

A POSITIVE THEORY OF TAX REFORM*

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Abstract

The political impediments to reform and the political forces allowing its success are studied in a model where the tax base and the statutory rate are separate instruments of tax policy. The model predicts that big bang reforms—large changes in the tax code—are politically feasible, while marginal reforms would be rejected. This contrasts with a prominent view that larger reforms face greater political difficulties. Politically feasible tax reform occurs when revenue needs are large, but will nonetheless involve reductions in marginal tax rates. At a “reform moment”, political platforms converge and reform may receive unanimous support. The recent history of tax reform in the US and other industrialized countries is discussed and shown to be in line with the model’s predictions.

JEL Codes: D72, D78, H20

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1 Introduction

In an era of fiscal austerity, questions of tax reform have once again taken center stage. While it is widely appreciated that the politics of tax reform can be tricky, knowledge of the forces that shape reform remains incomplete. Political pressures that allow inefficient policies to persist are central in the study of political economy. This has led to a large body of work on the role of special interest politics, the nexus between political and economic power, and public choice mechanisms, among other explanations for such “political failures”.¹ The political barriers to economic reform are a related field of inquiry.² A main tension in the politics of reform is the conflict between particularistic interests and overall economic efficiency. Despite the many political challenges to reform, there are nevertheless occasional “reform moments” where general interests overcome parochial ones. Although some have argued for gradualism in reform, politicians occasionally attempt, and succeed, in passing large and substantial reforms. When, then, does an economy reach a tipping point, where reform becomes politically feasible? At such tipping points, which types of reform are likely to pass?

This paper proposes a theory of tax reform in a general equilibrium setting. Inefficient tax policies generate rents to special interests. Each individual tax provision introduces small deadweight losses, but the combination of rents accrued to numerous special interests may have larger general equilibrium effects. When total efficiency losses are small, special interests and the general public might ignore these costs and focus their attention on securing targeted tax breaks. When these deadweight losses are large enough, the public, and even benefitting special interests, might be harmed significantly through the general equilibrium costs to the economy. The theory illustrates that there comes a tipping point when special interests can be persuaded to forgo their rents in favor of tax reform. Crucially, however, given the minor efficiency gains from eliminating rents accrued to an *individual* special interest, no special interest would individually forgo its own rents for the general equilibrium gains their elimination would deliver. This calls for a “big bang” reform, where multiple special interests are targeted simultaneously. Targeting numerous groups, or bundling a number of reforms in one package,

¹See Grossman and Helpman (2002), Acemoglu and Robinson (2001), and Besley and Coate (1998), respectively, as examples.

²See Alesina and Drazen (1991), Fernandez and Rodrik (1991), Jain and Mukand (2003), for example.

brings larger general equilibrium gains. While each special interest bemoans its individual losses, a big bang reform might nevertheless receive unanimous support as general equilibrium effects may be sufficient to compensate all special interests. This contrasts with a prominent view in the political economy of reform, where gradual, piecemeal, or small reforms are easier or less costly to implement.³

Tax reform is just one instance of policy reform albeit one where we can cast light on the persistence of inefficient policy more generally. Illustrating these general points through the lens of tax policy has a number of advantages. First, the deadweight losses of inefficient tax policies are readily assessed in a familiar public finance context, as are the benefits of tax provisions targeted to special interests. Second, tax policy is a popular vehicle for targeting special interests in practice. The Congressional Budget Office (CBO, 2013) estimates that the United States Treasury forgoes over one third of potential individual income tax revenues through “tax expenditures”. This sum is of a similar magnitude to all discretionary spending in the U.S.⁴ While some of these lost revenues were due to evasion or difficulties in tax administration, others were lost by the very design of the tax code, likely motivated by political, not only economic, factors. Given the sums involved and the prominence that tax policy takes in political debate, it is of independent interest to understand the politics of tax expenditures.⁵ Third, the emphasis on tax policy relates the current study to a rich literature on the political economy of taxation and redistribution.⁶ The innovation relative to existing studies of the political economy of taxation is in the clear distinction between the tax base and tax rates in the politics of taxation. Political conflict over tax policy is not only on the overall size of government and the progressivity of the tax code, but also on whether tax revenues should be raised by increasing tax rates or broadening the tax base. The model pre-

³See Dewatripont and Roland (2002) and Lau et al (2000). Relatedly, there is a public finance literature that defines tax reform as a marginal as opposed to large change in tax policy. The view presented here suggests that the marginality of policy changes should not be taken for granted. See Dixit (1975), Feldstein (1976), and more recently Golosov et al (2013).

⁴GAO estimates: http://www.gao.gov/key_issues/tax_expenditures/issue_summary

⁵Tax expenditures are not uniquely a U.S. phenomenon. Tax expenditures in Australia and Italy are estimated at 8% of GDP, 6% in the U.K., and 4% in Spain, for example. Source: Tyson (2014).

⁶See Persson and Tabellini (2002) for a literature review, and Alt et al (2009) and Castanheira et al (2012) for discussions of the politics of tax reform more specifically.

sented here gives a theoretical context for such base-versus-rates debates.⁷ The theory provides predictions on tax policy, which are then compared with actual reform experiences.

I propose a tractable model where a government raising revenues chooses not only the tax rate, but also the tax base, drawing on Yitzhaki (1979), Wilson (1989), and Slemrod and Kopczuk (2002). The policymaker may target specific groups through tax exemptions. Lump sum transfers are not feasible. This compounds the inefficiency of choosing targeted policies and links the value of tax exemptions more directly to overall economic conditions.⁸

In the model outlined here, a broader tax base is more efficient, as it removes a wedge between the prices of taxed- and tax-exempt goods. In political equilibrium, certain goods may nevertheless be exempt from taxation. The rents from tax exemptions are large and concentrated, while their costs are diffuse. If a powerful interest benefits from a tax preference, she will secure such a tax break despite its inefficiency. This phenomenon is familiar from our understanding of special interest politics.⁹

The novelty here is the study of the general equilibrium implications of the inefficient policies that result. While a tax preference increases the *relative* demand for a producer's product, the resulting inefficiencies reduce *aggregate* demand. The model yields a simple expression that quantifies the general equilibrium losses borne directly by the very beneficiaries of tax exemptions. When inefficiencies in the tax code reach a critical point, even beneficiaries from tax preferences are willing to forgo their benefits in favor of tax reform: the elimination of *all* tax exemptions.

Interestingly, no (small) special interest would ever forgo its tax break in isolation. The rents from the exemption are large, but the general equilibrium gains from its elimination are negligible. At the same time, a broad coalition of special interests may agree collectively to give up their tax preferences for tax reform. Marginal reforms are therefore politically difficult, while "big bang" reforms become feasible via a grand bargain. I study the size of the coalition that would collectively forgo the tax exemptions of its members for the enactment of tax reform. I show that the size of this coalition is increasing in the government's revenue needs. This gives a concrete prediction that tax

⁷Broadening the tax base was central in the tax policy platforms of both presidential candidates in 2012. See <http://www.whitehouse.gov/economy/reform/tax-reform> and http://www.ontheissues.org/2012/mitt_romney_tax_reform.htm

⁸This also precludes compensating losers from reform through such transfers.

⁹See Grossman and Helpman (2002).

reform is more likely when public finance needs are large.

While the economic framework lends itself to a variety of collective choice frameworks, I study a median voter model for ease of exposition. A standard and familiar political economy model highlights that results are driven by the economic foundations of the model, rather than a particular political structure. In this setting, tax reform is adopted with probability one if the median voter is part of a grand coalition for reform. As a result, the economy faces a “tipping point”. When revenue needs are below this tipping point, tax exemptions are allocated to a subset of firms with probability one. Once revenue needs hit this tipping point, there is a discrete change in policy. Tax reform—the elimination of all special tax provisions—is a political certainty.¹⁰

The model has a number of predictions on the politics of tax policy. First, tax reform is more likely when revenue needs are high. Second, there is a tipping point that triggers tax reform. When it is reached, policy changes discretely rather than gradually or on the margin. Third, tax reform will typically involve a broadening of the tax base and a *reduction* in marginal tax rates. A decrease in marginal rates may seem surprising when revenue needs are large. But not so if one recognizes that the change in the tax base is discrete and large in a “big bang” tax reform. This frees revenues to decrease marginal tax rates—politically necessary to compensate losers. Finally, tax reform may involve a political “grand bargain” and obtain bipartisan support. The model provides conditions that lead to unanimous support for tax reform. The predictions of the model are generally consistent with recent tax reforms in the U.S. and other countries. I provide recent historical examples in Section 4.

