, and especially so from people who own small businesses. Income tax withholding greatly simplifies collection from individuals who earn a wage. But in the mature, democratic societies represented in the table, political competition over the decades would surely have led to the abolition of withholding if this practice did not have the widespread and continuing support of the majority of the electorate. So it is tempting to hypothesize that this hard to collect tax, which is administratively and economically more efficient for the taxation of the income base than (indirect) sales taxes, can be relied upon to a greater extent in advanced democracies than in autocratic regimes because their citizens consent to this form of taxation.

Since the index of democracy in Table 1 is positively correlated with the level of economic development or per capita GDP, one might easily object to drawing inferences about the role of consent without controlling for the determinants of tax structure that may be correlated with economic and political development. This is done to the extent allowed by available data in Kenny and Winer (2006), where the basic model is applied to empirically model the tax mix as a whole across the 100 countries represented in Table 1 for 1975 to 1992. All data are averaged over three periods of from 5 to 7 years each to reduce the influence of macroeconomic fluctuations on the results.

The set of equations representing the share of revenues raised from each source by central governments, as specified in Table 2 below, is a full tax system. That is, a rise in the share of revenue taken from one base is offset by a fall in the share of revenue obtained from all the other bases.³ Revenue shares reflect choices about tax bases, rate structures and about the precise definition of taxable activity and effective rates of tax through special provisions such as exemptions and deductions. Thus all three major elements of the tax skeleton are implicitly included in a model of the tax mix. Modelling tax shares is more interesting than modelling nominal tax rates, which are just one simple part of the tax skeleton and for which implementation of a full system would be extremely difficult. A model of effective tax rates does incorporate special provisions, but also carries with it the problem of representing the system as a whole. An ideal approach would be to model a tax system in which each of the three major elements of the tax skeleton is separately represented. But to the best of our knowledge, this remains to be accomplished in empirical research⁴.

[Table 2 here]

The model in Table 2 excludes the scale effect represented by total revenues relative to GDP that is included in Table 3 of Kenny and Winer (2006). One may regard the equations in this table as reduced forms in which the scale of the public sector, which is endogenous and depends on the included right side variables, has been solved out of the system. Regressions based on this specifica-

³ This is the case if all regressions contain exactly the same set of right hand side variables, and the left side variables exactly sum to 1 (the sum of revenue shares). See Bodkin (1964) for explanation of this property of the estimation.

⁴ For an study of the interaction of two elements – an income tax rate and a special provision in the U.S. state income tax system, see Winer and Hettich (2002).

tion have not been previously published. The results provide strong support for our predictions that a rise in the tax base or a fall in administrative costs leads to greater reliance on this revenue source. The results remain very similar if the scale effect is included. A full discussion of the results will not be given here so that we may focus on the role of the degree of democracy as measured by the Gastil index.

The combined Gastil index is entered in the estimating equations using a two segment spline, which is a piece-wise linear function that changes slope at some combined Gastil value called the break point. The break point that provides the best fit of the data is labelled in Table 2 as SPLINE BREAK. In the individual income tax regression, the break point occurs when the combined Gastil equals 5, just as the descriptive data suggests. Moreover, the coefficient on the first segment of the spline is negative and statistically significant, with a coefficient that indicates that the relative reliance on the income tax would drop by about 0.1, that is, from 0.2 or 20 per cent to about 10 per cent when the Gastil index rises (and democracy declines) from 2 to 5. The coefficient on the second spline segment is not statistically significant, implying that additional increases in the Gastil do not lead to a further drop in the reliance on income taxation.

The results in Table 2 show that the first impression one gets from the descriptive data is not misleading. Democratic countries do rely substantially more on personal income taxation than do non-democratic regimes by a factor of about two, even after controlling for various factors that shape tax structures and which are correlated with the level of development.⁵

Such a finding could be caused by higher citizen consent in democracies as we suggested earlier or, perhaps, to democracies redistributing more by using progressive income taxation, or both. Mulligan, Gil and Sala-i-Martin's (2004) demonstration that income tax rate structures are somewhat flatter in democratic countries than in non-democratic ones suggests that our result is due not only to redistribution being relatively more important in advanced democracies. So too do the results on the second segment of the spline, which show that once the combined Gastil index rises above the value indicated in the row labeled Spline Break, non-democratic regimes rely more heavily on property and nontax revenues (revenues from sales, interest and the like), where self-reporting is not usually involved.⁶

The importance in Table 2 of what appears to be popular consent to taxation of a particular form is striking. The role of consent is not usually dealt with in public finance texts, despite its importance in the well-known Wickseil-Lindahl framework.⁷ Further research to confirm, amend or refute these results is warranted because of what they imply for the way we think about the evolution and reform of tax structures both in advanced and in less democratic regimes.

⁵ Profeta, Puglisi and Scabrosetti (2009) find a similar result - more freedom leads to greater reliance on personal income taxation - but for a sample (only) of developing countries, and using only the civil liberty component of the Gastil index.

⁶ The puzzling insignificance of the 2nd segment spline coefficient on trade taxes is, perhaps, due to corruption in customs collection.

⁷ For a discussion of the role of consent, and its opposite - coercion - in taxation, see for example Levi (1981), Breton (1996) and Winer, Tridimas and Hettich (2008).

5. Tax Structure and Electoral Systems: Do Majoritarian Systems Rely More on Personal Income Taxation?

We now narrow the discussion to consider the role of electoral systems in the more advanced democracies. There has been a lot of empirical work on the size of government in a comparative perspective; see, for example, Persson and Tabellini (2003) and Bueno de Mesquita et al (2005). But there has not been not much comparative empirical work in medium to large N situations dealing with the effects of governance on tax structure, with Cusack and Beramendi 's (2006) study of labor taxation in OECD countries being a notable exception.⁸

Iversen and Soskice (2006) begin a comparative analysis of majoritarian and proportional electoral systems with the observation that in a sample of 17 advanced democracies between 1945 and 1998, those with proportional representation had a far higher incidence of left-wing governments. According to Iversen and Soskice (2002, Table 1), about 75 percent of governments in PR systems were left of center, meaning that they favored redistribution to lower income groups. In contrast, in countries with majoritarian systems, about 75 percent of governments were right of center and less favorably inclined to support progressive redistribution.

