Political incentives and tax reforms

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Abstract: There is often a gap between the prescriptions of "optimal" and actual tax systems. Several of the observed differences are hard to rationalize either by arguments of economic efficiency or redistributive fairness. A plausible rationale is instead that political constraints and incentives are the true driver of tax reforms. This paper reviews the political economics literature on direct (personal income) tax systems and reforms. It also exploits a database of labour tax reforms in the European Union to identify which set of variables, political or economic, determine reforms. We find that political variables carry more weight than economic variables, and we show empirical regularities that support political economy theories. We conclude that policy recommendations drawn from the optimal tax literature too often overlook political constraints.

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JEL classification: H11, H21, H24, P16

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1. Introduction

There is often a gap between the prescriptions of an “optimal” tax system and actual tax systems. A tentative explanation would be that different countries have varying degrees of aversion against inequality, which would explain why countries prefer to maintain a “non-optimal” tax system. Yet, there are recurrent cases in which the tax system is neither efficient economically nor efficient at redistributing income. The first goal of the present paper is to review the political economics literature on tax systems and reforms to see whether political mechanisms allow us to better understand why tax systems look the way they look. Throughout, our main focus is on the personal income tax (PIT). We then confront the predictions of the literature with observations and present econometric evidence that political economy forces are a strong predictor of tax reforms. Based on these theories and on available evidence, we draw some conclusions on politically-sustainable tax systems and on the feasibility of reform.

The structure of the paper is as follows. Section 2 reviews the classical theories on income tax. Optimal tax systems aim at minimizing the "excess burden" from taxation – which calls for higher taxes on inelastic income sources - but taxation also has a role in enhancing income redistribution. A weakness of these theories of taxation is that they abstract from two fundamental issues: the definition of the tax base itself and they overlook the definition of what is “personal income”. When taxing different resources at different rates, taxpayers tend to exploit these definitions, which itself creates new types of distortions. This is reminiscent of the Lucas critique. An oft-heard recommendation is then to broaden the tax base and to reduce the rates of taxation because this reduces the taxpayers’ incentives to manipulate their activities, and thus distortions, while increasing horizontal equity. Despite many calls for such a movement towards a broad-base/low-rate system, few countries are actually implementing reforms in this direction.

Section 3 reviews the political economy literature on income taxation and reform. A fact is that policymaking is not the feat of an abstract social planner. In democratic societies, policies are made by political parties who must win elections. Thus, political processes are likely to play a role in shaping tax systems. To understand these processes, we begin by reviewing the seminal literature on the political economy of taxation. The “median-voter” approach, discussed in section 3.2 takes the hypothesis that political competition forces parties to pander to the voter that divides the electorate in two equal parts. An interesting contribution of this literature is to show that the median voter is actually not interested in picking an optimal tax system. If she is self-serving, she will prefer sub-optimally high tax rates to tax the rich and redistribute to herself. These predictions are however not borne out by facts. A more elaborate setup, in section 3.3, are the probabilistic voting models which shed light on the incentive of parties to offer lower tax rates to the groups that are electorally mobile. Framed differently, equilibrium tax rates are not only lower for more elastic *income sources*, but also for the voters whose *electoral elasticity* is higher. In contrast to the Ramsey rule, one may observe inelastic income sources that benefit from low tax rates, only because of political competition. Next, considering an "anonymous", where one can predict the Lorenz curve but not the identity of the beneficiaries, reveals that a fully egalitarian tax system is systematically beaten in a political competition game. This literature suggests that more intense political competition, under some conditions, induces parties to give up more efficiency in order to achieve better targetability.

Section 3.4 considers more widely the political economy of reforms: improving a tax system means starting from an existing situation, *the status quo*, and convincing politicians and voters to reform the system. This process creates uncertainty and losers and winners. The literature emphasizes several sources for a *status quo bias*. This bias means that voters will impose more conditions to move from a status quo *A* to a new tax system *B*, than to remain in *B* once the latter has initiated its existence. Thus, they oppose change as such. The government can tailor its reform strategy to try and circumvent this opposition. One strategy is to pursue *gradual reforms*, which amounts to splitting the reform in different chunks, to target a different group at a different time. In Section III, we provide econometric evidence that such reforms are more likely in proportional representation systems and when the ruling coalition has a strong lead. In some cases, the opposite strategy may be needed: if too many groups are able to block each single sub-reform, then the government may have to either rely on external constraints that make the reform unavoidable, or to group a suboptimally large range of reforms at once. Next, we review the incentives of the politicians when there is asymmetric information. Politicians may need to rely on strategies that hide some redistribution patterns, so as not to lose support from those who do not benefit from redistribution (i.e. suboptimal "sneaky" methods of redistribution). The politicians' incentives are typically affected by the rules of the game, defined by the country's institutions and constitution. One may for instance expect taxes to be lower in presidential and in majoritarian systems than in parliamentary or in proportional representation systems. Direct democracy also leads to quite different outcomes, but a normative conclusion cannot be drawn from such differences: each system suffers from some type of distortion or generates its own information failures. Finally, we provide some concrete examples from Italy and the UK.

In Section III, we exploit data on labour tax reforms in the EU27 for the years 2000-2007. We check which political or economic conditions increase the probability of observing a reform. Surprisingly, the political variables appear to have more explanatory power than economic factors. High unemployment, for instance, is not conducive to more reforms. Instead, the size of the ruling coalition and the number of parties in it, do have a systematic impact on the probability of a reform.

2. Preliminaries: traditional economic instruments

In a world of "perfect" markets, i.e. without information imperfections, externalities or public goods, *laissez-faire* should in theory produce an efficient allocation of production factors, goods, and services. This *laissez-faire* allocation is however unlikely to be perceived as "fair". In theory again, policy-makers with redistributive goals should be able to organize lump-sum transfers to modify the income or wealth allocation across agents without affecting market efficiency.[1] Hence, the ideal tax system should be able to achieve both efficiency and fairness at once. But reality is different from this "perfect" (à la Arrow-Debreu) world, which is mostly used for purposes of abstract analysis. Actual markets suffer from competition imperfections, asymmetric information, and externalities, and policy-makers cannot observe the true ability or assets of all agents. Even a benevolent, welfare-maximizing policy-maker would thus be strongly constrained in its ability to achieve both "efficient" and "fair" outcomes. This reality implies that policy-makers can at best achieve second-best outcomes, which trade off "equity" against "efficiency".

Efficient outcomes should be reached when (i) there is little redistribution and (ii) less mobile goods or factors are taxed more heavily than more mobile ones (the Ramsey rule) and (iii) goods, services or activities producing negative externalities are taxed more heavily, and those producing positive externalities are taxed less or even subsidized. The logic behind (i) is that low redistribution should maximize each individual's incentive to reveal her true potential, whereas heavier redistribution (high taxes on high income individuals and social support geared towards poorer individuals) would flatten incentive to work and/or invest. An implication is also that high income individuals should face low tax rates at the margin (Mirrlees, 1971, 1972, 1976**,** Saez, 2001).[2] The logic behind (ii) and (iii) is that taxing negative externalities and inelastic factors, goods or services, minimizes distortions (Ramsey 1927, Pigou 1920). Efficiency may thus call for discriminatory taxation. For instance, workers who can exit the labour market or emigrate at low cost should be taxed less. The former case may represent low-wage people or second-earners in a couple[3]. The second, high wage earners with lots of opportunities abroad: sports professionals, movie stars, etc. More generally, this may provide an efficiency argument in favour of a hump-shaped tax rate as a function of income, which leans against equity principles[4].

Equitable outcomes instead call for equal taxation of different individuals who earn the same income (horizontal equity) and ensure that the amount of tax liabilities is increasing in income or that the tax scheme is progressive (vertical equity). Equity can thus impose to move away from the inverse elasticity rule, subsidize the jobs of low-ability individuals, or to set high taxes on "luxury" goods (since they are disproportionately consumed by high-income earners), and set low taxes on "basic" goods, despite the low elasticity of their demand.

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[1] See for instance Hindriks and Myles (2006), pp. 370-375, for more details.
[2] The Ramsey Rule also motivates the introduction of Dual Income Tax schedules, in which different income sources are taxed at different rates. Typically, they tax capital income at a separate (usually both flat and lower) tax rate than labour income.
[3] For the tax treatment of second-wage earners, see, e.g., Kleven, Kreiner and Saez (2009).
[4] See Saez, Slemrod and Giertz (2009) for a review.

More formally, can introduce a simple representation of taxes on personal income. First, define total taxable income Y as: $Y=\sum_i \alpha_i y_i$, where i is the income source and α_i is the weight (or discount) given by the tax system to that source of income. Let $\alpha_i = 0$ if an income source is not considered in the tax base (this is common, for instance, for social security benefits). The *tax base* can thus be defined as the number of sources for which $\alpha_i > 0$. A *broadening of the tax base* is then a set of increases in the number of taxable income sources i: either α_i is increased from zero to some strictly positive value to include new income sources in the computation of taxable income, or α_i can be increased from some initially low but strictly positive value.[5]

Then, define (net) taxable income TI as TI=Y– D, where D is the deduction that the person can claim based on observable characteristics, such as the possession of the house in which he/she lives, the poverty level, expenses for earning or maintaining income, etc.