The remainder of the paper is organized as follows. Section 2 describes the economic environment, giving rise to citizens’ policy preferences. Section 3 describes the political model and political equilibrium; the main predictions of the model are summarized in this section. Section 4 outlines a number of tax reform episodes from recent history and compares these experiences with the model’s predictions. Section 5 studies the role of uncertainty in adopting tax reform. Section 6 concludes and discusses avenues for future research. Proofs are in the appendix; some further derivations alongside robustness checks and extensions can be found in the online appendix.

¹⁰In an extension, lobbying for tax benefits interacts with voting, yielding similar results.

2 The Economy

This section outlines the economy's response to tax policy. The political determinants of policy are then studied in Section 3.

2.1 Model Setup

Agents and Preferences The economy consists of a government and a continuum of identical citizens of unit measure and indexed by $j \in [0, 1]$. Each citizen is a worker, consumer, voter, and entrepreneur—terms that will be used interchangeably. The citizen values streams of consumption x^j and hours worked h^j according to a utility function

$$u^j = x^j - \frac{(h^j)^{1+\frac{1}{\eta}}}{1+\eta}. \quad (1)$$

Citizens' Income Each hour worked is compensated at a wage of w units of the consumption good. In addition to labor income, consumer j earns profits π^j from a *single* firm she owns; it is one of a unit measure of firms indexed by $i \in [0, 1]$. Firms' indexes are matched to those of their owners. The non-diversified ownership structure is somewhat stark, as is the assumption that all citizens derive profit income. This eases analysis by giving every citizen access to rents, but is not central to the theoretical insights.

Consumption and Intermediate Goods Each firm produces a single variety of an intermediate good. Each variety is sold at a price of $p(i)$ and let $x^j(i)$ denote consumer j 's demand for variety i . Households bundle individual varieties through a CES aggregate to give consumption x^j of

$$x^j = \left[\int_{i=0}^1 (x^j(i))^{\frac{\varepsilon}{\varepsilon+1}} di \right]^{\frac{\varepsilon+1}{\varepsilon}}. \quad (2)$$

Tax Policy Tax structure in this model draws on Yitzhaki (1979), Wilson (1989), and more recently Slemrod and Kopczuk (2002). The government faces an exogenously given public good need g , which must be financed with

tax revenues.¹¹ Tax policy consists of two instruments: the tax rate τ and the tax base f . Personal income $wh^j + \pi^j$ is taxed at a uniform rate τ . However, varieties of intermediate goods such that $i \in [f, 1]$ are fully deductible from income taxation. Setting $f = 1$ implies that no goods are tax deductible and the statutory tax rate τ applies to the entire tax base. Setting $f = 0$ means that all consumer purchases are deductible and tax revenues are zero. It is therefore natural to think of a higher value of f as a broader tax base.

Given that intermediate goods are identical (in their elasticity of demand, for example), there is no economic rationale to provide a tax exemption to any specific variety. Not surprisingly, a social welfare maximizer would set $f = 1$ always. Any deviation from a complete tax base is due political, rather than economic, forces. The tax structure is a simple way to capture the realistic features that tax exemptions can be individually targeted to special interests, but also that such exemptions tend to provide a discrete, rather than a marginal, benefit to their recipients. It is not essential that deductible goods qualify for a 100% tax refund. It is crucial for the results in this paper that tax deductions provide a *discrete* benefit. Allowing for infinitesimal tax breaks would muddle the distinction between the tax base and the tax rate. In practice, administrative factors limit the number of existing tax brackets: see Hettich and Winer (1984) for a discussion.

To reduce the dimensionality of tax policy, it is convenient to assume that the policymaker chooses the number of exemptions, but not the specific firms targeted. We may think of a good with a higher index as being less “taxable”—for either political or administrative reasons—so that a tax base of f always falls on goods $i \in [0, f)$. In the online appendix I introduce a lobbying model, where tax deductions are allocated in equilibrium based on firms’ degree of political organization.

Budget Constraint and Consumer Choice Given tax policy $\{\tau, f\}$, the consumer’s budget constraint is given by

¹¹The public good is assumed to be a specific variety: $i = 1$. The government purchases this good from the firm at a price of 1, which I will later show to be the market price of the good in the absence of government intervention. In other words, the government does not exploit its market power to affect the public good’s price, nor can the firm exploit its position as the monopolistic provider of the public good to charge an unusually high markup. The assumption that the government purchases a specific variety is for analytical convenience, but does not affect any of the insights delivered by the model.

$$\underbrace{\int_{i=0}^1 p(i) x^j(i) di}_{\text{Consumption Expenditure}} \leq \underbrace{(1 - \tau)(wh^j + \pi^j)}_{\text{After-tax income}} + \underbrace{\tau \int_{i=f}^1 p(i) x^j(i) di}_{\text{Tax deduction}} \quad (3)$$

Consumer choice is then to maximize (1) through a choice of varieties $\{x^j(i)\}_{i=0}^1$ and labor supply h^j , subject (3).

Consumption Bundle and Demand for Varieties Consumer demand for individual varieties is given by

$$x^j(i) = \left((1 - \tau(f, i)) \frac{p^c}{p(i)} \right)^{\varepsilon+1} x^j, \quad (4)$$

where $\tau(f, i)$ is τ for all intermediate goods in the tax base ($\forall i \in [0, f)$) and zero for all tax-exempt good $i \in [f, 1]$. p^c is the effective consumer price index

$$p^c \equiv \left(\int_{i=0}^1 [((1 - \tau(f, i)) p(i))^{-\varepsilon}] di \right)^{-\frac{1}{\varepsilon}}. \quad (5)$$

Firms Each firm i has a technology that transforms $h(i)$ units of labor into $zh(i)$ units of good i . Firms are identical in their productivity; firms with heterogeneous productivities are studied in the online appendix. Each firm faces a fully competitive labor market, but a monopolistically competitive (Dixit and Stiglitz, 1977) goods market. Monopolistic competition aides our analysis in two ways. First, firms obtain profits, which are decreasing in the effective tax imposed on their variety. This makes tax deductions redistributive instruments. Second, firms' profits are proportional to the demand for their varieties, so that firms benefit from higher aggregate demand, allowing for a general equilibrium demand externality.

Each firm hires workers at the market wage w and sells its intermediate good at price $p(i)$. Profit maximization subject to the production technology gives the standard result that prices are set at a constant markup $\mu \equiv \frac{\varepsilon+1}{\varepsilon}$ over marginal costs:

$$p(i) = \mu \frac{w}{z}. \quad (6)$$

We normalize the producer price (identical for all firms) to one, so that the consumer price index (5) can be written as

$$p^c = \frac{1}{1 - \hat{\tau}}.$$

$\hat{\tau}$ is the effective tax rate defined as

$$1 - \hat{\tau} \equiv [f(1 - \tau)^\varepsilon + (1 - f)]^{\frac{1}{\varepsilon}}. \quad (7)$$

This effective tax rate is the labor wedge caused by the tax policy $\{f, \tau\}$. It is useful to anticipate at this point that raising one unit of revenues via an increase in the statutory tax rate τ will always increase the effective tax rate by more than raising the unit of revenues via an expansion of the tax base f . Thus increases in tax rates are always less efficient than broadening the tax base.

Firms' profits are directly proportional to demand for their varieties: $\pi(i) = \frac{x(i)}{\varepsilon+1}$.

Government The government collects tax revenues

$$\rho = \tau \left(wh + \pi - \int_{i=f}^1 p(i) x(i) di \right), \quad (8)$$

which are revenues from income taxation net of deductions. The government uses these revenues to supply the public good, so that $\rho \geq g$.