The obvious hypothesis is that there will be more redistribution in countries with a proportional electoral system. Iversen and Soskice provide an excellent theoretical model of why this pattern is predictable, which we only briefly summarize in a footnote in order to focus on their empirical work and our new results.⁹

Iversen and Soskice test their model by regressing the percentage reduction in the Gini from before to after taxes and transfers on an indicator of the type of electoral system, along with several control variables, using data for 14 countries in the Luxembourg Income Study (for 1967 to 1997). Their regressions confirm that PR is significantly associated with a greater reduction in inequality compared to countries with a majoritarian electoral system.

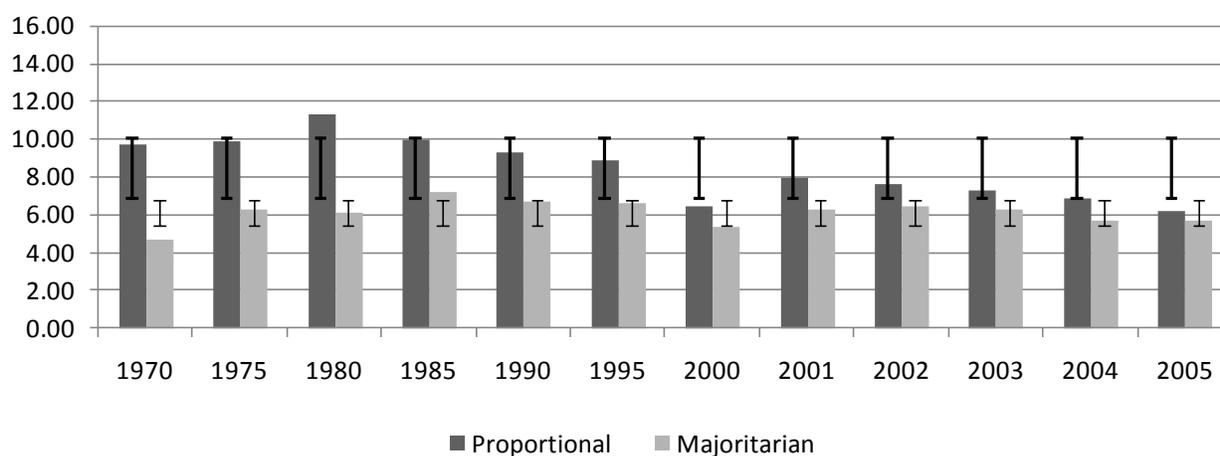
⁸ A useful survey of research up to 2002 is provided by Baker and Gould (2002). See also Hettich and Winer (1999).

⁹ In the Iversen-Soskice model, there are three groups of voters - Lower income, Middle and Higher income citizens - and there is a constraint on all governments that prevents the introduction of regressive policies. (This constraint may originate in the threat of political instability, and is not explained). Tax policy is multi-dimensional and the median voter theorem does not apply. **Under PR**, there are three parties - L, M and H - each of which is a perfect representative of the corresponding income group. Governments consist of a coalition of two of these parties. Given the non-regressivity constraint, the decisive middle income party, M, will likely join with L rather than with H. If M joins L, it can benefit with L from progressive taxation of H. If it joins with H, the non-regressivity constraint prevents the exploitation of L. In other words, M has to share with both L and H in an MH coalition, and only with L in an LM coalition. **In a Majoritarian system**, the governing party is a coalition of two groups and will have a centrist platform. Since the government is a coalition of different groups, its leadership may not be a good representative of its constituents. In that case, the decisive M voters prefer to join an MH party rather than an LM party. Although both parties will promise a centrist platform, the leadership of the LM party may waffle to the left, in which case M voters are at risk of being taxed to pay for redistribution to lower income voters. On the other hand, in view of the non-regressivity constraint, if the MH party waffles to the right, M can be made no worse off, and the best option for an H-dominated MH party will be to reduce the size of the public sector leaving H (and everyone else) with more disposable income. For an alternative model with a similar focus on why post-fisc inequality is less under PR, see Austen-Smith (2000).

It is difficult to know the pre-fisc Gini, since a complicated general equilibrium calculation would be required to determine it. For this reason, but also because it is an interesting issue in its own right, we investigate the direct impact of majoritarian and proportional electoral systems on the tax mix in the context of the model presented in Table 2. In view of the correlation of electoral systems with party ideology, and since personal income taxation tends to be the most progressive element in the tax structures of advanced democracies, it seems reasonable to expect that our investigation will show that countries with a majoritarian electoral system rely relatively less heavily on the individual income tax .

A graph of the personal tax (including social security and payroll taxes) to corporate tax ratio in OECD countries by type of electoral system is given in Figure 3 below. We see that countries with PR do appear to rely relatively more heavily on the taxation of personal incomes. But this graph is only a representation of simple correlations. Estimation of a full regression model may reveal something quite different.

Figure 3: Evolution of the Ratio of Personal Taxes (including social security and payroll) to Corporate Taxes, By Electoral System, OECD, 1970 - 2005*



*Notes to Figure 3: Bars represent averages within the categories. Vertical lines represent standard deviations. Majoritarian(t) = 1 if the lower chamber is elected by a majoritarian electoral system in year t, = 0 otherwise (proportional or mixed system, or other, in year t). Ireland and Japan (before 1994) had, respectively, transferable and non-transferable voting systems. Sources: Revenue statistics from OECD databases. www.sourceoecd.org. Electoral system data from Persson and Tabellini (2003) before 1999, IDEA website and Colomer (2005).

The results of adding an indicator representing the type of electoral system into the model of tax structure in Table 2 are recorded in Tables 3 and 4. Here only the estimated coefficients of the indicator variable MAJORITARIAN (= 1 if the electoral system for the lower elected chamber is majoritarian, = 0 otherwise) are presented. Presidential systems have been removed from the sample, so that the alternative to a majoritarian system is PR or mixed PR.

For the sample of countries used in Table 2, we see in Table 3 that majoritarian electoral systems make significantly more use of the individual income tax, and place less reliance on some-

what more regressive social security and payroll taxes. They also rely less on domestic consumption and property taxes, and more on corporate taxation and nontax revenues.

[Tables 3 and 4 here]

In Table 4 the sample is restricted to countries for which the combined Gastil is 5 or less, as is suggested by the results for the Spline Break in Table 2. The coefficient value for MAJORITARIAN in the individual income tax equation is 0.07, more than twice its value in Table 3. This coefficient indicates that the share of revenue coming from individual income taxes is 0.07 higher in the more advanced democratic countries using a majoritarian system in the lower chamber than if PR (or a mixed system) is employed. Since the share of taxes raised by the personal income tax ranges from 0 to 0.563 and has a standard deviation of 0.135 in the sample with a combined Gastil index of 5 or less (see Appendix Table A1), the estimated effect is substantial.