Then, define the *tax payment* as: TAX = τ(TI) – C, where τ is a function of taxable income, which includes the number of tax brackets and associated rates,[6] and C stands for *tax credits*, which are typically associated with personal characteristics of the taxpayer, such as the number of children and/or other family charges, and with specific personal expenditures.

Finally, we have to consider additional income sources that are not necessarily taxed according to the personal income tax (e.g. some capital incomes, property taxes, etc.) but through specific taxes and taxes on consumption. For simplicity, we consider that these income sources are taxed linearly. Let us define these other sources of income and associated taxes as:

$$T^{other} = \tau^z \sum_i \beta_i z_i + \tau^c \sum_j \gamma_j c_j \ ,$$

where z_i are these other sources of income and c_j is consumption of good j. Taxes on these other sources are typically flat rates, and we have indicated with τ^z the tax rate on the other sources of income and with τ^c the tax rate on consumption.[7]

In this simple scheme, some of the main debates about the economics of tax systems and reforms can be reframed as follows:

1) Efficiency. The larger the number of different α_i and/or τ^z, the larger is the number of potential distortions: As emphasized by Keynes "*the avoidance of taxes is the only pursuit that still carries any reward*" (cited by Gruber 2005, p551). In other words, trying to optimize the tax system by setting

[5] α_i may remain strictly between 0 and 1 for income sources that are only partially taxed (for instance, $\alpha_i = 0.85$ for the income that the owner receives from renting a house in Italy, if this income is higher than the official value of the property). Note that α_i can in theory be larger than unity.
[6] In a *flat rate* tax system, there is a single tax bracket and the function $\tau(TI)$ is linear.
[7] Notice however that a consumption tax need not be implemented by levying a VAT($\tau^c > 0$), since it can also be implemented indirectly by allowing savings to be deducted from the personal income tax base. We do not include this characterization in our simplified representation.

different tax rates or exemptions produces new opportunities for tax avoidance. This produces a kind of Lucas critique: the elasticity of the various income sources is itself a function of the tax system. For instance, Hettich and Winer (1999) argue that the presence of tax brackets may induce taxpayers to reduce their (measurable) income to avoid jumping brackets. de Mooij and Nicodème (2008) identify another case: they show that the reduction in corporate taxes in Europe induced many individuals to incorporate their business, in order to avoid taxes on labour. Thus, increasing the gap between two tax rates modified the individuals' behaviour, and therefore their labour income elasticity. This implies that broad-based and uniform tax rates across income sources may also be advocated for efficiency reasons. That is, all sources of income should be included in the same tax base: $\sum_i \alpha_i y_i + \sum_i \beta_i z_i$. An extreme version of is the pure flat tax proposed by Hall and Rabushka (1983, 1985), which taxes all income sources at the same rate. Alternatively, the government may rely more on consumption taxes. When this is not possible and different sources of income are taxed with different tax rates, the Ramsey rule recommends that $\tau_1 > \tau_2$ when tax base (1) is less elastic than tax base (2).

2) Vertical Equity. To achieve *vertical equity*, the tax system must be *progressive*. In our framework, the progressivity of the personal income tax must then be measured as the evolution of the *average tax rate*, as a function of total taxable income, TI. The personal income tax is progressive if the average tax rate is increasing in actual income, *i.e.* if:

$$d\frac{\frac{\tau(TI)-C}{Y}}{d\mathrm{Y}} > 0 .$$

This derivative will be zero if taxes are proportional to income, and negative if the tax system is regressive – remark that progressivity is equivalent to saying that the marginal tax rate is larger than the average tax rate. It is straightforward to see that deductions *D*, tax credits *C*, and tax brackets are three alternative instruments to achieve progressivity. They are typically used simultaneously, but their relative weight in actual tax systems differs across countries and over time. In particular, notice that even a *flat rate* tax scheme may be progressive: deductions, allowances, and tax credits are still available to introduce progressivity. Notice also that while tax credits provide an equal reduction in the total tax payment for all taxpayers, the tax reduction provided by deductions actually depends on the marginal tax rate of the taxpayer. This means that, when the tax rate schedule features higher tax rates for higher income brackets, the reduction in total tax payment is higher for higher levels of income

The progressivity of the overall tax system depends on the evolution of total tax payment as a function of total actual income:

$$\left(TAX + T^{other}\right)/(\sum_i y_i + \sum_j z_j),$$

where total actual income, $\sum_i y_i + \sum_j z_j$, puts a weight 1 on all income sources, be them in the tax base (α_i or $\beta_j > 0$) or not (α_i or $\beta_j = 0$).

This *actual income* is generally not observable: it may include undeclared or illegal activities for instance. Yet, even if the individual only performs lawful activities, income sources that lie outside the personal income tax base (because $\alpha_i = 0$) typically do not appear in tax forms. Yet, it is the tax base that the modeller would actually like to observe. Consider for instance the case of capital income: it is often not included in taxable income, but taxed separately, at a tax rate τ^z which is typically significantly below the tax on labour. If rich individuals benefit from much more capital income than the poor, then the overall tax system turns out to be regressive. Given the multiple potential rationales for taxing capital and labour incomes at different rates, we shall not be able to identify which tax reforms relating to changes in the values of α and/or β for different income sources are motivated by economic or political reasons.

3) Horizontal Equity. To achieve horizontal equity, a broad tax base corresponding to "comprehensive" income, $Y + \sum_i \beta_i z_i + \sum_j \gamma_j c_j$, should be preferred (Simons, 1938). [8] In a life-time perspective, taxpayers with the same income in present value terms should be taxed equally. Horizontal equity and progressivity then become distinct goals, since progressive tax systems may violate horizontal equity when the overall lifetime is considered. On the political level, one might expect that this idea of taxing the comprehensive income would receive the support of taxpayers, who would perceive such a system as fair. In practice, however, horizontal equity may not be endorsed by political parties in equilibrium, because it goes against their incentive to take account of the effective political influence of different population groups (see next section).

4) Complexity. As it is clear from our simplified representation, the complexity of the tax system depends on shape of the function $\tau(Y)$, *i.e.* on the number of tax rates and tax brackets, and on the number of deductions D and allowances A. It is not correct to say that a flat rate tax scheme (i.e. when $\tau(Y) = \tau Y$ with a unique τ for all levels of Y) is necessarily less complex than a scheme with several tax brackets, if the former is associated with more deductions and/or more allowances than the latter. There is a general trend in Europe towards reducing the number of brackets (e.g. Belgium, United Kingdom, or Italy). However, this need not imply less complexity, since the number of deductions, allowances, and exemptions, are typically increased at the same time. [9] Thus, the declared objective of many of these reforms, mainly the simplification of the tax system, may fail to be reached. [10] As we

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[8] E.g. the Schanz-Haig-Simons definition of economic income includes consumption and changes in wealth.

[9] See Slemrod (2005) on this point. For evidence on these trends in Europe see Bernardi and Profeta (2004). Notice also the link between tax progressivity and complexity.

[10] This is related to the argument by Alt et al. (2008) who insist on the need for governments to address tax systems in their entirety and avoid dealing with each tax rate separately.

explain in the next section, political motivations may again be a crucial factor to explain these trends (Galli and Profeta, 2008).

3. Political Economy and Policy Strategy

3.1. Main questions and summary of the section

The optimal tax argument should be sufficient to explain the evolution of tax systems if policymakers behaved as social planners. Yet, in democratic societies, policies are made by political parties that aim at collecting votes. Thus, also the political process plays a crucial role in shaping the tax systems that we observe. This section summarizes the studies on the role of political processes on the equilibrium tax systems and the feasibility of tax reforms. We focus on theories based on the demands that originate in the electorate. This is because we want to gain a better understanding of personal income tax reforms in the next section. Such decisions typically affect broad fringes of the population, and we expect voter preferences and vote hunting to play a significant role in this process. Such processes may be ill-adapted to analyse other type of reforms. Sector-specific reforms, for instance, would be best analyzed by lobbying theories (see Grossman and Helpman, 2001).

3.2. Do tax systems respond to the preferences of the median voter?

The standard approach in political economy is to check the preferences of the median voter: the classical Downsian analysis allows us to expect that parties need to please the median voter to win an election. As we shall see, however, the explanatory power of such theories is relatively small. One reason might be that the Downsian analysis rests on several important assumptions,[11] in particular that policy decisions can be summarized by a point on a line. Such a "point on a line" could represent the "aggregate" tax rate, or the size of government. But we know that tax reforms are typically multi-dimensional, because specific people or sectors can be targeted differently. Yet, it is important to see (i) that the median voter herself may develop an incentive to increase tax rates above efficient levels and (ii) that some comparative statics on tax levels go in directions opposite to this type of theory.