Labor Supply and Consumption Workers' first order condition for the supply of labor gives

$$h = h^j = \left(\frac{\eta z (1 - \hat{\tau})}{\mu} \right)^\eta. \quad (9)$$

Consumer j 's consumption can now be written as

$$x^j = (1 - \hat{\tau}) (wh^j + \pi(j)). \quad (10)$$

2.2 Indirect Utility

The utility of citizen j is given by (1). h^j is given by (9) and x^j is given by (10), so that the indirect utility of a citizen $j < 1$ can be described by

$$u^j = \eta^\eta \left(\frac{z(1-\hat{\tau})}{\mu} \right)^{\eta+1} \left(\frac{1}{1+\eta} + \frac{1}{\varepsilon} \frac{(1-\tau(f,j))^{\varepsilon+1}}{(1-\hat{\tau})^\varepsilon} \right). \quad (11)$$

This indirect utility function can be separated into two easily-interpretable terms. The first reflects the utility of the citizen in her role as worker; the second, in her role as entrepreneur. Absent wealth effects these terms are additively separable. The model can thus be easily adapted to other assumptions regarding the distribution of ownership, monopoly rents, and income in society. The assumption that every citizen owns a firm can be easily altered, as can the assumption that workers derive no share of the monopoly rents of their employers.

The first term,

$$u^W \equiv \frac{\eta^\eta}{1+\eta} \left(\frac{z(1-\hat{\tau})}{\mu} \right)^{\eta+1}$$

is the utility of citizen j as a worker. It gives the utility of consumption from labor income net of the dis-utility of supplying this labor $wh - \frac{h^{1+\frac{1}{\eta}}}{1+\eta}$. It is immediately apparent that all workers derive the same utility. In addition, the effects of tax policy on this component of utility is entirely captured by the effective tax rate $\hat{\tau}$, given in (7), and is therefore decreasing in both the tax rate τ and the breadth of the tax base f . As consumers, all citizens wish fewer goods to be taxed and for taxed goods to be taxed at a lower rate. We will see, however, that raising a unit of revenues by increasing the statutory tax rate τ increases the effective tax rate $\hat{\tau}$ by more than raising revenues through a broadening of the tax base f . Workers therefore always prefer the broadest possible tax base.

The second term

$$\pi(j) = \frac{\eta^\eta}{\varepsilon} \underbrace{(z(1-\hat{\tau}))^{\eta+1}}_{\text{Aggregate Demand}} \underbrace{\frac{(1-\tau(f,j))^{\varepsilon+1}}{(1-\hat{\tau})^\varepsilon}}_{\text{Relative Demand}} \quad (12)$$

gives the utility of citizen j as in her role as entrepreneur, namely profits. Profits from the total sales of variety j are affected by both aggregate and

relative demand. The term labeled as aggregate demand is familiar from the utility of workers, as it is proportional to total consumption. Aggregate demand is decreasing in the effective tax rate, with an elasticity related to the elasticity of labor supply.

The term $\frac{1-\hat{\tau}}{1-\tau(f,j)}$ is the relative price of good j . Thus $\left(\frac{1-\tau(f,j)}{1-\hat{\tau}}\right)^{\varepsilon+1}$ is the relative demand for good j . This is the only term in citizens' preferences where the statutory tax rate and the tax base appear separately from the effective tax rate. A higher statutory tax rate τ increases the relative price of and lowers the relative demand for goods that are in the tax base. It lowers the profits of "taxed" firms: those that do not have a tax exemption. (Note that profits of all firms are taxed. I use the term "taxed firms" as shorthand for firms whose goods are not tax deductible.) The tax base f determines whether a specific product is ($j \geq f$) or is not ($j < f$) sheltered from taxation.

These two terms highlight how firms benefit from tax exemptions, but also bear a cost, through general equilibrium channels. The value of securing an individual tax benefit can be gleaned from a comparison between the profits of a firm directly below, with those of one directly above, the threshold of $j = f$. The relative demand for the product of the "sheltered" firm—that directly above the threshold $j > f$ —is higher by a discrete margin. Accordingly, this firm's profits are higher by a discrete amount. Entrepreneurs have a strong incentive to secure a tax exemption.

For a given revenue need, the effective tax rate is minimized, however, by relying on the broadest possible tax base. Aggregate demand is therefore harmed by a narrow tax base. The aggregate demand term in (12) demonstrates that entrepreneurs internalize, to some extent, the costs of their tax exemption demands. However, the aggregate demand cost of any single tax exemption is infinitesimal, while the benefits to its recipient are not. This highlights that no firm has the interest to unilaterally forgo its own tax benefit. The aggregate demand channel does leave scope, however, for a group of firms to collectively forgo their tax benefits.

Conditional on a firm's tax status, its profits are decreasing in the effective tax rate if and only if $\eta + 1 > \varepsilon$.¹² This is because high effective tax rates have an aggregate demand cost, but also a relative demand benefit to entrepreneurs. The benefit follows from the fact that a higher effective tax rate

¹²This echoes the result in Auerbach (1985) that the relative magnitudes of own- and cross-elasticities are critical in determining the excess burden of taxation.

gives a higher average price level. Holding the price of an individual firm’s good fixed (as would be the case for sheltered firms), the higher price level benefits the firm’s relative demand. The relative magnitude of the Frisch elasticity of labor supply η and the elasticity of substitution across goods ε determines the net effect of the effective tax rate on profits. The higher is the Frisch elasticity, the greater is the impact of the labor wedge on labor income and the greater is the aggregate demand impact of a higher effective tax rate. The higher is the elasticity of substitution across goods, the more an increase in the price level induces substitution towards tax-exempt goods and the greater is the relative demand impact of a higher effective tax rate. The following proposition summarizes the impact of tax policy on citizens’ utility.

Proposition 1 *Citizens owning a taxed firm prefer a lower tax rate and a narrower base on the margin at any tax rate and any breadth of the tax base. Citizens owning a sheltered firm also prefer a lower tax rate and a narrower base if and only if*

$$(1 - \hat{\tau})^\varepsilon > \frac{\varepsilon - (\eta + 1)}{\varepsilon}. \quad (13)$$

Proof. Appendix A. ■

The proposition ranks utilities, not policy preferences in general, which would incorporate the trade-off between the need to raise public revenues and the costs of taxation. Proposition 1 shows, however, that even in the absence of greater revenue needs, tax-sheltered firms may prefer higher effective tax rates. This may occur only if $\varepsilon > \eta + 1$, i.e. if relative demand dominates aggregate demand in determining the profits of tax-sheltered firms.

The proposition refers to “taxed firms” and “sheltered firms”, but keep in mind that the tax status of any individual product is endogenous, and depends on the breadth of the tax base f . Thus a specific firm may prefer a broader tax base *conditional* on remaining sheltered, as specified in Proposition 1, but not if tax base were broadened to include the firm’s own product.

The possibility that tax-sheltered firms may prefer higher levels of taxation may have some interesting implications, but these go beyond the scope of this paper and needlessly complicates analysis. In what follows, I therefore restrict attention to parameter values such that all citizens, including those that are sheltered from taxation, dislike higher taxes. Formally, I assume (13) holds. Let us define this region of the state space as one where citizens

are *tax averse* and maintain this assumption throughout the remainder of the analysis.¹³

2.3 Marginal and Big Changes to the Tax Base

To illustrate the preferences of an individual citizen, Figure 1 shows the utility of the citizen indexed $j = \frac{1}{2}$: the median voter. The figure shows preferences for $\eta = 1$ and $\varepsilon = \frac{1}{2}$ for graphical convenience, but the insights are not sensitive to this parameterization. The statutory tax rate τ is shown on the x-axis, while the utility of citizen $j = \frac{1}{2}$ is shown on the y axis. Each of the curves represents a different value of f , increasing from a narrow base of $f = 0.1$ on the top to a broad base of $f = 1$ at the bottom.

Proposition 1 states that with $\eta + 1 > \varepsilon$, utility is strictly decreasing in both τ and f , as is evident in the figure. But while utility decreases continuously in the tax rate, there is a discrete downward jump in utility at $f = \frac{1}{2}$. This is the point, at which the tax base broadens to eliminate the median voter’s tax exemption.