These estimation results refute the simple prediction made earlier. Majoritarianism is associated with greater reliance on personal income taxation than is PR, not less. Instead majoritarian countries rely less on social security and payroll taxes, the usual structure of which limits their progressivity, less on consumption taxes and more on corporate taxation. This conclusion is further bolstered by the work of Aidt and Dutta (2009), who find a similar pattern for a sample of ten Western European countries between 1930 and 1938! They show that the presence of PR is significantly associated with less reliance on direct taxes including corporate taxation, and also greater reliance on domestic trade taxes.

Cusack and Beramendi (2006) point out that the correlation of PR with the existence of a coordinated market, in which employers and unions bargain at a central level over wages, is high, at over 0.7 (Gourevitch and Haves, 2002). PR and the existence of coalition government also is highly correlated. Their analysis of wage taxation in these countries in the light of these facts helps to explain the pattern of results in Tables 3 and 4.¹⁰

The Cusack and Beramendi analysis, on our reading, suggests that (the usually) left of center coalition governments in PR countries provide a high level of public benefits, including generous pensions, and pay for them with relatively high taxes on the labor incomes of those who benefit, especially where the legislature is strong relative to the executive. It is important in their view that wage bargaining reduces the extent to which these taxes are passed on to employers by unions, so that unemployment does not rise and investment is maintained. Moreover, since governments in PR systems are usually coalitions, the credibility of wage bargains is enhanced because it is difficult for any particular government to meddle with them.

There is a complementary story based on Lindert (2003). The evidence assembled by Lindert suggests that the relatively large public sectors of the E.U. leads them to impose tax structures that are less harmful of economic efficiency and growth than would be the tax systems of countries with smaller public sectors. A related argument appears in Steinmo (1993). One wonders, though, why vigorous political competition fails to insure the same degree of efficiency in countries like the U.K., the U.S. and Canada.

¹⁰ The analysis relies in part on the varieties of capitalism framework of Hall and Soskice (2001).

In any case, the new results in Tables 3 and 4 indicate that in PR, as opposed to majoritarian electoral systems, there is greater reliance on social security and payroll taxes and also on domestic trade taxes. Exactly how these facts can be reconciled with the Iversen-Soskice finding that PR countries reduce inequality more than do majoritarian ones remains to be seen. No doubt more than tax structure is involved.

6. The Comparative Microstructure of Electoral Systems and Tax Structure

Sven Steinmo's book *Taxation and Democracy* (1993) represents an early attempt to link tax systems to the microstructure of their specific institutional setting. He argues that political institutions are not neutral. Going one step further, he proposes that such institutions not only affect the relative distribution of power among participants in the political process, but that "the structure of a polity's decision-making institutions also profoundly affects how interest groups, politicians and bureaucrats develop their policy preferences" (p.7).

Steinmo covers the development of modern tax structures for Sweden, the U.S. and Great Britain, breaking the discussion for each country into three parallel historical periods. The analysis is given in narrative form and comparisons are incorporated into the separate treatment of each country. There is much material in the book which elucidates the different cultures and histories of tax policy formulation in the three nations. However, Steinmo's approach does not lend itself to the derivation of specific testable hypotheses. This is not surprising if we consider his statement above which implies a need for three distinct groups of variables: those relevant to preferences and preference formation of policy makers, those describing actual institutions and those characterizing observed fiscal outcomes. A rather complex formal model would be required to implement a research program of this nature in a quantitative manner. As it stands, Steinmo's work serves as a stimulating introduction to the political economy and history of taxation in the three countries.

In their comparison of fiscal decision making in Canada and the United States, Hettich and Winer (1991) adopt a more narrowly focused approach by relating differences in the transaction costs associated with policy making to specific features in the tax systems of the two countries. As they point out, decision making in the parliamentary system of Canada involves fewer actors and requires less time than the making of significant national tax choices in the U.S. with its political system of checks and balances. While proposed new tax laws in Canada are prepared in secret in the Department of Finance, proposed by the Minister of Finance to Cabinet and then introduced to Parliament, a set of steps that can be accomplished fairly quickly, major tax legislation in the U.S. involves participation by the President, the House of Representatives and the Senate in a process that is much lengthier, more open to negotiation by different centers of power and to public discussion and more directly influenced by specialized interest groups.

Based on the discussion of national political institutions, the authors derive several specific hypotheses about expected differences in the tax structures of the two countries. Among them are the predictions that Canada will use more discretionary fiscal policy than the U.S., and that its tax code will be less complex. The authors test their hypotheses with considerable success, even though the small number of relevant observations prevents them from carrying out formal statistic-

al tests. Results are thus suggestive only, but they clearly support the notion that specific institutional features that affect the nature of policy making will lead to identifiable differences in fiscal structure.

Tsebelis (1995, 2002) uses the concept of a veto player to formalize the meaning of key actors in a political system. Veto players are individual or collective actors whose agreement is required for a change of the status quo (2002, 19). The number of veto players is likely an important determinant of transactions costs referred to in the analysis of Hettich and Winer.¹¹ Even when there is a minority government, the Canadian Westminster-style parliamentary government has fewer veto players than the U.S. congressional system.

Empirical studies show that the number of veto players does affect the number and size of tax changes. Of special interest from our perspective is the work of Hallerberg and Basinger (1998), Iversen and Soskice (2006) and Ganghof (2006)¹². Iversen and Soskice show that in their sample of advanced democracies, while PR leads to more redistribution, an increase in the number of veto points reduces the extent of it. Hallerberg and Basinger study tax changes in OECD countries that followed the 1986 tax reforms in the United States, when tax rates on personal income and on corporations fell. They find that an increase in veto points from one to two reduced the fall in tax rates over the period studied by 18 to 20 percent.