The median voter approach to taxation and redistribution was pioneered by Romer (1975), Roberts (1977) and Meltzer and Richard (1981). They consider a setup with one marginal tax rate (hence a single dimension), τ. The value of τ is determined through a direct vote. This ensures that outcomes are not biased by the incentives of politicians or by information asymmetries.

Romer (1975) shows that majority voting need not lead to a progressive tax schedule (which would produce a negative lump-sum value and a sufficiently large marginal tax rate). Roberts (1977)

[11] See Persson and Tabellini (2000, chp 2) for a review of some sufficiency conditions.

shows that this is true even when preferences are not single-peaked. Meltzer and Richard (1981) provide a *rational theory of the size of government*: they assume that tax revenues are redistributed lump-sum and uniformly to the population. Thus, from an efficiency standpoint, the optimal tax rate is zero. Now, let us see how each individual citizen perceives the problem. Let each citizen (indexed by *i*) be characterized by his taxable income $TI(i)$. The average of all taxable incomes is denoted TI_{avg}. The amount of benefits redistributed to any citizen is $b = \tau TI_{avg}$. This means that individual *i* receives a *net* transfer equal to:

$$\text{Net transfer} = b - \tau \ TI(i) = \tau \times (TI_{avg} - TI(i)).$$

In other words, the net transfer is decreasing in income, and is only positive for citizens with an income below the average. The latter implies that any voter with an income below the average thus supports strictly positive tax rates, despite their lack of efficiency. Absent tax distortions, all such voters would actually vote for a 100% rate, whereas the voters above the average would vote for a zero tax rate. Factoring the distortionary costs of taxation in the reasoning yields that the poorer is a voter, the higher is her preferred tax rate, and that even the poorest voter's preferred rate is strictly below 100%. Only voters close or above the average income prefer the efficiency maximizing tax rate: zero. Meltzer and Richard (1981) thus conclude that the more unequal is income distribution *among the voters*, the higher the tax rate (and the size of government) will be. Clearly, extending the franchise to poorer citizens and to women (initially less independent financially) can thus explain why the equilibrium tax rate increased continuously over time (Bertocchi, 2007).

Such predictions can be tested on actual data. So, can these theories really explained the observed patterns of taxation and redistribution? The brief answer is "not really". Yet, this model was –and still is– extremely influential, which makes it important to look closer at the patterns that are observed in reality. Meltzer and Richard (1983) tested, and apparently validated, their model based on the evolution of government size over the period 1938 to 1976 in the U.S. The main explanatory variable is TI_{median}/TI_{avg}, which is the ratio of the income of the median earner to that of the average earner, which is a summary for inequality. Yet, as Mueller (2003, pp518-519) emphasizes, this contrasts with the finding of Tullock (1983), who "*pointed out* [that] *this ratio has been virtually constant since World War II, yet it 'explains' a significant fraction of the growth of government. Meltzer and Richard's test essentially amounts to regressing one long-run trend variable on another. Any other long-run trend variable might yield a similarly high correlation*".

The real test is thus to confront this theory to a panel of data that allows comparisons both over time and across countries. In this case, the model generally fails the test, as the effect of income inequality is often insignificant or takes the wrong sign (see e.g. Perotti 1993 and 1996, Bénabou 1996, Gouveia and Masia 1998, Bassett et al. 1999, Borck 2007). However, such tests do not look at actual redistribution patterns; they only focus on the size of government. In reality, redistribution patterns can be very complex. A large state and high taxes may generate little redistribution across income quantiles (see e.g. Le Grand 1982 or Esping-Andersen 1990).

A direct way to look at the redistributive effects of tax systems is thus to compare factor and disposable incomes for different quantiles of the earning distribution. This has recently become possible thanks to the Luxembourg Income Survey (LIS). Milanovic (2000) performs a detailed study along these lines. He computes the share gain for each of the bottom five deciles (in the factor income distribution). These gains are defined as "*the difference between the share of a given decile in factor and disposable income. For example, if the bottom decile receives 2% of total factor income, while the same people receive 8% of total disposable income, the share gain is 6 percentage points.*" (p. 375). He demonstrates typical redistribution patterns: first, a significant fraction of redistribution takes place through pensions.[12] Second, when pensions are *not* considered, a reduction of 1 percentage point in factor income is on average matched by (a) an increase in redistribution of about 0.7 percentage point when all the citizens with an income below the median are considered, and (b) an increase in redistribution of about 0.93 percentage point when the bottom quintile of the population is considered. In other words, if the very poor lose one percentage point in factor income, their loss is almost *fully compensated* by an increase in transfers. In contrast, at the median of the distribution, compensation is less elastic.

A tighter test of the Meltzer-Richard hypothesis is to check whether the median's disposable income is indeed higher than his factor income: does he benefit from this overall redistribution scheme? Milanovic (2000) shows that the median typically *loses* from these transfers: the 5th and 6th deciles respectively lose 3.6% and 10% on average. Borck (2007, section 4) surveys other empirical evidence and also shows that the evidence is broadly against the Meltzer-Richard hypothesis.

The main reason for this apparent failure of the Meltzer-Richard hypothesis is that the voting problem must be modelled as unidimensional. That is, voters choose one tax rate, and redistribution is uniform. Actual tax systems are instead non-linear and transfers are not uniform, which makes the problem fundamentally multidimensional. To address such problems, we need another set of theories. We review the results of two of them below.

3.3. Probabilistic voting models: lower taxes for swing voters

The probabilistic voting model assumes that, when choosing for which party to vote, voters do not only consider economic variables such as the tax rate. Other dimensions matter, such as charisma, political mood, etc. The idea of the probabilistic voting models is to explicitly introduce these aspects in the model, as a random component. The implication is that parties can only compute the

[12] This partly biases the results: a rich individual who retires and benefits from a generous public pension will be perceived as receiving a large transfer. We thus focus on the results that leave pensions out.

probabilities with which each group of voters may support their platform or that of their opponent (Lindbeck and Weibull 1987, Dixit and Londregan 1998). This apparently trivial modification of the model has an important consequence: here, a marginal change in policy leads to a smooth change in the number of expected votes. By contrast, with deterministic voting models, a marginal change in policy typically leads to discontinuous changes in vote support, which makes it impossible to study multidimensional policy spaces.

Thanks to this probabilistic voting approach, the literature can thus tackle more complex tax systems, with different net tax rates for different groups of voters.[13] Such a multidimensional problem, which had no solution in median voter models, often features a unique solution in probabilistic voting models (see Lindbeck and Weibull 1987 for conditions of equilibrium existence).

Typical equilibrium patterns. The typical equilibrium features the two parties proposing the same platform.[14] This platform balances the opposing interests present in the electorate, and takes into account the political influence of each group. The tax structure that emerges from this approach is quite realistic, with those groups who are most mobile across parties being also the most favoured by the tax system (see Warksett, Winer and Hettich, 1998). In a nutshell, the *equilibrium (net) tax rates are **not** inversely proportional to the elasticity of the **income** source with respect to the tax rate* (as advocated by the Ramsey rule). *They are also influenced by the between-party **electoral** elasticity of each voting group*. *Electorally mobile voters pay lower taxes in equilibrium* (for more detail, see the formalization below).

As pointed out by Lindbeck and Weibull (1987), if those 'mobile' voters are the middle class, which is likely in a two-party system, then the structure of tax and public good provision will reproduce what Stigler (1970) termed *Director's Law*, after Aaron Director. In an "ends against the middle" equilibrium, the rich and the poor pay relatively high taxes and receive little public goods in exchange, while the middle class benefits the most (See Feld and Schnellenbach 2007 for a survey).

Winer (2001) shows how political competition affects tax systems in such a "probabilistic voting" setup. Assume that the government can set different tax rates for different groups, to finance the supply of a common public good. Each voter compares the "tax offers" of the two candidates and computes the income gap that would result from electing one or the other. In addition, each voter has a random utility difference that may favour either party. Unless the utility difference more-than-compensates for the income gap, the voter votes for the party making the best offer. Translated into a

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[13] 'Net' means the difference between the taxes paid and the subsidies received, which may either be positive or negative.

[14] See also Calvert (1985), Wittman (1983) and Roemer (2001) for models in which the politicians' ideology prevents platform convergence.

classical demand model, the random utility difference could be interpreted as defining the "electoral elasticity" of the voter with respect to the income gap.