The figure helps visualize the best strategy in securing tax reform and foreshadows features of the political equilibrium. Consider an initial tax policy with a tax base of $f = \frac{1}{2}$, and a statutory tax rate of 56%, the point marked in a black dot in the figure. Let us assume that the citizen $j = \frac{1}{2}$ has some degree of veto power over policy. She may derive this veto power from her pivotal role as the median voter—as will be the case in the following section—or from any other source of political power. If the government faces a small shock to government spending and is forced to

¹³Citizens disliking taxes is appealing a-priori, but also holds for realistic parametrizations. To see what it would take to violate (13), let us set η to the lower-end of its estimated range at $\eta = 0.3$, where (13) is less likely to hold. The parameter ε is the elasticity of substitution between varieties of goods. In our case, the relevant elasticity is that between taxed and tax-exempt goods. While some differentiated taxation exists between narrowly defined products, the more relevant elasticity would appear to be between broader categories, such as food items vs. housing vs. automobiles. I therefore set $\varepsilon = 2$, following Broda and Weinstein (2006). Due to notational differences $\varepsilon = 2$ reflects an elasticity of substitution of 3. With these parameters, the effective tax rate $\hat{\tau}$ would need to exceed 41% to violate (13). To put this in further perspective, with a tax base of $f = 80\%$ —almost certainly an overestimate for the U.S., based on CBO estimates (CBO, 2013)—this implies average statutory tax rates τ exceeding 60%. This tax rate is on the higher bound of those observed across the world, and moreover exceeds the peak of the Laffer curve, given the chosen parameter values and the assumed tax base.

raise revenues, it could do so by increasing statutory tax rates, broadening the tax base, or a combination of the two. Assume for a moment that the government wishes to satisfy the new revenue needs with marginal changes in the two tax instruments and consider the views of $j = \frac{1}{2}$ on this matter. A marginal increase in the statutory tax rate would reflect a small shift to the right along the $f = 0.5$ curve in Figure 1 and thus a negligible loss of utility to the median voter. A marginal increase in the tax base, in contrast, would cause a discrete loss in utility, indicated by the “marginal reform” arrow in the figure. Obviously, the median voter would far prefer to finance the increased revenue needs by increasing rates, rather than broadening the base.

This is not necessarily the case, however, when considering large reforms. Let us now relax the restriction that the policymaker must change tax instruments only marginally. The “grand bargain” arrow in the figure shows a shift to another policy that raises the same revenues as the initial tax policy. The new policy increases the utility of the median by a small margin. Broadening the tax base to $f = 1$, rather than marginally, delivers enough revenues to lower the tax rate significantly. The median voter can then be compensated for losing her tax benefit with lower rates and a more efficient tax code.

Notice in (11) that the utility of all sheltered entrepreneurs is the same, regardless of their index. Their index merely determines their tax status. Therefore, not only the median voter, but also *all* tax-sheltered entrepreneurs (all $j \geq \frac{1}{2}$) prefer the “grand bargain” tax reform to the status quo. This means that even if all citizens $j \geq \frac{1}{2}$ have veto power over policy, they would unanimously support the grand bargain policy shift. Collectively, all special interests would forgo their tax benefits, but no individual special interest would give up its tax break unilaterally. A “big bang” reform may be more feasible than a marginal or piecemeal one. In the example presented here, the policy of $f = 1$ would receive unanimous support against the alternative $f = \frac{1}{2}$.

To summarize, a large reform that eliminates many tax benefits is more feasible, politically, than one that attempts to eliminate a single tax preference. Tax reform takes the form of broadening of the tax base and a *reduction* of statutory rates. The latter is necessary because losers from reform are compensated through an increase in aggregate demand, stimulated by a lower effective tax rate. With a broader base, lowering effective tax rates requires lower statutory rates.

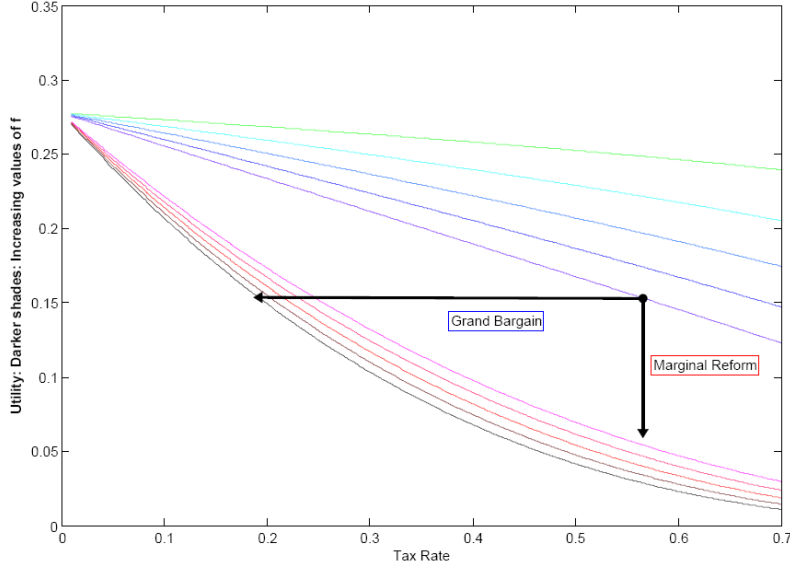


Figure 1: Utility of Citizen $j = \frac{1}{2}$ at a Policy $\{f, \tau\}$

2.4 Policy Preferences

Revenues Policy preferences must take the government's budget constraint into account. The logarithm of tax revenues $\rho(\tau, f)$ in (8) is given by

$$\log(\rho(\tau, f)) = \log \tau + \log f + \eta \log(1 - \hat{\tau}) + \varepsilon \log\left(\frac{1 - \tau}{1 - \hat{\tau}}\right) + \zeta(z, \eta, \varepsilon), \quad (14)$$

where $\zeta(z, \eta, \varepsilon)$ is a term that does not contain the tax instruments f and τ . An increase in either the tax base or the tax rate brings a direct proportional increase in tax revenues, as captured by the first two terms in (14). The remaining terms reflect changes in taxable income due to household incentives. First, an increase in the effective tax rate decreases revenues proportionally to the elasticity of labor supply: the standard disincentive effect of labor taxation. But it is the effective rather than the statutory tax rate that determines the labor wedge.

Tax revenues are further affected by revenue efficiency, captured by the term $\theta \equiv \frac{1 - \tau}{1 - \hat{\tau}}$: the ratio of the statutory and the effective net-of-tax rates. Tax efficiency is decreasing in the tax rate, as a higher rate on the existing tax

base incentivizes substitution into tax-free goods. This gives an additional distortion due to higher statutory tax rates: substitution from taxable to non-taxable activities, lowering tax revenues through an additional channel. The value θ is increasing in the tax base, which reduces the range of tax-sheltered products, making tax avoidance via substitution into tax-sheltered goods more costly.

Policy Preferences of Citizen j We can now solve for the policy preferences of a given citizen given an exogenously-determined need for revenues g . The preferred policy of citizen j is given by

$$\begin{aligned} & \max_{\tau, f} u^j \\ \text{s.t. } & \rho(\tau, f) \geq g. \end{aligned} \tag{15}$$

Recall that citizen j 's utility u^j faces a discrete jump at $f = j$. The maximization problem can be solved in three steps. First, solve the problem with citizen j 's firm sheltered from taxation: $j \geq f$. Second, solve the problem when the firm is taxed: $j < f$. Third, compare the citizen's utility under the two scenarios and chose the policy that provides the citizen with higher utility.

In the first two steps, an interior policy choice satisfies the following optimality condition:

$$MCPF^\tau(j) = MCPF^f(j), \tag{16}$$

where

$$MCPF^\tau(j) \equiv -\frac{\partial u^j}{\partial \tau} / \frac{\partial \rho}{\partial \tau} \quad \text{and} \quad MCPF^f(j) \equiv -\frac{\partial u^j}{\partial f} / \frac{\partial \rho}{\partial f},$$

are the marginal costs of public funds when a unit of tax revenues is raised by increasing the tax rate and broadening the tax base, respectively. This optimality condition is intuitive: the citizen wants both policy instruments to be used up to the point that the private marginal costs of raising an additional unit of revenues using the instruments are equalized.

However, as the following proposition states, the solution to the maximization problem is always a corner solution at $f = j$ or $f = 1$. All citizens prefer raising revenues by broadening the base than by increasing tax rates

as long as this does not affect their own tax status. It is obviously assumed that the value of g is feasible, i.e. that there exists a tax policy $\{f, \tau\}$ that can raise sufficient revenues to finance government purchases.