Ganghof (2006, chp 8) replicates and extends the Hallerberg-Basinger study to distinguish between corporate and personal taxation. He argues that their result for corporate taxation is brittle, and that veto points had in fact no effect on the course of business taxation. On the other hand, he presents evidence showing that an increase in the number of veto points reduced the decline in top personal income tax rates. Ganghof attributes these results to the difference in the strength of international versus domestic constraints on public policy. He argues that the number of veto players is irrelevant to the choice of corporate tax structure, as all political actors preferences are forced to accommodate the same harsh international realities. On the other hand, the domestic political system plays a significant role in determining the personal tax structure. He does not discuss in detail why international constraints bite more deeply, and we shall return to this matter in a later section.¹³

The veto point framework permits empirical research to be conducted using medium sized samples that include countries with different electoral and legislative systems. Most work of this kind deals only with how the number or size of tax policy changes over time are affected. Such a focus is a natural product of a framework that emphasizes the ability of key actors to block changes

¹¹ The ideological distance between veto players may also play a role, as a greater distance generally makes it more difficult to agree on changes from the status quo. Thus increasing elite polarization in the United States may also be important in explaining the Hettich-Winer findings. On polarization in the U.S. see for example the recent survey by Fiorina and Abrams (2008).

¹² Stewart (1991) is an early paper on tax U.S. reform in the 1981 to 1987 period that can be seen, with hindsight at least, as being consistent with, or involving elements of, a veto player analysis, as may the analysis of Hettich and Winer.

¹³ In a complementary study, Ha (2007) argues that empirical evidence from a similar data set of industrialized countries from 1960 to 2000 indicates that the pressure of globalization to increase domestic welfare spending is reduced if there are more partisan or institutional veto players.

from the status quo if they are not adequately compensated.

There does not appear to be any research that considers the effect of veto points on the equilibrium tax mix. Accordingly, in Table 5 we show the results of adding an index of veto points constructed by Tsebelis¹⁴ to the model in Table 2. The sample is a set of 21 advanced democracies, again for 1975 – 1992. (See Table A2 for a list of included countries). In Table 6 this is augmented with the MAJORITARIAN indicator of electoral systems.

[Tables 5 and 6 here]

In both tables we see that as the number of veto players increases, central governments turn towards domestic consumption taxes and away from nontax revenues (including fees, property income, interest on investments, sales of goods and services, fines and other items). An explanation for this pattern is not immediately obvious. On the other hand, the insignificant coefficients on the number of veto points in the corporate tax regressions is consistent with Ganghof's (2006) assertion that veto players are largely irrelevant to the choice of corporate tax policies.

Other major elements of institutional micro structure not so far discussed include federalism, presidentialism and bicameralism. Federalism is included in Table 2, where we see that central governments in federal systems (compared to unitary states) tend to rely more on corporate taxation and less on domestic trade taxes and property taxes. This seems understandable: lower levels of government find it easier to tax domestic consumption and property than mobile capital, and the opposite is the case for corporate taxation by the central government, while competition between jurisdictions leads to an efficient assignment of policy instruments in the federation.¹⁵ We must leave investigation of presidentialism and bicameralism for another occasion.¹⁶

7. Equilibrium Tax Structure in a Mature Democracy: Three Moments in the Political Economy of the Consumption-Income Tax Mix

We now turn to the determinants of tax structure in mature democratic states with a stable electoral system, a simple model of which is illustrated in Figure 2. If we look around the world, a wide variation in the tax systems of such countries is apparent. Variation in the personal to corporate tax ratios of OECD countries, shown by the vertical lines in Figure 3, is just one example.

Just as varied is the choice between consumption and income as sources of public finance. European Union (15) countries raised on average about 29 per cent of their revenues from taxes on general consumption in 2006, while the United States and Canada derived from 14 to 22 percent of revenues respectively from this source, with much variation occurring among countries falling in between (see OECD, 2008, 108). Reliance on personal income taxation is similarly varied, and

¹⁴ See http://sitemaker.umich.edu/tsebelis/veto_players_data (June 30, 2009)

¹⁵ On the assignment of policy instruments in a federal state, see for example Breton and Scott (1978).

¹⁶ When a PRESIDENTIAL indicator replaces MAJORITARIAN in Tables 3 and 4, presidentialism leads to less reliance on personal income taxation and more reliance on social security and payroll taxation, as under PR. We have no obvious explanation for this pattern.

generally moves in the 'opposite' direction: Excluding social security contributions, the U.S. and Canada raised approximately 36 per cent of total revenues in this manner, a figure falling substantially above the average for E.U. 15 members which was close to 25 per cent.

There is a well known tradition of fiscal analysis relating to the choice between consumption and income taxation. (Reviews of the extensive literature are provided by Bradford 1996 and Zodrow and McClure 2007). This literature is mostly normative in nature, and work on the choice between the two revenue sources when both are determined endogenously as part of a political process is sparse. The question we address in this section is this: Differences in the structure of electoral institutions aside, what factors may lead to variation in the income-consumption tax ratio across countries?¹⁷

In a framework appropriate to the study of this question, several key elements of both the private and public sectors must be present. Some of these factors may act directly on tax structure, while others may only exert an indirect influence. The empirical work reported in Table 2 and similar work by others has shown the importance of the relative size of tax bases, as measured by the per capita size of the corresponding taxable activity. Previous research has also demonstrated that the variance of incomes plays a significant role in determining income tax structure at least because the taxpaying public is heterogeneous in its tastes for leisure (Cukierman and Meltzer 1991).

The factors underlying the size of government are also involved, as tax structure may change with the overall role of government in the economy. We referred to this earlier as the scale effect. Work on the size of government has identified per capita income as a significant determinant (see the literature on Wagner's Law, reviewed by Mueller 2003), so here is another reason to add this factor to the list. The median voter theorem of Black (1968) points to the skewness of the income distribution as a key determinant of government size (Meltzer and Richard 1981, 1983). Thus we can point to the first three moments of the distribution of income as potential determinants of the tax mix in mature democracies.

In a different but related context, Usher (1977) has drawn attention to the heterogeneity of preferences for public goods, including both second and third moments of the distribution of tastes, as a determinate of whether a commodity is provided publically or not. Lower income citizens especially are faced with a trade-off between the benefits of redistributive financing of publically provided goods (as in the Meltzer-Richards framework), and the loss of welfare that may occur when their tastes differ substantially from others who are involved in making collective decisions.

Preferences for public goods relative to private goods and leisure may also be implicated directly, as well as indirectly via the scale effect, in the evolution of tax structure. The nature of such preferences may affect the way in which individual taxpayers at different places in the income distribution react to changes in different types of taxation. Thus, in moving beyond the existing literature, it seems sensible to explore the first three moments – *the mean, variance, and skewness*

¹⁷ For work of differing sorts on partisanship and taxation see, for example, Stewart (1991) on U.S. national tax policy in the 1980's and Reed (2006) on tax policy in U.S. states.