If the distribution of random utility differences is identical across all the voters, then the offer made by each candidate should mimic the Ramsey rule: electoral competition produces an efficient tax schedule in which parties try to minimize the deadweight loss from taxation. But, if this distribution is not identical (the most likely case), then candidates develop an incentive to compete more aggressively for the voters that have the highest "electoral elasticity": swing voters being ideologically more neutral, they are more easily attracted by a given tax favour than steadfast party supporters.[15] In the political equilibrium, more politically mobile groups should thus benefit from lower taxes than less politically mobile groups. Returning to Director's Law, if the middle class is ideologically more neutral (and hence keener to swing from voting for one party to the other for a given tax cut), then it will be offered the lowest tax contributions in equilibrium (net of the supply of public goods), whereas the poor and the rich will contribute more relative to their income (for a more formal review of the model, see Castanheira, Nicodème and Profeta, 2011, and see Profeta 2007 for an application to Italy).

This simple framework also helps explain how policymakers are likely to introduce their tax *reforms*: if a candidate interested in winning the election must choose between (a) an efficient tax reform that is broad-reaching and (b) a less efficient reform that targets tax increases on the least mobile voters, he should go for the latter. Comparative statics also suggest that (i) proposed policies will be more alluring to the voter groups that are larger in size (number of voters); and (ii) both left- and the right-wing parties should propose similar tax reforms, since they face the same set of incentive conditions. Our empirical analysis below partly confirms this: many tax reforms have been similar under both left- and right-wing governments.

3.3.1. Colonel Blotto games: the efficiency-targetability trade-off

The focus of probabilistic voting games is on which groups will be preferred by the redistribution policy of the government. The approach pioneered by Myerson (1993) instead "anonymizes" the set of offers: the modeller loses the ability to learn which group receives which offer, at the benefit of becoming able to endogenize after-tax inequalities, and compare the features of these equilibria across institutional systems. Since the modelling approach is relatively technical, we shall skip these details here, and focus on the intuition behind the main results.[16]

Colonel Blotto games are a mathematical representation of how a colonel should allocate his troops across battlefields: scattering troops makes him moderately weak on all battlefields. Focusing

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[15] Interestingly, this means that the entry of a new party, say on the right-end side of the political spectrum, should induce the other parties to propose lower taxes for the rich than before the entry of this new party.

[16] See Myerson (1993), Lizzeri and Persico (2001, 2005) and Crutzen and Sahuguet (2009) for more details.

his troops on fewer battlefields increases noticeably the chance of victory there, but also ensures that the enemy wins in the other battlefields. Myerson's extension of that model considers a number of political candidates who must allocate resources across voters. Offering a large (net) transfer to a voter means that she will vote for you with a very high probability. But the budget constraint means that you will have to transfer less to the other voters, who will start supporting your opponent(s). The typical equilibrium of such a game is in mixed strategy. This is why this approach is "anonymous": in equilibrium, a given percentile of the population will benefit from large transfers; another from low transfers, but one cannot ex ante identify which is which. The equilibrium is thus determined as a Lorenz curve that identifies the fraction of transfers received by each fraction of the population.

A striking result is that politicians will always make unequal offers. Indeed, imagine that there are two politicians. Each has a budget of 1. The first politician proposes a fully equalitarian offer, and splits this budget equally across all voters. The second politician can then offer 0 to a fraction x of the population, and increase the transfer to $1/(1-x)$ to the remaining fraction of the population, with size $(1-x)$. These prefer the offer of the second politician. For $x \rightarrow 0$, almost all the population prefers the second politician: deviating from the equalitarian offer would provide an overwhelming majority to politician 2. Politician 1 can thus not make the equalitarian offer if she wants to have a chance to win the election.

Myerson (1993) compares the features of the equilibrium across electoral systems, and for a different number of candidates. In first-past-the-post systems (UK, US, for instance), the more candidates running, the more unequal is the policy. Other systems can produce more or less inequality. Lizzeri and Persico (2001, 2005) extend the model by letting politicians choose between a general public good, which has a high social value, and redistributing money, which has no social value. They show that proportional representation systems will be more efficient at producing the public good, and that increasing political competition (by increasing the number of candidates) will increase social waste in equilibrium: to win the election, the politician must rank first among his supporters. The fiercer is political competition, the higher are transfers, and the lower is the supply of public goods.

Crutzen and Sahuguet (2009) and Castanheira and Valenduc (2006) apply this type of game to tax systems. Crutzen and Sahuguet (2009)'s insightful analysis provides the first formalization of the political economic determinants of a tax system based on this type of games. They begin with a simple case: imagine that the government must decide about the tax rate τ, that taxes are distortionary, and that there is no public good. Clearly, the optimum is then not to tax: $\tau^*=0$. But, the political incentives underlined above induce politicians to nevertheless levy a tax, to finance socially wasteful transfers. The purpose is only to increase their political appeal: this perverse incentive makes the tax system become inefficient and unfair. The efficiency loss is shown to be hump-shaped in distortions: if distortionary effects are extremely large, high taxes would lose many votes, and only win a few. Thus, equilibrium taxes are low, which maintains distortions at a low level as well. With intermediate distortionary effects, equilibrium taxes will be high, and so will be distortions. Finally, with minimal distortionary effects, equilibrium taxes will be maximal, but distortions will be small again. In their general setup, they study the case in which politicians can choose *targetable taxes*. Targetable taxes avoid taxing an individual and then transfer benefits back to the same individual. They show that targetable taxes will always be used in equilibrium, regardless of the inefficiencies they create. In some cases, both targetable and non-targetable taxes are used in conjunction, to increase the amount of transfers.

Castanheira and Valenduc (2006) propose a case study of a few tax policies in Belgium that do not enhance either efficiency or equity. They show how the above arguments help explain such choices. For instance, Belgium grants special tax exemptions to small and medium enterprises, in principle to promote their activity and address some of their liquidity problems. Yet, the *Conseil Supérieur des Finances* concluded that these efficiency arguments are not actually valid for the targeted enterprises. In reality, these tax exemptions generate distortions that induce some individuals and independents to incorporate for tax avoidance reasons (see also De Mooij and Nicodème 2008), and may even create the perverse incentive to lower enterprise growth. Yet, the type of government coalitions observed across the years made SMEs a key political actor, which precisely induces the type of inefficiencies underlined by Lizzeri and Persico (2004, 2005) and Crutzen and Sahuguet (2009).

3.4. Reforms: how broad and how fast?

While the previous section describes the type of tax and redistribution systems that pre-electoral political interactions should produce in the long-run, this section discusses the process of change from an existing system to another.[17] The idea is the following: consider a politician who, having been elected, wants to engineer an efficiency-enhancing that will have sufficient political support. Reforms differently affect the welfare of each group or individual: some groups will be hurt and may oppose reform. Thus, “good” reforms may not easily be implementable. The question is how the reform-minded policymakers can jump the political economic hurdles that she will face. We will see that coalition building may require sacrificing some efficiency in the reform. Thus, oddly enough, economically inferior reforms may be more palatable politically.

A second question is whether a politician actually has the incentive to press for efficiency-enhancing reforms: aren’t they politically suicidal? We will review the argument that crises can be necessary to trigger reform: the idea is that crises may increase the support for reform. This argument

[17] For a more in-depth discussion of these processes, see Castanheira, Nicodeme and Profeta (2010) who accompany their review of the economic literature with an illustration of the political economy of flat tax reform in Estonia.

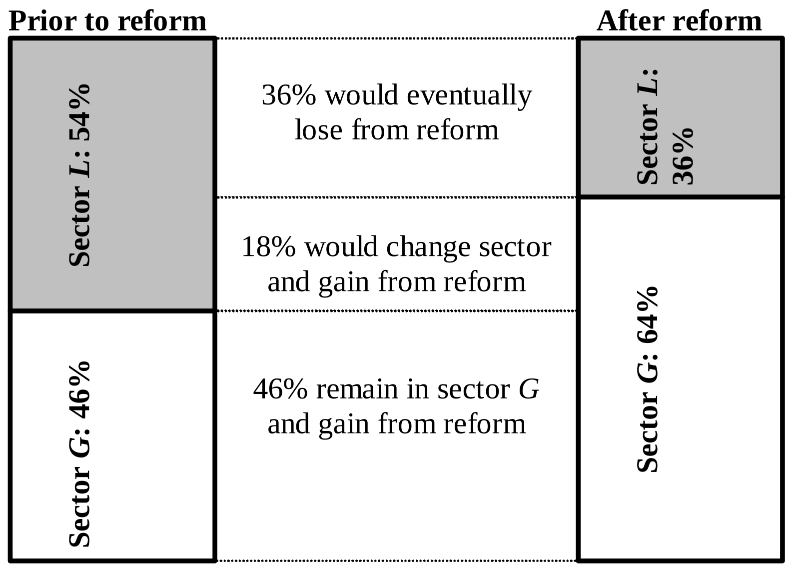
has been bitterly criticized, though. Finally, while most of the literature focuses on the reform process itself, we wish to also relate it to the reasons why the status quo emerged in the first place.

3.4.1. The status quo bias

To explain why governments may fail to adopt policies that are considered efficiency-enhancing, Fernandez and Rodrik (1991) focus on the role of individual uncertainty generated by reforms: while the losers from a reform are easily identifiable, the gainers are more uncertain.