Proposition 2 *The marginal cost of increasing revenues through an increase in the tax rate exceeds the marginal cost of increasing revenues through broadening the tax base $MCPF^\tau(j) > MCPF^j(j)$, for any $j \neq f$. The optimal tax base for citizen j is either $f = j$ or $f = 1$.*

Proof. Appendix A. ■

Note that a social welfare planner—putting an equal and infinitesimal weight on the discrete tax preferences of all citizens—would always set $f = 1$.

Discussion of Tax Enforcement Costs This last result relies on the assumption that a broader base entails no additional costs. This departs from the literature on the optimal tax base as in Yitzhaki (1979), Wilson (1989) and Slemrod and Kopczuk (2002). In our context this assumption is appealing for four reasons. First, it highlights the *political* impediments, as opposed to administrative constraints, to tax reform. Absent any administrative rationale to restrict tax collection to a narrow set of goods, any limitations to tax collection in equilibrium will be due to political constraints.

Second, while some base-broadening measures would most likely increase administrative costs,¹⁴ others would arguably reduce administrative costs. Proposition 2 highlights the difficulty in explaining failures to expand the tax base in such cases absent political frictions.

Third, when the tax base is chosen optimally, as in the public finance literature, increases in the tax base are always associated with increases in statutory tax rates. Our theory helps explain those cases when the tax base broadens while tax rates decline. (More on this in Section 4.)

Finally, the extreme result in this proposition clearly demarcates the general interest from the special interest in broadening the base. A base-broadening tax reform makes every citizen in the economy better off, with the possible exception of those citizens whose firms are brought into the fold of the tax base.

¹⁴Imputed rent of owner-occupied housing is one such example.

The Marginal Reformer j^R . In searching for the preferred policy for citizen j , we have narrowed the search to two possible tax bases $f \in \{j, 1\}$. I refer to a choice $f = 1$ as *tax reform*, as a move to this base will involve a broadening of the tax base, a simplification of the tax code, a decrease in deadweight losses, and an increase in horizontal equity. It is now interesting to ask which citizens prefer tax reform to any other policy. The following proposition is central in understanding the political prospects for tax reform. It delineates two clear constituencies: one whose preferred policy is tax reform and another comprised of interests who value their tax preferences more than the efficiency that tax reform would bring. These two constituencies are partitioned by a marginal reformer j^R , indifferent between the two.

Proposition 3 *For any feasible revenue need $g > 0$, there is a cutoff citizen $j^R \in (0, 1)$ so that all citizens $j < j^R$ have a preferred tax base of $f = 1$ and all citizens $j > j^R$ have a preferred tax base of $f = j$.*

Proof. Appendix A. ■

There are two separate factors that might determine the marginal reformer j^R : feasibility and preferences. Which of the two is binding depends on parameter values. First, the revenue need g might exhaust the government's fiscal capacity at the tax base of $f = j^R$. That is, revenues of g require taxing at the revenue-maximizing tax rate at the tax base of $f = j^R$. As revenues at this point are increasing in f , no policy $f < j^R$ is feasible, while policies $f > j^R$ are. Citizens $j < j^R$ support tax reform, recognizing that their own tax exemption is not economically feasible.

Second, citizen j^R might be exactly indifferent between tax reform and her own tax exemption, as in Figure 1. If citizen j^R is indifferent, then all $j > j^R$ must prefer $f = j$ to tax reform. As $f = j > j^R$ gives a broader base and higher utility than $f = j^R$, it dominates the latter for citizen j . Similarly all $j < j^R$ prefer tax reform to $f = j$. The online appendix assesses when preferences, as opposed to feasibility, determine j^R .

Proposition 3 delineates two clear constituencies. All citizens $j < j^R$ prefer $f = 1$ to any other tax base and always support a broader over a narrower tax base. All citizens $j \geq j^R$ have $f = j$ as their preferred policy. They strictly prefer any $f \in [j^R, j]$ to $f = 1$ and strictly prefer $f = 1$ to any $f < j^R$ or to $f \in (j, 1)$. Whether reform wins the day depends on how the preferences of these two groups are aggregated.

Revenues and Tax Reform Before turning to the question of preference aggregation in the following section, it is worthwhile outlining comparative statics, giving a central prediction of the model. What determines the value of the cutoff j^R ? Put differently, what determines the size of the constituency for reform. Intuitively, the larger are the deadweight losses caused by raising revenues from a narrow tax base, the more support reform receives and the larger is j^R . Two critical elasticities are naturally η and ε : the Frisch elasticity of labor supply and the elasticity of substitution across varieties, respectively. Higher values of these two parameters imply that it is easier to avoid taxation by substituting from taxed goods to leisure or to tax deductible goods. With such substitution, raising tax revenues becomes more difficult and the aggregate demand losses of allowing a narrow tax base are larger. One might expect j^R to be higher for higher values of these elasticities.

It also seems plausible that support for tax reform increases with the revenue needs of the government. Raising higher revenues on a narrow base may be more difficult and might require more distortionary taxation. This intuition can be derived formally at two extremes. The following proposition states that the coalition for tax reform collapses to an empty set as revenue needs go to zero, while all citizens support tax reform for high revenue needs.

Proposition 4 *As revenue needs approach zero ($g \rightarrow 0$), the marginal supporter of tax reform j^R goes to zero. There exists a revenue need, above which $j^R = 1$ and all citizens preferred policy is tax reform $f = 1$.*

Proof. Appendix A. ■

Figure 2 shows that this result holds away from the two extremes suggested in Proposition 4. It shows j^R as a function of the revenue requirement g , given as a percentage of GDP. This relationship is shown for four parametrizations. In all four—and other—parametrizations, j^R is monotonically increasing in g . The four curves also illustrate that higher elasticities (η and ε) lead to higher values of j^R . The horizontal line shows $j^R = \frac{1}{2}$, giving the revenue needs at which a majority of citizens support tax reform.¹⁵

¹⁵ j^R may be determined by the feasibility of raising revenues at $f = j^R$ or by the desirability to do so for citizen $j = j^R$. The kinks in a couple of the curves in Figure 2 is caused by a change in which of the two of these is binding as g increases.

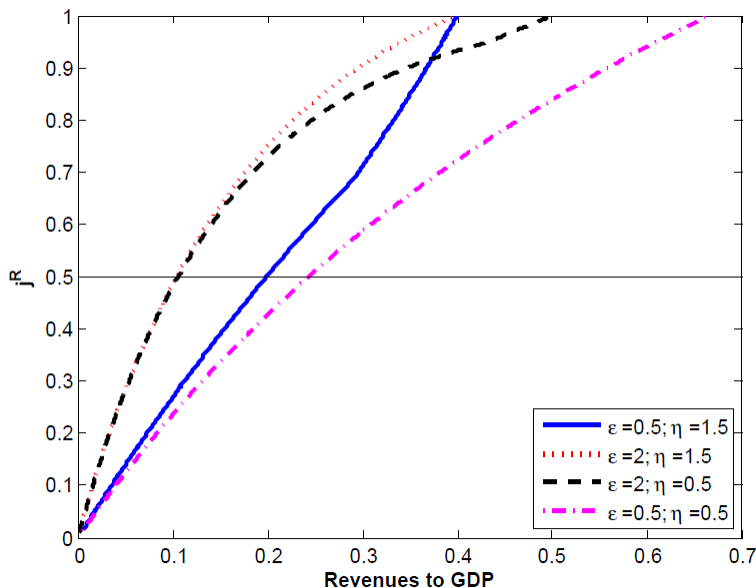


Figure 2: j^R , Revenue Needs, and Elasticities

3 Politics

Armed with citizens' preferences and the ranking of their proclivity for reform, we now turn to the positive predictions of the model. Naturally, political outcomes depend on the specifics of public choice institutions and mechanisms. Proposition 3 delineates one clear constituency: citizens $j < j^R$ have tax reform $f = 1$ as their ideal point. The remaining citizens $j \geq j^R$ all prefer their tax benefit to the economic efficiency that tax reform brings. All would support a narrow tax base of $f = j^R$ over a tax reform proposal of $f = 1$. But such a coalition is inherently unstable: all but a measure zero of citizens would agree to broaden the base on the margin. Political outcomes thus depend critically on the extent to which collective action among special interests $j > j^R$ can be enforced as well as the relative political power of citizens to the left and right of the j^R threshold.

For simplicity, I model collective choice in a standard Downsian setting. The online appendix provides extensions that allow for a more general influence function and a role for lobbying by special interests in policy determination.