– of the distributions of income and tastes for public goods, as factors that may shape the consumption – income tax mix.¹⁸

7.1 Studying the role of the three moments in the consumption–income tax mix using simulation

Investigating the role of the three moments identified above is a complex task. Winer, Warskett and Hettich (2009) use simulation of a spatial voting model to examine the role of these factors. As is now well known, such a model can be solved for its equilibrium by optimizing a synthetic (political support) function which is weighted sum of indirect utilities, with weights reflecting the effective political influence of each group of citizens (see for example, Coughlin 1992). In the Winer et al model, utility is Cobb-Douglas in one pure public good, one private good and leisure. Heterogeneity of tastes for the public good involves assumptions about the mean, variance and skewness of parameters in the utility functions. A distribution of skills and thus of wages and incomes is introduced via the budget constraints of citizens, which also include an exogenous capital income for each person. A distribution of political influence is introduced through assumptions about the weights on indirect utilities in the political support function.

There are five groups of voters with population weights symmetrical about the mean, and taxes on the wage income and consumption of these groups are assumed to be strictly proportional. The model is calibrated so that the relative size of the public sector is 0.5 and the tax on wages and on consumption are both non-negative. Further details are provided in their paper.

Simulations of this model for societies with symmetric and asymmetric distributions of income and tastes show that the tax mix may vary substantially even when the distribution of political influence is held fixed. Here we consider as an illustrative case the effects of changes in the variance of skills, since this is not usually investigated. In this case, mean skill is held constant and tastes are homogeneous across the income groups.

Table 7 records the simulated values of tax rates on labor and consumption t_l and t_c , the tax ratio t_l/t_c , and the relative size of government, $gsize$. (In this model, tax rates and revenues move together and only rates are reported here). We see that as the model equivalent of the variance of skills falls, t_l falls and t_c rises, with government size relative to aggregate income remaining more or less the same. There is, thus, an increase in relative reliance on consumption taxation as the distribution of skills becomes more concentrated.

¹⁸ The second and third moments of the distribution of political influence will also be important, since tax policy is a result of collective choice. (The first moment or average degree of political influence has no meaning since influence is a relative concept.) We note that partisan party politics, including differences in the ideology of redistribution, is not involved here, and is left for further research.

TABLE 7: A homogenous (in tastes) society.
Model mean skill = 850. Change in variance of skills.

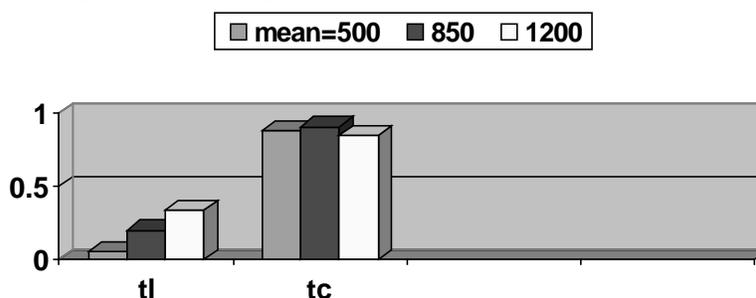
<i>Model variance</i>	<i>tl</i>	<i>tc</i>	<i>tl/tc</i>	<i>gsize</i>
10000	0.22	0.88	0.25	0.54
20000	0.23	0.85	0.27	0.54
30000	0.24	0.84	0.29	0.54
40000	0.25	0.82	0.30	0.54
50000	0.27	0.79	0.34	0.54

These results are foreshadowed by Cukierman and Meltzer (1991) to whose work we referred earlier. In their median voter model, a decrease in income inequality reduces the size of government because total taxable income, the only base in their model, shrinks as a result of the declining importance of differences in the elasticities of labor supply of the rich and the poor as the distribution of incomes is reduced. Here, in a model with a multi-dimensional issue space (two tax rates and one public good), we see changes in the tax mix even though the size of the public sector does not change.

It is useful to examine the change in tax structure further by now imposing a near zero dispersion in skills and hence in income, so that there are no rich or poor relative to the mean.¹⁹ The results, illustrated graphically in Figure 4, shows three cases in which the (model) mean of skills declines from 1200 to 500 while the distribution of skills remains very highly concentrated.

The population with low mean skills has relatively low income, both earned and from its endowments. Then the elasticity of leisure with respect to income is relatively high (see equation 2.2b in Winer et. al. 2009), and a tax on labor income represents a strong disincentive to work for

Figure 4: A homogeneous society with minimal skill variance.



everyone. It is therefore optimal when maximizing expected votes to have a lower t_l . In the case of low mean skills, this leads to a corner solution where there is virtually no labor income taxation at all ($t_l = 0$). What is happening at this corner is that labor income is taxed as little as possible to make gross incomes as high as possible, while desired public services are then financed relatively effi-

¹⁹ The presence of some distribution is essential, however small the dispersion, as otherwise there is no equilibrium in the model for a small countable number of voters.

ciently by diverting private expenditure into the public purse, a use of the consumption tax that is not commonly considered.

Finally, we note that when the mean taste for public goods is increased in any of the experiments outlined above, consumption taxation tends to grow in importance in the tax mix for any given skill variance.

A general lesson from the model is that the distribution of tastes for public and private goods interacting with the distribution of income may influence tax structure by affecting the elasticity of tax bases and the efficient means of financing public services. While the specific nature of this interaction depends on the particular model structure adopted, it seems reasonable to expect some adjustments of this sort when there is substantial variation in the distributions of income and of tastes.

It is always a good idea to remain cognizant of how assumptions drive conclusions in the sort of simulation model we have briefly explored.²⁰ Still, in the light of our experience with the simulation model, we may speculate that the relatively high reliance on consumption taxation in the European Union compared to North America may be partly due to greater income equality coupled with a stronger preference for public goods. Whether or not, and the extent to which this may be so has not been considered in the empirical literature.

8. Globalization and Tax Competition

Tax competition exists and is a factor reshaping tax systems (see the reviews in Devereux 2008, Feld and Heckmeyer 2008, and Zodrow 2008), even if there is no obvious withering away of the state so far (Garrett 1998, Swank and Steinmo 2002, Ha 2008, Bergh 2008, Bernholz 2008).²¹ In this last substantive section we consider how one might study the consequences of globalization and international tax competition in the context of the basic model outlined earlier.

At one level, modeling the effects of globalization is straightforward. To make use of a model like the one illustrated in Figure 2, one needs to know which tax bases become relatively more

²⁰ See, for example, Renstrom (1996) who adopts a quasi-linear specification of preferences instead of Cobb-Douglas, producing a model in which an increase in tastes for public goods leads to more labor income taxation rather than less. A general message of the same kind is found in Deaton (1987).