A numerical example can illustrate this point. Consider a population divided in two sectors: *L* is the sector (or group) that stands to *lose* from the reform. *G* is the sector that stands to *gain*. Ex ante, 54% of the population works in sector *L*. Thus, a majority of the population potentially stands to lose. Yet, the productivity gains in sector *G* imply that this sector will grow. Imagine that *ex post*, 64% of the population will be working in sector *G*. Therefore, a majority of the population (64%) will actually gain from the reform: those who are already present in sector *G* (46% of the population), and the additional 18% who will move from one sector to the other.

Figure (2): Gainers and losers from reform



The issue is that each single individual in sector *L* is uncertain about *who* in *L* will move to *G*. Assume that the reform increases the payoff of anyone in sector *G* by 10, while decreasing the payoffs of anyone in sector *L* by 8. Thus, with probability 2/3[18], an individual initially in sector *L* loses 8 and, with probability 1/3, he or she gains 10. This implies that, from an *ex ante* standpoint, all *L*-sector

[18] Calculated as 36/(36+18)

workers are opposed to the reform, since they face a negative expected pay-off of –2. This ex ante constraint means that the reform is blocked by a majority: even a well-meaning politician faces the impossibility to pass the reform. Note the irony: after the reform is implemented, a majority of the population would actually be in sector *G* and support the reform (or oppose its reversal).

One may also imagine another reform, which would attract ex ante majority support, e.g. by giving strong compensation to those who remain in sector *L*, but which is rejected *ex post*, e.g. because the compensations are so high that the ones now in sector *G* prefer the initial situation. Summing up, this political economy approach to reforms shows that proposed reforms must overcome the *status quo bias*, that is, obtain support from a majority both *ex ante* and *ex post*. [19] By contrast, a purely economic approach would focus on aggregate gains.[20]

3.4.2. Bundling and speed of reform

Political support and opposition also depend on the bundling and the speed of reforms. Given the intrinsic uncertainty of reforms, it may be optimal to delay some reforms, until uncertainty gets resolved; *e.g.* a country *B* waits to see the performance of a similar reform in country *A*. In this case, *B*'s reforms are expected to be implemented late, but quickly. Conversely, country *A* may benefit from introducing reforms gradually, to benefit from an experimentation phase, *e.g.* by testing the reform on specific sectors or areas. In Dewatripont and Roland (1995) for instance, a major reform is split into two smaller reforms and each of them is introduced at a different time. Typically, the first reform should be the one with the highest expected payoff and the highest probability to reveal information about the value of the entire process, while the second one should be the more politically difficult reform. Then, this gradualism helps winning some of the ex ante opposition in support of the second reform: whenever these people learn from the first reform that benefits are higher than expected, they allow the entire process to be implemented. Finally, another way to overcome the status quo bias may be to unbundle reforms and divide them into steps that do not damage the same voters. These are called *divide-and-rule* tactics

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[19] See Roland (2000) for an in-depth analysis that focuses on transition countries, Valenduc (2006) for an application to Belgium.

[20] Note that efficiency gains are a *necessary*, but not sufficient, condition to satisfying both the *ex ante* and the *ex post* constraint. In a different setup, the two concepts may be somehow unrelated: imagine that a majority of 50%+1 voter earn for sure a very small benefit, whereas 50%–1 voter lose for sure a very large amount: political constraints may be satisfied, even though efficiency would require blocking the reform. Thus, both the economic gains *and* the political constraints should be considered in any sound cost-benefit analysis.

Table (3): divide-and-rule tactics

	Reform 1	Reform 2	Big bang
Group 1 in *L*	+1	–3	–2
Group 2 in *L*	–3	+1	–2
Group 3, in *G*	+5	+5	+10

To illustrate this point, let us go back to the example we used in the previous section, but identify two subgroups in sector *L*. Remember that, from an ex ante basis, group *L* expects a loss of -2, because only some will win from the reform. These are the payoffs summarized in the "Big Bang" column of Table (3). The gradual strategy divides sector *L* in two subgroups and the reform in two steps; each of them only targets one of the two subgroups. Imagine for instance that, as illustrated in Table (3), Reform 1 gives +1 to Group 1, and concentrates the losses onto Group 2. Clearly, Group 1 supports this reform, which passes with the support of Groups 1 and 3. At the interim stage, when Reform 1 has passed, Group 2 prefers that Reform 2 be also implemented. This warrants the support of Groups 2 and 3 for the completion of the reform package. The watchful reader will remark that Groups 1 and 2 may wish to coalesce with one another and block both steps of the reform. This is correct: the policy-maker must indeed engineer a prisoner's dilemma situation to be successful: he must offer a sufficiently interesting short-run benefit to Group 1, to ensure that it prefers the reform to the blocking coalition.[21] Notice however that Martinelli and Tommasi (1997) argue that gradual reforms may be impossible in countries where many groups have veto power. In this case, it is better to delay reforms and bundle many reforms together.

To sum up, there is no magic recipe. Reforms need to be politically feasible, and not only economically efficient. To reach political feasibility, the policymaker may decide to delay or accelerate, to bundle or unbundle some aspects of the reforms. In this way the policymaker manipulates the "redistribution-to-efficiency gain" ratio. However, these political constraints that may influence reforms have some costs, as the more negotiable is a reform, the longer the delay (see Alesina and Drazen 1991; Drazen 1998 for a survey). In this direction, notice also that it may be the case that the existence of an additional constraint, as for example a constraint from IMF or EC, helps the reform process. Finally, a period of crisis or bad economic conditions may also be useful for the introduction of reforms.[22]

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[21] Note that gradualism may mean that reform 2 is only implemented after several years. As we saw with Dewatripont and Roland (1995), information may also be revealed at the interim stage. In such cases, Group 1 may wish that the experimentation does take place if Group 2 is the guinea pig.

[22] However, Rodrik (1996) challenges this view on the ground that if a reform takes place, it is normally meant to address some problem but is it necessarily a "crisis"? Alternatively, if no reform takes places, would it mean that the crisis was not so serious?

3.4.3. Information asymmetries affect policymakers' incentives

The above analysis focuses on the cases in which voters and politicians have access to the same information. In reality, voters should be "rationally ignorant" (Downs, 1957): collecting information about each policy is very costly for a voter who has virtually no chance of affecting the election outcome. Caplan (2007) identified crucial dimensions of economic policy for which voters suffer from major biases in their beliefs. His conclusion is that such prejudices induce democracy to be diverted away from the best policies. This gives politicians perverted incentives. Populist positions, for instance, may receive wide support.

More generally, politicians may wish avoid leaning against the winds of popular prejudices (see also Kessler 2005). For instance, Alt et al. (2008) report that politicians of all stripes are unwilling to extend VAT to children's clothing or food, for fear of people reactions, even when these measures have negative redistributive effects.[23] Moreover, some taxes are more transparent than others: for instance, how much you pay in social security contributions is less observable than how much you pay in VAT. As a consequence, politicians who want to please tax-averse voters will tend to over-utilize the former rather than the latter. Another strategy, often used by politicians, is to focus the debate (and thus the attention of citizens) on statutory tax cuts, but hide how they intend to change tax thresholds, whose effects are more difficult to observe. A way to correct for these distortions could be to improve transparency and foster the public's understanding of such matters.

Information may also have consequences on the timing of reforms. This is a well-known issue in yardstick tax competition. When voters do not have information on the costs of providing public goods but can compare their government's tax policies with those of neighbouring jurisdictions, they may induce tax mimicking behaviours on the part of their own government (Besley and Case, 1995a). There is an ample literature showing these effects, in particular at decentralised level (e.g. Besley and Case, 1995b; Heyndels and Vuchelen, 1998; Revelli, 2002; Bordignon, Revelli and Cerniglia, 2003; Edmark and Agren, 2007). One result of these studies is that, in this informational context, the prospect of facing an election shall trigger tax reforms, or that reforms are brought forward closer to elections.

Importantly, all individuals need not be informed: fact that most voters are ill-informed or biased *individually* does not prevent them from making the right decisions *collectively*. This self-correction mechanism of elections is known as the *Condorcet Jury Theorem* (Austen-Smith and Banks 1996, Feddersen and Pesendorfer 1997, Piketty 2000, Castanheira 2003). On a related note, the voters' information is actually endogenous to the political system. Benz and Stutzer (2004), for instance,

[23] The Institute for Fiscal studies shows that getting rid of reduced VAT rates in the UK would raise about £23 billion. Using £12 billion of this revenue to increase means-tested benefit and tax credit rates by 15% would leave the poorest three deciles of the population better off (Crawford et al. 2008).

provide empirical evidence that, when given the power to influence policy directly, voters become politically more active and acquire more information. Conversely, professional politicians invest more in "competence" when they have more control over policy (Kessler 2005). Representative democracy "*may therefore be based on a more informed decision process which takes future or present circumstances better into account*" (Kessler 2005, p28). Two related analyses, by Carrillo and Castanheira (2008) and by Castanheira, Crutzen and Sahuguet (2010), investigate a situation in which the policymaker must spend a costly effort to design good policies. They show that politicians develop better policies when voters have better information, but information may also trigger welfare-reducing actions on other dimensions: it reinforce party polarization, and political parties may reduce intraparty competition. Schultz (2008) studies the effect of increasing accountability by reducing term length. He shows that shorter office terms may induce the policymaker to manipulate information —and thereby voter beliefs— to increase support for his own pet projects.