Condorcet Winner I begin by searching for a Condorcet winner, i.e. a policy that would receive a majority of votes in a bilateral referendum against any other policy. A Condorcet winner exists in the case $j^R > \frac{1}{2}$, but not in the case $j^R \leq \frac{1}{2}$, as outlined in the following proposition.

Proposition 5 *If $j^R > \frac{1}{2}$, there exists a Condorcet winning policy at $f = 1$. If $j^R \leq \frac{1}{2}$, no Condorcet winner exists.*

Proof. Appendix A. ■

The intuition for the first part of the proposition is straightforward: If $j^R > \frac{1}{2}$, the median voter is part of the cohesive coalition for tax reform and this policy is implemented. If $j^R \leq \frac{1}{2}$, only a minority of voters have tax reform as their ideal policy. In a median voter model, there is no direct way to resolve the collective action problem among citizens $j \geq j^R$ to form a unique winning coalition.¹⁶ It is therefore possible to construct a policy that a winning coalition of voters would support in favor of any other policy in a bilateral vote. All citizens prefer a broader base, as long as their own tax status is unaffected by this change. For any $f < 1$, it is possible to broaden the base in such a way that a majority of voters is unaffected; this majority would prefer this broader base. However, there is also a coalition that would prefer any $f \in [j^R, \frac{1}{2}]$ to $f = 1$, by the very definition of j^R . With $j^R < \frac{1}{2}$ this coalition is a majority.

The absence of a Condorcet winner in the case $j^R < \frac{1}{2}$ poses problems of equilibrium existence in pure strategies. We now turn to equilibrium in mixed strategies under a winner-take-all electoral system, where candidates maximize their probability of obtaining a majority of votes. The result is that $f = 1$ is the unique equilibrium if $j^R > \frac{1}{2}$, but tax reform occurs with a lower probability if $j^R < \frac{1}{2}$.¹⁷

Political Model There are two political candidates A and B that are not citizens of the economy described so far. Their sole objective is to maximize their probability of election.

¹⁶A more cohesive set of special interests are studied in the online appendix.

¹⁷An analysis of proportional representation (PR), approximated as in Lizzeri and Persico (2001), with vote-share maximization, is available upon request. One important difference is that the probability of tax reform converges smoothly to 1 as j^R approaches $\frac{1}{2}$ from below under PR, but jumps discretely from zero to 1 under winner take all.

The political game consists of two stages. In the first stage—the voting stage—the two candidates observe the revenue requirement g and formulate their strategy. A strategy for each candidate is a choice of a probability distribution $\phi^A(f^A)$ or $\phi^B(f^B)$, respectively, from which they draw their political platforms. Let $\Phi^A(f^A)$ and $\Phi^B(f^B)$ denote the corresponding cumulative distribution functions. A well-defined probability distribution has $\phi(f) \geq 0$ for all $f \in [0, 1]$ and satisfies $\Phi(f) = 0$ and $\Phi(1) = 1$. Candidates simultaneously draw platforms from their distributions. The platform consists of a tax base f^A or f^B . The corresponding statutory tax rate is uniquely determined by the budget constraint (15). The candidates are fully committed to implement their platform if elected.

Voters observe the platforms f^A and f^B and vote sincerely for their preferred candidate. Each citizen has one vote. Indifferent voters randomize between the two candidates with equal probability. The candidate who receives a majority implements her proposed policy. If both candidates obtain the same vote share, each candidate’s policy is implemented with probability $\frac{1}{2}$.

In the second stage—the economic stage—the economy proceeds as described in Section 2. Citizens choose their labor supply and consumption, firms maximize profits, and citizens’ payoffs are realized, given the tax policy set in the first stage.

Political Equilibrium Not surprisingly, when $j^R > \frac{1}{2}$, the Condorcet-winning policy of $f = 1$ is implemented with probability 1. When $j^R \leq \frac{1}{2}$, in contrast, a large set of equilibria exist, but they all have some common features.

In all equilibria there is a negligible probability that comprehensive tax reform $f = 1$ is implemented. There is a 50% probability that a narrow base in the $[j^R, \frac{1}{2}]$ range is implemented and a 50% chance that a broader base in the $[j^R + \frac{1}{2}, 1]$ range is implemented. The following proposition summarizes the characteristics of equilibrium. I focus on symmetrical equilibria where both candidates draw platforms from the same distribution $\phi(f) = \phi^A(f^A) = \phi^B(f^B)$ with CDF $\Phi(f)$.

Proposition 6 Political Equilibrium. *If $j^R > \frac{1}{2}$, both candidates propose $f^A = f^B = 1$ with probability 1 and each obtains a vote share of $\frac{1}{2}$. The unique equilibrium policy is $f = 1$. If $j^R \leq \frac{1}{2}$, a function $\phi(\cdot)$ constitutes a symmetrical political equilibrium if*

and only if it has the following characteristics.

- 1) There is a 50% probability of proposing a tax base between j^R and $\frac{1}{2}$.
- 2) There is a 50% probability of proposing a tax base between $j^R + \frac{1}{2}$ and 1.
- 3) $\phi(\cdot)$ has an identical distribution in $[j^R, \frac{1}{2}]$ as in $[j^R + \frac{1}{2}, 1]$: $\phi(f) = \phi(f + \frac{1}{2}) \forall f \in [0, \frac{1}{2}]$
- 4) The function $\phi(\cdot)$ does not contain any mass points.

Proof. The paragraphs that follow provide a proof that the conditions above are sufficient for an equilibrium. The proof of their necessity is relegated to the online appendix. ■

The intuition of the first part of the proposition is simple. The policy $f = 1$ is the preferred policy of a measure j^R of the population. If $j^R > \frac{1}{2}$, proposing this policy gives a candidate a vote share of no less than 50% and thus a probability of no less than 50% of winning. This clearly dominates any other strategy.

Figure 3 illustrates an equilibrium for the case $j^R \leq \frac{1}{2}$. The proposition states that that $\phi(\cdot)$ looks identical in the ranges $F^L \equiv [j^R, \frac{1}{2}]$ and $F^H \equiv [j^R + \frac{1}{2}, 1]$, with a cumulative 50% probability of drawing a policy in either of these ranges. There is a zero probability of drawing a tax base outside F^L or F^H .

To see why this constitutes an equilibrium, it is first useful to note that any proposal $f^A \geq j^R$ defeats another proposal $f^B \geq j^R$ if and only if f^A proposes a broader base, without removing tax exemptions from more than 50% of citizens, relative to f^B . Citizens whose tax status is the same under both proposals prefer a broader tax base, but citizens $j \geq j^R$ prefer a tax exemption to a broader base.

With a symmetrical distribution as in Figure 3, a platform f^A in F^H then defeats all proposals f^B drawn from F^H such that $f^B < f^A$. The platform defeats all proposals in F^L that are *greater* than $f^A - \frac{1}{2}$. As the distributions F^H and F^L are symmetrical, this adds up to a 50% chance of a proposal f^A winning against a proposal f^B drawn from the distribution. A similar logic applies to policies drawn in F^L .

No proposal outside F^L or F^H is a profitable deviation. A proposal $f^A < j^R$ loses against all proposals in F^L (and possibly some in F^H) and thus cannot give a vote share of more than 50%. Any proposal in $[\frac{1}{2}, \frac{1}{2} + j^R]$ loses to proposals in F^H and obtains 50% of the vote. The PDF $\phi(f)$ in Figure 3 is therefore an equilibrium. In the online appendix, I provide a proof that any equilibrium must have similar characteristics as described in

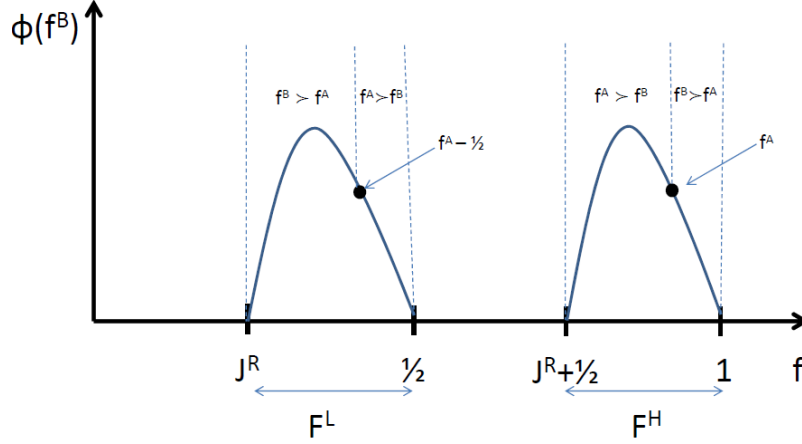


Figure 3: Probability Distribution $\phi(f)$ in a Political Equilibrium

Proposition 6.¹⁸

Characteristics of Political Equilibrium Predictions of the model are sharper when $j^R > \frac{1}{2}$ and the unique equilibrium is tax reform $f = 1$. As is often the case with mixed-strategy equilibria, predictions are slightly murkier when $j^R < \frac{1}{2}$. A comparison between the two does, nevertheless, deliver some insights.