²¹ Garrett (1998) makes a good case that the importance of the state has increased as a result of globalization, particularly in countries with left of center coalition governments (and proportional representation) and encompassing labor market institutions. Rutherford and Winer in Hettich and Winer (1995, 1999 chp. 7) illustrate the connection between domestic politics in the U.S. and globalization in the 70's in a unique fashion. They construct a spatial voting model of the sort employed in this paper, with the GEMTAP tax model embedded in it. The influence weights of each of three income groups in the political support function (the optimization of which replicates the equilibrium) are calibrated so that the model reproduces the GEMTAP benchmark data sets in 1973 and 1983. Then, applying the 1973 effective influence weights of the poor (without capital income), middle and high income groups to the 1983 data set leads to an equilibrium tax on capital that is substantially lower and a tax on labor income that is higher than actually observed in 1983. This shows that to replicate the 1983 data set, what is required is an increase (compared to 1973) in the relative domestic political influence of voters who favor lower taxation of labor income.

elastic, and how the economic consequences of this for a specific rate-revenue relationship are translated into political costs of raising revenue from that base. Then the consequences for the tax mix follow in a straightforward manner.

There are several complications to deal with before one arrives at that point, however. First, the elasticities involved are equilibrium quantities being, to some extent, the result of strategic interaction between national governments and even of states or provinces which act on their own to attract foreign investment. Economists have been on the track of these tax elasticities empirically (see Feld and Heckmeyer for references). Second, how changes in elasticities translate into political support is even harder to study. Though they may not refer to their enterprise in these terms, political scientists have been working on this part of the story (see, for example, Garrett 1998 and Ha 2008) by investigating how domestic political institutions attenuate the consequences of the increasing international integration of national economies. Third, acknowledging that tax structures are *systems of related elements* in this context remains a substantial challenge in its own right.

This third aspect of the study of globalization leads to several thorny issues and problems confronting researchers working on the empirical political economy of taxation. One of the most interesting of these is that even though tax structures are systems of related elements, strategic interaction tends to be studied tax by tax, such as with respect to corporate taxation. It is necessary to allow for the fact that shocks anywhere in the system may propagate everywhere. Indeed, there is no reason to limit international competition to that over taxation, since there are other types of policy instruments that can often serve as good substitutes (Trebilcock et al 1982, Sinn 2003).²²

A second problem stems from the fact that since tax structures are *systems*, big shocks that are common across countries influence much of the tax structure of all the affected countries, and often in a similar manner. For this reason, it is difficult to distinguish a situation in which there are similar, autonomously arrived at reactions in several countries to a common shock, from a situation in which countries strategically interact. (On this point, see Revelli 2005).

As a final comment, we return to the question of why there is a difference between domestic strategic interaction among taxpayers and the government, on the one hand, and strategic interaction between countries when international migration as opposed to 'internal migration' between political parties is possible, on the other. To recall, this difference played a key role in some of the research on veto points we considered, and surely is an important part of any study of international competition. One sensible (and often provided) answer is that except for highly skilled people who supply internationally traded services, companies can move across national borders more easily than can labor in response to favorable policy differentials.

But while this answer may appear adequate, it is important to keep in mind that the differ-

²² The Trebilcock, Prichard, Hartle Dewees (1982) study of substitutability of governing instruments (expenditures, taxes, regulation, law and so on) is, perhaps, the seminal work on systems of governing instruments. Sinn (2003) analyzes competition between national systems of policy instruments. A few authors have caught onto this, though they have not explored the full implications: see, for example, Fredriksson et al (2004) and Hauptmeier et al (2008).

ence in mobility of factors is to a considerable extent a product of public policy. Governments can and do regulate the mobility of labor and capital, both independently and through bilateral and multilateral agreements. Labor mobility is lower and that of capital increasing because of deliberate policy choices. It seems sensible to suspect, therefore, that further work on the difference between domestic and international constraints on policy choices may lead to new perspectives on both the positive and normative study of fiscal systems.

9. Concluding Remarks.

The comparative analysis of fiscal systems raises many significant questions for the study of political economy. Foremost among them are those concerned with the influence of institutions. In this paper, we pay particular attention to the impact of political institutions on tax structure, though taxation is not determined in isolation from other aspects of public policy. After briefly presenting a model suitable for explaining fiscal outcomes as a political equilibrium, we examine some of the relevant literature, while also reporting on new statistical results. Our survey is selective rather than comprehensive, focusing on what we consider to be some of the important issues and results in a rapidly growing body of literature.

At the broadest level, international comparisons across all types of regimes show that the degree of democracy is an important influence on tax structure, with more democratic countries relying more heavily on personal income taxes and social security and payroll taxes. This suggests that the degree of consent may play a vital role in the nature of observed revenue structures.

When we turn to comparative analysis among modern democracies, a major institutional feature of the electoral system - whether they use proportional or majoritarian electoral systems - is of particular relevance. Again we find that the institutional setup matters. Our statistical work shows that countries using PR make heavier use of social security, payroll and domestic trade taxes and rely less on individual income, corporate and international trade taxation than nations using a majoritarian electoral system. While it is possible to suggest explanations for some of these effects, further research will be needed to confirm them.

When we examine the comparative microstructure of revenue systems, further questions arise. Particularly relevant at this level is the influence of transaction costs, or in a related formulation, the role of veto players who can block or delay relevant policy decisions. We present some new results on the impact of veto points on the tax mix, a topic not so far explored in the literature.

Research on fiscal structure is complex since the analyst is faced with equilibrium systems where all significant policy instruments are related. It is not surprising therefore that most empirical research is confined to data that consists of average values, since there are multiple challenges to estimation even without the consideration of higher moments of the relevant variables. New work using simulation techniques points, however, to influences that can be captured only with higher moments. It suggests, for example, that changes in the variance of incomes interacting with the distribution of tastes for public goods may result in significant differences over time or across countries in the use of revenue sources. The empirical role of the three moments relative to institutional factors remains to be investigated.

Comparative analysis offers a rich field for research on tax systems. It also presents significant challenges because observed data reflect equilibrium outcomes, requiring estimation techniques taking account of the simultaneity of different policy features. Various parts of revenue systems – what we have called the tax skeleton – are all related and cannot be studied properly in isolation.