Another important issue is that politicians may pursue objectives that are not in line with the electorate's needs, as suggested by the Leviathan view of government. This may end up in different economic outcomes under direct and representative democracies. However, as argued by Iversen and Soskice (2006), the fact that the size of government is smaller in direct democracy may not derive from abuse of politicians but rather from different voter preferences.

Coate and Morris (1995) consider a situation in which two types of policymakers coexist: those who maximize welfare, and the "captured" ones, who want to please some groups only. The issue is that none of them wants to be detected as "captured". Thus, whenever they wish to organise transfers to some groups, they will prefer less visible "sneaky" methods, even if those are highly distortive. Dewatripont and Seabright (2009) add the idea that some politicians are also very productive, and all of them want to be detected as "productive". This gives another perverse incentive: to appear as hyperactive, and introduce many "visible" reforms even if they have negative social value.

Models of comparative politics such as Persson, Roland and Tabellini (1997, 1998, 2000, and 2003) or Diermeier and Feddersen (1998) disentangle some of these effects. Persson et al. (2000), for instance, postulate that politicians wish to divert rents for themselves. They study the effect of some institutions on the equilibrium level of rent diversion and of public good provision. Processes meant to improve accountability, such as the separations of powers present in presidential-congressional regimes, reduce rent diversion (a positive effect) but also to depress public good provision and redistribution below the optimum (see also the analysis by Lizzeri and Persico, 2004).

Empirical work such as Milesi-Ferretti et al. (2002) and Persson and Tabellini (2003) provide evidence supporting these comparative statics. Looking at the politicians' sensitivity to pressure groups, Horgos and Zimmermann (2008) claim that "*interest group activity significantly leads to a* *decline in the growth rate and a rise in the inflation rate*". Using data on Swiss cantons, Feld and Frey (2002) provide empirical evidence that tax compliance depends on the interaction between taxpayers and tax authorities. They hint that, the more developed are political participation rights, the better tax authorities treat taxpayers and the higher is "tax morale". Drazen and Limão (2008) have a provocative view on such distortions due to pressure group activity: they show that a well-meaning government *should* sometimes introduce inefficient policies. The mechanism is that, when more distortions are present, the pressure groups become dependent on government action to increase their profits. Thus, the government acquires increased bargaining power over these groups. In a nutshell: if the increase in bargaining power is sufficiently large compared to the loss in efficiency, the inefficient policy increases welfare.

Finally, we wonder whether a pro-reform government is more likely to implement reforms. As argued by Cukierman and Tommasi (1998) if people expect pro-reform governments to push for reforms, they may believe that the reform is not necessary and deny their support. As a result, the pro-reform government will not implement reforms. The opposite applies to non-reform governments. This is probably why there is weak evidence that tax reforms are more likely to be implemented by left-wing or right-wing governments.

4. The political economics of tax reforms: an empirical test

4.1. The data

In this section, we investigate the empirical determinants of tax reforms and assess some of the theories. To do so, we use a *LABREF*, a database managed by the European Commission and which collects reforms in labour markets that occurred in the Member States of the European Union. The database covers all current 27 Member States between 2000 and 2008[24]. Within this dataset, we focus on the reforms in labour taxation on three accounts: changes in personal income taxation, changes in social security contributions of employees and changes in social security contributions of employers. The database also allows identifying whether the change in legislation positively or negatively affects the rate and/or the base and whether the reform was targeted to taxpayers with specific characteristics, such as old workers, young workers, self-employed, families with children, high or low-income, etc. In the database, we identify 86 reforms of personal income taxation (among which 47 were targeted), 23 reforms of social security contributions of employees (among which 15 were targeted) and 53 reforms of social security contribution of employers (among which 33 were targeted). We codify these by creating a variable "reform" that takes the value 1 if a reform of one of these three types occurs in a specific country in a specific year and 0 otherwise. In the same vein, we

[24] There is no information for reforms in social security contributions in Bulgaria between 2000 and 2002.

create a variable “target” that takes the value 1 if a targeted reform of one of these three types occurs in a specific country in a specific year and 0 otherwise. Table (4) provides summary information on the 117 reforms, of which 77 were targeted.

Table (4): Reforms of labour income taxation in the European Union

Reforms	Total number	Of which, at least one reform is targeted
PIT, SSCe, SSCr	9	7
PIT, SSCe	5	5
PIT, SSCr	15	10
SSCe, SSCr	6	0
PIT only	57	31
SSCe only	3	3
SSCr only	22	15
Total	117	77

Source: LABREF and own calculations

To assess the effects of political factors, we have collected indicators from the *Database of Political Institutions*, run by the World Bank (see Keefer, 2007). This database provides information on the political framework and the composition of executive and legislative institutions in most countries of the world between 1975 and 2006. To match these data with the data coming from *LABREF*, we have updated the database for our countries of interest with 2007 data. Next, we use information contained in the yearly *CIA Factbook* between 2000 and 2007, which also provides socio-economic information. Finally, we also use economic data provided in the *AMECO* database run by the European Commission.

4.2. Estimation technique

To investigate the determinants of the reform choices of governments we rely on the use of discrete choice modeling techniques and use the binary logit approach for this purpose. The choice of implementing a reform may be viewed as a maximization process done by the government and can be viewed as a variant of McFadden’s random utility maximization model (see Long and Freese, 2006). This approach assumes that governments choose to reform or not depending on the impact on a latent (i.e. unobservable) variable y* (e.g. the expected political profit). Additionally, observed political and socio-economic characteristics are assumed to directly influence this latent variable. They enter the profit function of a given government *i* as follows:

$$y_i^* = X_i \beta + \varepsilon_i \qquad (1)$$

where the latent variable y* of government *i* depends on observed independent variables represented by X_i and a random component ε_i. The government will decide whether to reform of not (the observed decision y) based on the following measurement equation:

$$y_i = 1 \;\; if \;\; y_i^* > 0 \qquad (2)$$
$$y_i = 0 \;\; if \;\; y_i^* \leq 0$$

Table (5) provides summary statistics on the main political variables and controls used in the subsequent empirical work to explain reform decisions. The mean value of *reform* – a dummy variable capturing the occurrence of a reform – is 0.542 and the mean value of *targeted* – a dummy variable capturing the occurrence of a targeted reform – is 0.356. Among the political controls, *execoalition* is the number of seats of majority of the governing coalition in the parliament, which varies in our panel from 1 to 8, with a mean value of 2.7. A large number of coalition partners is expected to increase the number of reforms – albeit not necessarily their efficiency – because it increases political competition (Lizzeri and Persico, 2005). However, this process may depend on the respective power of each political party. To control for this, we include *herfgov*, a variable computed as the Herfindahl index of the share of each party in the number of seats of the majority coalition. A similar variable, *Herfopp*, is computed for the opposition. The decision to reform may also depend on the size of the majority of the ruling coalition and we therefore include *maj*, the proportion of seats of the majority whose mean value in our sample is 54.4%. Next, we add *parliamentterm* as a variable capturing the length of the legislative mandate and *parlyterm*, which is computed as the ratio of the number of years left in the current mandate on the length of the legislative mandate. *Left* and *right* are two dummy variables capturing the political wing of the ruling coalition, the default being a centrist government. Right-wing or left-wing governments may be willing to implement specific reforms. At the same time, as mentioned in section 2.3., Cukierman and Tommasi (1998) show that reforms may be easier with governments that are less-prone to reforms as pro-reform governments may fail to implement reforms because of distrust in the population about their necessity. Finally, *Govspec* is a dummy variable indicating whether a member of the ruling coalition has specific political (nationalist, regional, religious or rural) interest. Such party might be more eager to implement targeted reforms.