When revenue needs cross the $j^R = \frac{1}{2}$ threshold, policy changes discontinuously from a narrow base—a comprehensive tax base of $f = 1$ is a zero probability event—to comprehensive reform. Below this threshold there is a 50% probability that a broad, but incomplete, tax base is proposed (in the F^H range) and as j^R approaches $\frac{1}{2}$, this proposal becomes closer to comprehensive tax reform (in the sense that it incorporates a base that approaches 1). Nevertheless, as long as $j^R \leq \frac{1}{2}$, there is always a 50% probability that a narrow base is chosen within F^L . This probability is eliminated discontinuously at $j^R = \frac{1}{2}$.

The probability of disagreement among political candidates also changes

¹⁸The nature of equilibrium echos Lizzeri and Persico (2001), where a public good is provided with probability one if its value is large enough relative to the value of targeted transfers. Here, the “public good” is tax reform whose value relative to rents generated by tax exemptions is determined endogenously through the economic structure of the model.

discontinuously at $j^R = \frac{1}{2}$. When $j^R \leq \frac{1}{2}$, the probability that both candidates propose the same platform is zero and there is a 50% chance that they propose platforms in different ranges (F^L vs. F^H). Neither political party is likely to propose comprehensive tax reform ($f = 1$), but it is likely that one political party will adopt the mantle of some tax reform measure (F^H), with the other defending tax exemptions (F^L). The latter cultivates special interests through tax exemptions, while the former calls for a broader base, hoping to alienate less than 50% of voters in the process. In contrast, when tax revenue needs increase to the tipping point where j^R exceeds $\frac{1}{2}$, the nature of political changes. Tax reform becomes political consensus, and both political parties put forth comprehensive tax reform proposals. This occurs because the majority of voters have internalized the need for tax reform.

Summary of Findings

1. “Grand bargains” for comprehensive reform may be possible, even when marginal reforms appear politically infeasible. (See Figure 1.)
2. Politically feasible tax reform is likely to involve a broadening of the tax base and a *reduction* in statutory marginal tax rates. (See Figure 1.)
3. Political support for tax reform is increasing in the government’s revenue requirements (Proposition 4 and Figure 2).
4. A threshold level of revenues triggers a “reform moment”, where the probability of reform increases discretely (Proposition 6).
5. At such a reform moment, broad political consensus emerges for tax reform (Proposition 6).

4 Tax Reform in Recent History

In this section I contextualize the model in light of some historical experiences of tax reform in a number of countries.

United States The landmark tax reform of the past several decades in the United States was the Tax Reform Act of 1986. Its main objectives were to simplify the tax code, broaden the tax base and increase fairness, primarily considering horizontal equity—all features of tax reform as described in the theory. Revenue needs were perceived to be great at the time, with a federal budget deficit in excess of 5% of GDP that year. Some prominent Republican leaders, including Senate Majority Leader Robert Dole initially opposed revenue-neutral tax reform because they believed that deficit reduction should take priority (Birnbaum and Murray 1987, *Kindle Loc. 301*). This is consistent with the model, where high revenue needs trigger tax reform.

Nevertheless, reform was ultimately designed to be revenue-neutral, with significant reductions in marginal tax rates combined with base-broadening measures. Accounts of the political process suggest that a combination of reductions in tax rates and broadening the tax base were necessary for the enactment of the Tax Reform Act.

Support for the Tax Reform Act was bipartisan, passing the Senate 74 to 23 and the House of Representatives by 292-136.¹⁹ The political process lead to compromise between uncommon political bedfellows. As Birnbaum and Murray (1987) state:

“Merging the lower rates of the supply-siders with the base-broadening of the liberal tax reformers was the glue that held the 1986 tax bill together... The ability of this unholy alliance to stick together throughout an arduous process... was the key to success.” *Kindle Loc. 162*.

The change in the tax code was significant, rather than marginal, with top marginal tax rates dropping from 50% to 28%. Again, Birnbaum and Murray (1987) write:

“Congress was a slow and cumbersome institution that usually made only piecemeal, incremental changes. Tax reform proposed something very different: a radical revamping of the entire tax structure.” *Kindle Loc. 504*.

¹⁹The initial Senate vote prior to the Conference Committee was close to unanimous at 97 to 3, demonstrating the breadth of support for tax reform in general.

It is interesting to contrast the 1986 experience with the 1981 Economic Recovery Act and the 1984 Deficit Reduction Act. These were two of a series of tax changes enacted during President Reagan’s first term in office. Although the 1981 act was larger in its overall revenue implications than the 1986 reform—the latter was intended to be roughly revenue neutral—its main objective was to lower the overall tax burden rather than a wholesale reform of the tax system. The 1984 law was passed due to concerns over the government deficit (Romer and Romer, 2010). These smaller changes in the tax code correspond more closely to the predictions of Yitzhaki (1979) and Wilson (1989), as the tax rate and the tax base moved in the same direction. Alongside cuts in marginal income and corporate tax rates included in the 1981 bill, new depreciation guidelines decreased the tax base as well. The 1984 bill, designed to increase revenues, reduced tax benefits for tax-exempt entity leasing and other base-broadening measures. In contrast, the large, tax reform grand bargain of 1986 saw the tax base and tax rate moving in opposite directions. This is inconsistent with the predictions of models where administrative costs are the main barrier to base broadening policies, but coherent with the theory presented in this paper.

Canada In other countries, tax reform has followed similar patterns. The main objective of Canada’s “1985 Plan” was the reduction of the Federal deficit: It came amidst a significant effort to consolidate the Federal budget. The plan was, however, accompanied by proposals to reform the Canadian tax code. (See Sancak, Liu and Nakata, 2011.) These led to legislation in 1987 that broadened the personal and corporate tax base and eliminated deductions, while lowering corporate tax rates.

The second phase of tax reform was introduced in 1991, with a reform of the sales tax. The reform replaced the 13.5% Manufacturers’ Sales Tax with a 5% Goods and Services Tax, introduced a more transparent tax that provided a more equal treatment of business, thus broadening the sales-tax base alongside the lower tax rates.

Germany The German tax reform of 2000—passed after a decade of debates—was discussed in the context of fiscal consolidation. Chancellor Gerhard Shroeder’s initial proposals were for fiscal consolidation and tax cuts. (See IMF, 1999; IMF, 2000; and Breuer, Gottschalk, and Anna Ivanova, 2011.) The theory in this paper provides a rationalization for these seemingly

contradictory aims. Prior to the reform, the corporate tax base was so narrow that the 45% statutory rate on retained earnings raised only 2% of GDP in revenues (IMF, 2000). Corporate tax reform involved a broadening of the tax base, limitations to depreciation allowances, and lowering top marginal tax rates. Personal income tax rates were also decreased, although without substantial changes in the tax base.

The German experience may also highlight the broader applicability of the political economy of reform presented in this paper. Not only was corporate tax reform comprehensive, rather than a marginal elimination of individual tax benefits, but was also bundled together in a broader reform agenda. Tax reform was one element of the Agenda 2010 reform plan of the Schroeder administration. Rather than taking a piecemeal approach to reform, as would be advocated by a gradualism, Schroeder proposed reforming several aspects of economic policy simultaneously.²⁰ The reform package included labor market reforms, social benefit reform, and tax reform. A gradualist view to reform would suggest that such an ambitious agenda is foolhardy or doomed to failure. Our theory provides some insights on the political viability of such a grand policy of reform. While each individual reform proposal had winners and losers, the general equilibrium benefits of wide-sweeping reform may have been sufficient to compensate losers. The bundling of reforms may have been a recipe for success rather than a formula for failure.