We started the paper by asking, among other questions, whether the literature in this field offers some lessons for current tax design. As we noted earlier, the analysis clearly suggests that institutions matter. Reform proposals that do not take account of the institutional context, should they be implemented, will have significant and unforeseen side effects in other parts of the fiscal system. Further work of the type reviewed here will allow us to better predict such effects, as well as lead us to a better understanding why we observe such wide variation in revenue systems across countries in both the developed and the developing parts of the world.

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Table 2*
Tax Share Regressions for Central Governments, 1975 - 1992
Analogous to Table 3 in Kenny and Winer 2006, but with TOTAL REVENUE/GDP (scale effect) excluded.
(Absolute t-statistics in parentheses, based on Huber-White standard errors)

	NONTAX	CORPORATE	INDIVID. INCOME	SOC. SEC. & PAYROLL	GOODS & SERVICES	TRADE	PROPERTY
INTERCEPT	-0.0149 (0.25)	0.197 (4.11)	0.295 (4.40)	-0.0102 (0.23)	0.0978 (1.57)	0.417 (6.78)	- 0.00120 (0.11)
FEDERAL STRUCTURE	-0.0254 (1.45)	0.070 (2.89)	-0.00845 (0.48)	0.0390 (1.63)	-0.0382 (1.89)	0.00836 (0.54)	-0.00977 (3.41)
CRUDE PETROL	17.532 (7.76)	8.635 (2.20)	-7.330 (3.82)	-9.595 (5.32)	-5.077 (2.32)	-2.094 (0.72)	-1.161 (3.92)
TRADE	0.0237 (1.83)	-0.00271 (0.37)	-0.0330 (5.64)	-0.0306 (3.35)	-0.0531 (3.80)	0.0850 (8.45)	.00040 (0.22)
GDP PER WORKER	0.51X10 ⁻⁵ (2.51)	-0.49X10 ⁻⁵ (2.84)	0.34X10 ⁻⁵ (2.05)	0.98X10 ⁻⁵ (6.19)	-0.38X10 ⁻⁵ (2.02)	-0.80X10 ⁻⁵ (4.17)	0.25X10 ⁻⁶ (0.79)
LF:% FEMALE	-0.00389 (6.27)	0.00028 (0.47)	0.00091 (1.76)	0.00065 (1.06)	0.00268 (3.64)	-0.00058 (0.74)	0.00012 (0.87)
SECOND ENROLL	-0.00027 (0.73)	-0.00074 (1.64)	-0.23X10 ⁻⁴ (0.07)	0.00022 (0.46)	0.00087 (1.69)	-0.11X10 ⁻⁴ (0.02)	-0.00011 (1.32)
URBANIZATION	0.24X10 ⁻⁴ (0.06)	0.00078 (1.38)	0.00010 (0.26)	-0.00076 (1.72)	0.00134 (2.46)	-0.00227 (4.28)	0.00019 (2.14)
LOG POP. DENSITY	0.00458 (0.90)	-0.00301 (0.79)	-0.00946 (2.02)	0.0117 (2.08)	0.00342 (0.73)	-0.00937 (1.90)	0.00343 (3.21)
GDP COEF. VAR	0.273 (1.17)	0.235 (1.26)	-0.254 (1.87)	-0.205 (1.09)	-0.168 (0.82)	0.0275 (0.11)	0.0210 (0.48)
COUPS	0.00265 (0.25)	-0.0114 (0.81)	-0.00654 (0.73)	0.00531 (0.43)	-0.00434 (0.34)	0.0154 (1.19)	-0.00160 (0.82)
SOCIALIST	0.0246 (0.88)	0.0499 (2.09)	-0.0108 (0.48)	0.0880 (2.53)	0.0708 (2.26)	-0.128 (5.21)	-0.0110 (2.58)
COMBINED GASTIL: 1 ST SEGMENT	0.0358 (3.56)	-0.00796 (2.33)	-0.0324 (3.12)	-0.00110 (0.41)	0.0130 (1.60)	-0.00246 (0.44)	-0.00135 (0.82)
COMBINED GASTIL: 2 ND SEGMENT	0.0100 (2.70)	0.00672 (0.49)	-0.00182 (0.71)		-0.0163 (3.09)	0.00655 (0.89)	0.00120 (2.02)
1981-85	0.0229 (1.50)	0.00122 (0.08)	-0.00967 (0.66)	-0.00805 (0.40)	-0.00734 (0.43)	-0.00753 (0.43)	0.00011 (0.04)
1986-92	0.0228 (1.53)	-0.00321 (0.23)	-0.0138 (0.94)	-0.0195 (0.98)	-0.00754 (0.45)	0.00432 (0.23)	0.00050 (0.15)
ADJ. R-SQUARE	0.5938	0.1550	0.4244	0.3971	0.2733	0.5518	0.1288
ROOT MSE	0.1004	0.0961	0.0910	0.1104	0.1106	0.1173	0.0198
NUMBER OF OBS.	269	248	246	198	269	269	258
SPLINE BREAK	5	11	5		7	9	5

*Intercepts omitted. Results are essentially the same if the scale of the public sector (Total Revenue / GDP) is included. In that case, the Gastil – 1st segment has a coefficient of -0.0327 (t = 3.13). Other coefficients are also similar in sign and size. Full list of countries used in Table 2 is found in Kenny and Winer (2006).

Table 3*: Tax Share Regressions for Central Governments, 1975 - 1992**MAJORITARIAN included.**

(Absolute t-statistics in parentheses, based on Huber-White standard errors)

	NONTAX	CORPORATE	INDIVID. INDIVID	SOC. SEC. & PAYROLL	GOODS & SERVICES	TRADE	PROPERTY
MAJORITARIAN (vs. PR or Mixed)	0.063 (3.36)	0.027 (2.53)	0.034 (1.70)	-0.089 (4.74)	-0.058 (3.16)	0.041 (1.91)	-0.0066 (2.00)
ADJ. R-SQUARE	0.7819	0.1023	0.4513	0.5605	0.3487	0.6575	0.2557
ROOT MSE	0.0833	0.0700	0.0986	0.0987	0.1057	0.1026	0.0184
NUMBER OF OBS.	132	128	127	116	132	132	132

* Full results from model in Table 2 not reported. Results are similar if a scale effect (TOTAL REVENUE/GDP) is included. Countries with a Presidential system are excluded from the sample. Results are similar if these countries are included.