Table (5): summary statistics

Variable	N# obs	Mean	Standard dev	Min	Max
Reform	216	.542	.499	0	1
Targeted	216	.356	.480	0	1
Lag reform	189	.529	.500	0	1
Lag targeted	189	.354	.480	0	1
Execoalition	216	2.708	1.341	1	8
Herfgov	216	.654	.258	.180	1
Herfopp	216	.506	.200	.213	1
Maj	216	.545	.076	.357	.732
Parlyterm	216	.405	.284	0	1
Parliamentterm	216	4.259	.439	4	5
Left	216	.361	.481	0	1
Right	216	.333	.472	0	1
Govspec	216	.194	.397	0	1
Pop65	216	15.187	2.054	11	20
Ethnic	216	.824	.175	.415	1
Outputgap	216	.308	2.488	-7.286	13.056

Complgovemp	216	11.075	2.509	6.844	18.025
Lagitrlabor	216	35.344	6.812	19.1	48.5

Next, we include socio-economic variables. *Pop65* represents the share of the population aged 65 or more. An ageing population could be an incentive for governments to reform – because of public finance constraints – but can also be an obstacle to reforms if this category prefers the status quo. *Ethnic* is the Herfindahl index of the various ethnicities composing society, with a value of one indicating a homogenous population. Heterogeneous populations might reflect heterogeneous preferences for reform which could increase political competition and hence the probability of a reform. Finally, we include economic control variables. *Outputgap* is the measure of the output gap of the economy, with a positive value indicating high growth. Alesina and Drazen (1991) hypothesise that reforms are more likely to happen during economic crises. *Complgovemp* capture the share of the compensation of labour of government employees in the economy and is hence a measure of the power of state officials. Finally, *lagirtlabor* is the lagged value of the implicit tax rate on labour. A high ITR on labour is expected to trigger reforms to decrease it.

4.3. Empirical results

Table (6) provides the empirical results from a logistic regression on the probability for a reform in labour taxation to occur. Table (7) provides similar regressions for targeted reforms. In both tables, we start with regression (1) as our base case, which includes political variables only. *Execoalition*, the number of political parties in the ruling coalition enters in Table (6) with a coefficient of 0.352 that is significant at the 1% level. Alternatively, (unpublished) marginal effects indicate that increasing the number of political parties by one leads to an increase in the probability of reforming by 8.7%. This result seems to give in support for the prediction of Lizzeri and Persico (2005) that increased political competition leads to more reforms because of an increased need to seek political support. Next, the Herfindahl index of governmental parties enters positively and significantly at 1% level, indicating that more homogeneous governments (or governments with a dominant party) are more likely to reform. The marginal effect indicates that a one-percentage point increase in the index leads to an increase in the probability of a reform by 0.58%. We also control for the size of the majority in terms of parliamentary seats and also find a positive and significant effect at the 5% level. The marginal effect is substantial with a one-percentage point increase in the majority yielding an increase in the probability of a reform by 1.29%[25]. The length of the parliamentary term is also introduced as a control. Governments with longer terms may want to spread reforms over the term

[25] Note that there is a possibility of quadratic effects. Adding the square of *maj* in regression (1) keeps the significance (at 10%) of both maj and its square, this latter entering with a negative sign. This significance disappears in other regressions.

and practice gradualism. Alternatively, longer terms may mean less political competition and hence a lower need for reform. The negative and strongly significant result could provide support for this latter hypothesis. Having a 5-year mandate instead of a 4-year mandate decreases the probability of reforming by 26.2%. However, the size of the result may also simply mean that the number of reform per term is more or less fixed and that governments with a 5-year term have simply a lower "reforms to years" ratio. Finally, both left-wing and right-wing governments are less likely to reform. In those cases, the presence of such government decreases the probability of a reform by 26 and 22% respectively. This provides support for the theory of Cukierman and Tommasi (1998) which predicts that governments that are seen as more pro-status-quo are more likely to succeed in reforming because their claims that a reform is necessary will be seen as more credible by voters. The basic model is quite successful in predicting reforms as its forecast is correct in about 64% of cases.

In regression (2), we add the Herfindahl index of the opposition, the ratio of the number of years left in the current mandate on the length of the legislative mandate and a dummy variable indicating whether a member of the ruling coalition has specific political interest as additional political variables. The first variable enters positively and significantly at the 1% level. Its marginal effect is similar to the one of the index for the government in this regression at 0.47% and 0.46% respectively. It provides additional support for the political competition theory. The other two additional variables are not significant albeit their sign is in line with the predictions. First, governments tend to implement reforms at the end of their mandate (the larger the part of the mandate that remain to be done, the less likely the reforms). This is in line with the results of yardstick tax competition that parties could try to bring reforms closer to reelection years. Second, governments with specific interests are more likely to yield specific reforms. The other variables are not affected qualitatively and their marginal effects remain similar[26].

Regression (3) introduces economic variables as controls. A high implicit tax rate on labour in the previous period is an incentive to introduce a reform. Indeed, the variable enters positively and significantly at the 10% level. A large size of the public sector – as proxied by the compensation of government employees in GDP – is predicted to favour the status quo. The variable enters indeed the regression negatively but fails to be significant. Finally, the economic conditions are reflected in the output gap variable. The results infirm the prediction of Alesina and Drazen (1991) that reforms are more likely to happen during a crisis. Instead, the positive and significant coefficient for the output gap suggests that governments engage in pro-cyclical policies. The marginal effect indicates that a

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[26] Note that those three additional variables are somewhat strongly correlated with some of the other ones and such collinearity is expected to decrease the significance of the results. It is therefore good news that the results are largely unaffected.

one-percentage point increase in the output gap increases the probability of a reform by 3.4%[27]. To confirm this, we substitute in regression (4) the unemployment rate for the output gap. The negative and significant coefficient indicates that high unemployment is negatively correlated with the occurrence of reforms.

In regression (5), we substitute demographic controls for economic ones. We find that an ageing population is an incentive for reforms but that more homogenous populations have a positive but non-significant effect. Note however that entering those variables cause some of the core variables to be insignificant. This seems to be largely due to collinearity problems. Putting all variables together in regression (6) aggravates this problem further.

Against the possibility that political variables may actually reflect underlying economic conditions, in regression (7), we test economic variables only and find that their effects is quite similar than when they are mixed with political variables. Finally, we test for lagged effects in regression (8) and for the influence of reforms in other countries in regression (9). Both enter non-significant.

Next, Table (7) provides mirror regressions for targeted reforms. In regression (1), *Execoalition*, *Herfgov* and *Maj* enter the regression positive and significant with marginal effects close to their values in Table (6). The length of the term enters negatively but just fails to be significant at 10% level. Interestingly, left and right variables cease to be significant and this is confirmed in all regressions of table (7). This may be an indication that targeted reforms are not necessarily associated with a political colour but are used by all parties to win the support of specific groups of voters like in the Colonel Blotto Games. Regressions (2) to (8) display results that are qualitatively similar to regression (1). Several points are nevertheless worth noticing. First, economic variables do not seem to play a role. This is a strong indication that targeted variables might be of political nature instead of economic one. Second, the degree of majority seem to play a minor role, which shows again that - unlike general reforms that necessitate a broad political support - targeted reforms might be more political acts towards specific constituencies. This argument is strengthened by the lower role plaid by the Herfindahl index of the government in Table (7). Finally, the lag of the dependent variable enters positive and significant at the 5% level. The marginal effect indicates that having done a targeted reform in the previous period increases the probability of having a targeted reform in the current period by 17.7%. This seems to indicate that, unlike general reforms, targeted reforms are characterised by gradualism.

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[27] An (unpublished) additional regression shows that there are no quadratic effects for the output gap, i.e. reforms do not occur in either very good or very bad economic situations.

5. Conclusions

Economic theory on optimal taxation provides many prescriptions on how to shape tax systems to reach economic efficiency by minimizing excess burden of taxation. Similarly, achieving fair tax systems also require specific designs for tax systems. Despite the economic case for such ‘optimal’ tax systems, actual ones are often shaped in a way that achieves neither efficiency nor fairness and recommended tax reforms are implemented in few countries only. It therefore of high policy interest to better understand the determinants of tax reforms. This paper is aiming to this goal.

A weakness of economic theories on tax efficiency and fairness is that they often abstract from both the definition of the tax base and the definition of income. In both cases, they encompass many aspects of diverse nature and are also somewhat subject to manipulation. Such gap between theory and practice may constitute a first bias. An important second bias is that policymaking is not the achievement of a benevolent social planner but is formulated by politicians and parties that also have an electoral objective. Several theories have been devised to explain their behaviour. The median-voter theory asserts that politicians will try to please the voter that divides the electorate in two equal parts as s/he is the one deciding upon the electoral results. The empirical literature has failed to validate this theory, maybe because it relies on too many simplifying assumptions. More elaborated models - such as the probabilistic voting models – predict that the equilibrium tax policy will not only be a function of the elasticity of the income sources but also of the electoral elasticity of voters. Such models explain many observed policy outcomes such as why fully equalitarian tax systems are not politically feasible, how the status quo bias hinders reforms and prescribes gradual reforms to circumvent it, or why broad-base and low-rate tax systems might not be politically sustainable as an equilibrium of such political ‘games’ modelled by the political economy literature.

Finally, we exploit a database of reforms in labour taxation in the European Union between 2000 and 2007 to check the determinants of all reforms, on the one hand, and of targeted reforms, on the other hand. The results fit well with political economy theories and show that political variables carry more weight in triggering reforms than economic explanatory variables. This shed light on whether and how tax reforms are achievable. It also explains why many reforms that seem economically optimal fail to be implemented.

Table (6): The impact of political variables on reforms.

All Reforms	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Base regression	More polit. V.	More econ. V.	Unemp. Rate	Demographic v.	All variables	Econ variables	Lag depend v.	Lag # reforms
execoalition	0.352***	0.414***	0.302**	0.367**	0.310**	0.314**		0.383***	0.406***
	(0.123)	(0.131)	(0.152)	(0.153)	(0.142)	(0.157)		(0.141)	(0.139)
herfgov	2.347***	1.854**	2.321**	2.631***	0.532	1.124		1.735*	1.867**
	(0.828)	(0.879)	(0.966)	(0.995)	(1.055)	(1.230)		(0.968)	(0.951)
maj	5.206**	4.363*	3.940	4.433	1.635	2.023		4.203	4.839*
	(2.571)	(2.567)	(2.755)	(2.720)	(2.813)	(2.965)		(2.809)	(2.841)
parliamentterm	-1.058***	-1.187***	-1.084**	-1.313***	-0.688	-0.868*		-1.058**	-1.156***
	(0.410)	(0.404)	(0.461)	(0.493)	(0.483)	(0.517)		(0.441)	(0.434)
left	-1.073**	-0.997**	-0.895**	-1.077**	-0.979**	-0.841*		-0.622	-0.771*
	(0.421)	(0.425)	(0.448)	(0.456)	(0.447)	(0.450)		(0.462)	(0.464)
right	-0.879**	-1.165***	-0.838*	-1.079**	-1.240***	-0.893**		-0.954**	-1.050**
	(0.389)	(0.420)	(0.446)	(0.450)	(0.423)	(0.440)		(0.449)	(0.445)
herfopp		1.917**	1.196	1.481	1.953**	1.436		1.602	1.738*
		(0.919)	(0.943)	(0.931)	(0.902)	(0.947)		(0.979)	(0.986)
parlyterm		-0.274	-0.111	-0.174	-0.237	-0.143		0.017	-0.092
		(0.521)	(0.528)	(0.528)	(0.531)	(0.533)		(0.551)	(0.555)
Govspec		0.370	0.646	0.619	0.404	0.515		0.206	0.173
		(0.438)	(0.440)	(0.436)	(0.427)	(0.451)		(0.458)	(0.463)
outputgap			0.140**			0.101	0.144**		
			(0.066)			(0.068)	(0.063)		
complgovempl			-0.061	-0.068		-0.082	-0.096		
			(0.068)	(0.069)		(0.074)	(0.061)		
lagitrlabor			0.052*	0.045		0.016	0.070***		
			(0.031)	(0.031)		(0.037)	(0.022)		
unemplr				-0.077*					
				(0.045)					
pop65					0.255**	0.198			
					(0.103)	(0.123)			
ethnic					0.762	0.792			
					(0.972)	(1.095)			
lagreform								0.345	
								(0.326)	
lagnumreform									-0.790
									(1.151)
Constant	0.055	-1.243	-0.947	0.411	-3.653	-2.294	0.361	-0.129	0.457
	(1.776)	(0.952)	(2.679)	(2.730)	(2.468)	(2.850)	(1.820)	(1.968)	(2.046)
Observations	216	211	211	211	216	211	216	189	189
Pseudo R-squared	0.08	0.06	0.11	0.11	0.12	0.12	0.09	0.09	0.09
Goodness of fit	0.639	0.644	0.701	0.678	0.667	0.677	0.639	0.672	0.640

*Estimation is by logit model. White (1980)'s heteroskedasticity-consistent standard errors are reported between brackets. The goodness of fit is the percentage of correct predictions (either fitted value of reform >0.5 and actual reform=1 or fitted value of reform=<0 and actual reform =0). Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.*

Table (7): The impact of Political variables on targeted reforms.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Targeted Reforms	Base regression	More polit. v.	More econ. v.	Unemp. rate	Demographic v.	All variables	Econ variables	Lag dependent v.	Lag # reforms
execoalition	0.347***	0.397***	0.329**	0.370**	0.326**	0.325**		0.339***	0.394***
	(0.122)	(0.128)	(0.146)	(0.153)	(0.135)	(0.148)		(0.131)	(0.135)
herfgov	2.139***	1.612*	1.958**	2.172**	0.503	1.153		1.316	1.306
	(0.830)	(0.895)	(0.989)	(1.009)	(1.060)	(1.290)		(0.895)	(0.975)
maj	3.972*	3.220	2.574	2.912	1.486	1.735		2.745	2.663
	(2.185)	(2.251)	(2.372)	(2.369)	(2.515)	(2.703)		(2.297)	(2.449)
parliamentterm	-0.659	-0.802*	-0.728	-0.890*	-0.525	-0.653		-0.646	-0.581
	(0.404)	(0.441)	(0.477)	(0.498)	(0.470)	(0.498)		(0.445)	(0.485)
left	0.025	0.104	0.022	-0.090	0.098	0.051		0.162	0.593
	(0.415)	(0.441)	(0.458)	(0.461)	(0.464)	(0.482)		(0.442)	(0.497)
right	0.220	-0.054	-0.059	-0.202	-0.127	-0.061		-0.058	0.116
	(0.420)	(0.453)	(0.490)	(0.491)	(0.449)	(0.486)		(0.449)	(0.502)
herfopp		2.030**	1.695*	1.852**	2.097**	1.798*		1.861**	1.705*
		(0.874)	(0.932)	(0.920)	(0.912)	(0.962)		(0.910)	(0.904)
parlyterm		-0.281	-0.217	-0.256	-0.284	-0.253		-0.140	0.019
		(0.538)	(0.535)	(0.543)	(0.534)	(0.536)		(0.544)	(0.558)
GOVSPEC		0.359	0.558	0.556	0.404	0.504		0.319	0.347
		(0.424)	(0.444)	(0.441)	(0.428)	(0.449)		(0.422)	(0.468)
outputgap			0.078			0.061	0.074		
			(0.061)			(0.067)	(0.060)		
complgovempl			-0.003	-0.011		-0.023	0.017		
			(0.068)	(0.068)		(0.071)	(0.055)		
lagitrlabor			0.037	0.033		0.022	0.050**		
			(0.031)	(0.031)		(0.037)	(0.022)		
unemplr				-0.053					
				(0.043)					
pop65					0.152	0.083			
					(0.102)	(0.123)			
ethnic					1.086	0.951			
					(0.995)	(1.064)			
lagtargeted								0.765**	
								(0.334)	
lagnumtargeted									1.878
									(1.455)
Constant	-2.402	-2.111	-3.270	-2.288	-4.653**	-3.902		-2.394	-3.312
	(1.808)	(1.894)	(2.512)	(2.691)	(2.348)	(2.608)		(1.914)	(2.092)
Observations	216	216	211	211	216	211	211	216	189
Pseudo R-squared	0.05	0.07	0.08	0.08	0.09	0.09	0.02	0.09	0.08
Goodness of fit	0.685	0.695	0.711	0.701	0.708	0.730	0.645	0.656	0.688

*Estimation is by logit model. White (1980)'s heteroskedasticity-consistent standard errors are reported between brackets. The goodness of fit is the percentage of correct predictions (either fitted value of reform >0.5 and actual reform=1 or fitted value of reform=<0 and actual reform =0). Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.*

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Appendix A. Variable definitions and data sources

Variable	Definition	Source
Reform	Dummy indicating the occurrence of a reform in labour taxation	LABREF (European Commission) and own calculations
Targeted	Dummy indicating the occurrence of a targeted reform in labour taxation	LABREF (European Commission) and own calculations
Execoalition	Number of parties in the governing coalition	CIA Factbooks and own calculations
Herfgov	Herfindahl index for the governing coalition (in % of seats)	DPI (World Bank)
Herfopp	Herfindahl index for the opposition (in % of seats)	DPI (World Bank)
Maj	Percentage of majority in seats	DPI (World Bank)
Right	Dummy indicating a right-wing government	DPI (World Bank)
Left	Dummy indicating a left-wing government	DPI (World Bank)
Parliamentterm	Length in years of the parliamentary term	DPI (World Bank)
Parlyterm	Number of years left in the current term divided by the length of the term	DPI (World Bank) and own calculations
Govspec	dummy variable indicating whether a member of the ruling coalition has specific political (nationalist, regional, religious or rural) interest	DPI (World Bank)
Pop65	Share of the total population aged 65 or more	CIA Factbooks
Ethnic	Herfindahl index of the various ethnic	CIA Factbooks and own calculations
Outputgap	Output gap of the economy (a positive index indicates GDP above potential GDP)	AMECO (European Commission)
Complgovempl	Compensation of employees of government in % GDP	AMECO (European Commission) and own calculations
Unemplr	Unemployment rate	AMECO (European Commission) and own calculations
Lagitrlabor	Lag of the Implicit tax rate on labour (computed as labour taxes collected on their own base)	Taxation Trends (European Commission)