Table 4*: Tax Share Regressions for Central Governments, 1975 - 1992**MAJORITARIAN included. Sample restricted to countries for which sum of GASTIL indexes = 2 to 5.**

(Absolute t-statistics in parentheses, based on Huber-White standard errors)

	NONTAX	CORPORATE	INDIVID. INCOME	SOC. SEC. & PAYROLL	GOODS & SERVICES	TRADE	PROPERTY
MAJORITARIAN (vs. PR or Mixed)	0.0046 (0.57)	0.027 (2.16)	0.070 (2.32)	-0.082 (2.88)	-0.088 (5.08)	0.091 (3.90)	-0.0029 (0.99)
ADJ. R-SQUARE	0.3994	0.1612	0.3597	0.4473	0.4922	0.6483	0.3615
ROOT MSE	0.0548	0.0653	0.1022	0.1109	0.0849	0.0951	0.0125
NUMBER OF OBS.	84	83	83	79	84	84	84

* Full results from model in Table 2 not reported. Results are similar if a scale effect (TOTAL REVENUE/GDP) is included. Countries with a Presidential system are excluded from the sample. Results are similar if these countries are included.

Table 5*: Tax Share Regressions for Central Governments in 21 Advanced Democracies, 1975 - 1992**# VETO PLAYERS included.**

(Absolute t-statistics in parentheses, based on Huber-White standard errors)

	NONTAX	CORPORATE	INDIVID. INDIVID	SOC. SEC. & PAYROLL	GOODS & SERVICES	TRADE	PROPERTY
# VETO PLAYERS	-0.013 (6.04)	-0.0069 (1.39)	-0.00037 (0.03)	-0.0077 (0.72)	0.019 (3.17)	0.0052 (1.50)	0.00062 (0.48)
ADJ. R-SQUARE	0.6796	0.0537	0.1519	0.5334	0.6135	0.4330	0.2395
ROOT MSE	0.0203	0.0609	0.1167	0.1134	0.0582	0.0322	0.0132
NUMBER OF OBS.	62	62	62	62	62	62	62

* Full results from model in Table 2 not reported. Results are similar if a scale effect (TOTAL REVENUE/GDP) is included. List of countries included is found in Table A2.

Table 6*: Tax Share Regressions for Central Governments in 21 Advanced Democracies, 1975 – 1992
VETO PLAYERS and MAJORITARIAN included.

(Absolute t-statistics in parentheses, based on Huber-White standard errors)

	NONTAX	CORPORATE	INDIVID. INCOME	SOC. SEC. & PAYROLL	GOODS & SERVICES	TRADE	PROPERTY
# VETO PLAYERS	-0.014 (5.73)	-0.0073 (1.30)	0.016 (1.39)	-0.016 (1.21)	0.015 (2.32)	0.0032 (1.00)	-0.0019 (1.51)
MAJORITARIAN	-0.0037 (0.57)	-0.0033 (0.16)	0.126 (2.77)	-0.061 (1.26)	-0.033 (1.54)	-0.015 (1.34)	-0.019 (4.14)
ADJ. R-SQUARE	0.6739	0.0335	0.2554	0.5401	0.6208	0.4363	0.4165
ROOT MSE	0.0205	0.0615	0.1093	0.1125	0.0577	0.0321	0.0115
NUMBER OF OBS.	62	62	62	62	62	62	62

* Full results from model in Table 2 not reported. Results are similar if a scale effect (TOTAL REVENUE/GDP) is included. List of countries included is found in Table A2.

Appendix

Table A1: Descriptive Statistics, Countries with a Combined Gastil Index of 5 or Less, 1975 – 1992*

	<i>Mean</i>	<i>Standard Deviation</i>	<i>Minimum</i>	<i>Maximum</i>
MAJORITARIAN	0.388	0.487	0	1
PRESIDENTIAL	0.252	0.436	0	1
NONTAX	0.122	0.075	0.021	0.460
CORPORATE	0.106	0.108	0	0.577
INDIVIDUAL INCOME	0.193	0.135	0	0.563
SOCIAL SECURITY & PAYROLL	0.185	0.156	0	0.540
GOODS & SERVICES	0.240	0.124	0.0096	0.500
TRADE	0.142	0.177	0	0.681
PROPERTY	0.018	0.016	0	0.067

* MAJORITARIAN(t) = 1 if lower chamber is majoritarian in year t; = 0 otherwise (PR, Mixed PR or Other in a few cases). PRESIDENTIAL(t) = 1 if there is a presidential system in year t; = 0 otherwise. Classification follows Persson and Tabellini (2003). MAJORITARIAN in the regressions is defined as the average value of the dummy variable over each sample period employed. Gastil Index is an average of the Gastil values for the years in a time period in which we have values for it. See Table A2 for list of countries.

Table A2: List of Countries with a Combined Gastil Index of 5 or Less, 1975 – 1992*

<i>Country</i>	<i>In OECD?</i>	<i>Included with Veto Players Data?</i>
Argentina		
Australia	OECD	VETO PLAYERS DATA
Austria	OECD	VETO PLAYERS DATA
Bahamas		
Barbados		
Belgium	OECD	VETO PLAYERS DATA
Bolivia		
Botswana		
Canada	OECD	VETO PLAYERS DATA
Colombia		
Denmark	OECD	VETO PLAYERS DATA
Dominican Republic		
Ecuador		
Fiji		
Finland	OECD	VETO PLAYERS DATA
France	OECD	VETO PLAYERS DATA
Gambia		
Greece	OECD	
Iceland	OECD	VETO PLAYERS DATA
India		
Ireland	OECD	VETO PLAYERS DATA
Israel		
Italy	OECD	VETO PLAYERS DATA
Jamaica		
Japan	OECD	VETO PLAYERS DATA
Luxembourg	OECD	VETO PLAYERS DATA
Mauritius		
Netherlands	OECD	VETO PLAYERS DATA
New Zealand	OECD	VETO PLAYERS DATA
Norway	OECD	VETO PLAYERS DATA
Papua New Guinea		
Portugal	OECD	VETO PLAYERS DATA
Solomon Islands		
Spain	OECD	VETO PLAYERS DATA
Sri Lanka		
Sweden	OECD	VETO PLAYERS DATA
Switzerland	OECD	VETO PLAYERS DATA
United Kingdom	OECD	VETO PLAYERS DATA
USA	OECD	
Venezuela		
West Germany	OECD	VETO PLAYERS DATA

*OECD countries not in subsample: Czech Republic, Hungary, Korea, Mexico, Poland, Slovak Republic, Turkey. Full list of countries used in Table 2 is found in Kenny and Winer (2006).