Latin America Mahon (2004) and Focanti et al (2013) conduct panel regressions of determinants of tax reform in Latin America and both find that high inflation was the main domestic driver of tax reform. Given that high inflation in the region has often been due to fiscal pressures, this too is consistent with the theory that revenue needs are a stimulant for tax reform. Sanchez (2006) reviews the history of and political forces motivating tax reform in Latin America. He describes tax reforms undertaken in Latin America over the past three decades “to create simpler, more efficient tax systems with a greater emphasis on indirect taxes of broader bases, and more moderate marginal tax rates.” (pp. 772) He too cites the debt crises of the 1980s as the leading domestic forces towards reform.

²⁰The Agenda 2010 reform program was first announced in March 2003. See http://germanhistorydocs.ghi-dc.org/sub_document.cfm?document_id=3973

Sweden The Swedish tax reform of 1991 was dubbed by some the “tax reform of the century” (Agell et al, 1996). The reform involved a significant reduction in personal income tax rates, estimated to lose as much as six percent of GDP in tax revenues. A large part of these reductions in marginal tax rates were financed by a broadening of the VAT tax base to include goods and services that were previously exempt, as well as the elimination of tax loopholes. Consistent with the model, tax reform passed in the aftermath of a fiscal crisis, with the debt to GDP ratio increasing from 40% of GDP in 1980 to over 60% by the middle of the decade and a currency crisis following at the end of the decade. The reform was passed by a left-wing government, in what was viewed as a shift in policy, consistent with consensus for tax reform at a reform moment, predicted by the theory.

United Kingdom In the United Kingdom, the 1980s and early 1990s were also periods of tax reform, partially stimulated by debt consolidation attempts. (See Ahnert, Hughes and Takahashi, 2011.) In 1980, the Thatcher government faced a fiscal deficit of 4.8%. After failed attempts by his predecessor to rein in the deficit, Chancellor Nigel Lawson presented a plan in 1984 that envisaged a deficit reduction of nearly four percentage points. The lion’s share of the consolidation came on the expenditure side, while tax reform measures were planned to be roughly revenue neutral. The reform package included a reduction in the corporation tax rate from 52% to 35%, financed by base-broadening measures.

Recent Events Recent discussions of tax reform in the U.S. have arisen again in a time of budget consolidation. Alongside debates about the relative merits of expenditure cuts and tax increases, a debate has also emerged as to whether new revenues should come through increases in marginal tax rates or broadening the tax base. Again, as in the Tax Reform Act of 1986, there have been strong political pressures to compensate for base-broadening measures with decreases in marginal rates. (See for example the House of Representative’s Committee on the Budget Budget proposal in 2014: <http://budget.house.gov/>.)

The European sovereign debt crisis has also brought tax reform to the forefront. This is consistent with the theory presented here, where large revenue needs trigger tax reform. While it is still early to predict whether any significant reform will be enacted, nor what form it will take, there are

some early indicators of reforms along the lines suggested here. The Financial Times predicts that

“At the heart of the overhaul [of the Spanish tax code] will be an election-friendly move to lower marginal rates on income and corporate tax. The headline reductions will be balanced by steps to broaden the tax base, mostly by eliminating some of the exemptions and deductions that litter the system.” Financial Times, February 10, 2014.

The notion that base-broadening measures will have to “bought” with lower tax rates seems to be on the minds of reform-oriented politicians.

In summary, several of the largest successful efforts to reform the tax code in the U.S. and other industrialized countries in the past few decades seem to conform with the general features of the model. Tax reform successfully passes through the political process as alongside efforts to reign in deficits—in times of high revenue needs. They often involve broadening the tax base, used to finance reductions in marginal tax rates. Reforms were often comprehensive, eliminating many tax breaks in one fell swoop, rather than gradualist. In some instances these gained broad and bipartisan support that was unexpected to political observers at the time.

5 The Role of Uncertainty

In the analysis thus far, citizens knew their pecking order in terms of taxability. This section extends the analysis to incorporate uncertainty about citizens’ ranking and explores the role of uncertainty in driving tax reform.

Prior to the voting stage, each citizen observes a noisy signal \tilde{j} of her actual ranking j . This could be, for example, based on the firm’s past tax status. After the voting stage, but prior to the economic stage, citizens learn their actual ranking. With probability $1 - q$, their rankings are indeed \tilde{j} ; with probability q , the citizens’ rankings are drawn randomly from a uniform distribution.²¹ q is thus an indicator of the degree of citizens’ uncertainty about the distribution of tax benefits.

²¹The assumption that in the case of a newly drawn ranking the citizen ranked $j = 1$ also becomes the provider of the public good simplifies the exposition. I will therefore follow this assumption.

Citizen j 's supply of labor is governed by (9) and consumption is given by (10). Using these equilibrium conditions in (1), citizens' expected utility if j is drawn from a uniform distribution, is therefore

$$Eu = \eta^\eta \left(\frac{z(1-\hat{\tau})}{\mu} \right)^{\eta+1} \left(\frac{1}{\eta+1} + \frac{1}{\varepsilon} \right).$$

The indirect utility of a citizen with $\tilde{j} < 1$ in the voting stage is

$$Eu^{\tilde{j}} = \eta^\eta \left(\frac{z(1-\hat{\tau})}{\mu} \right)^{\eta+1} \left(\frac{1}{\eta+1} + \frac{q}{\varepsilon} + \frac{1-q}{\varepsilon} \frac{1 - \tau(f, \tilde{j})^{\varepsilon+1}}{(1-\hat{\tau})^\varepsilon} \right).^{22}$$

Greater uncertainty increases the weight a citizen puts on aggregate demand and lowers the weight she puts on her own tax benefit. All else equal, all citizens become more amenable to tax reform as summarized in the following proposition.

Proposition 7 *j^R is monotonically increasing in q . If a citizen prefers tax reform $f = 1$ to $f = \tilde{j}$ for some level of uncertainty, she prefers tax reform to $f = \tilde{j}$ for all higher degrees of uncertainty $q' > q$.*

Proof. In the online appendix. ■

This result echoes, but contrasts with, the assessment of Fernandez and Rodrik (1991). In their analysis, as here, uncertainty increases support for policy whose distributional implications is more certain. In Fernandez and Rodrik (1991), the status quo provides greater clarity on policy's individual implications. Citizens are reluctant to embark on the path to reform, with its uncertain distributional impact, even if reform is known to be welfare-improving. Greater uncertainty about the nature of redistribution under reform harms its prospects.

Uncertainty in this model is on a different dimension. High q may reflect greater uncertainty about the relative power of various special interests or less transparency as to how the tax code will be applied and enforced. Greater uncertainty along these dimensions increases support for tax reform. Truly comprehensive reform brings horizontal equity, simplicity, and clarity. Well designed reform might have clearer distributional implications than the status quo.

²² Eu^j does not converge smoothly to Eu as $q \rightarrow 1$, because at $q = 1$ citizens with $j < 1$ lose a chance to supply the public good.

6 Concluding Remarks

The enactment of tax reform is a highly political process. Reformers' desire to bring about a simpler, more efficient, and "fairer" tax system is often stonewalled because of the distributional consequences of such change. This paper proposes a tractable model of the political economy of tax reform. When revenue needs are low, these can be met more easily with narrow tax bases. Voters focus on securing parochial tax benefits, each of which has a only minor implications for overall efficiency, but combined may bring significant deadweight losses. Greater revenue needs are more difficult and more costly to fund with a narrow tax base. Voters become increasingly willing to forgo their own tax breaks in favor of efficiency as revenues increase. A tipping point arrives where tax reform is feasible.

Politically feasible reform, however, may not be etching at the margin of the tax code, but a significant overhaul of the tax system. This contrasts with the common view that small changes entail smaller political costs than big ones do. When direct compensation for lost benefits is impossible, a special interest blocking reform can only be compensated via the general equilibrium benefits it brings. These benefits are small if only one special interest is confronted. But forging a grand bargain where a number of special interests is targeted simultaneously may improve efficiency sufficiently to compensate all losers. This points to the potentially broader applicability of the insights of this paper. Gradualism in reform suggests politicians should take on special interests one at a time. The analysis in this paper shows why it might be less costly for politicians to take on a large number of special interests at the same time.

I hope this study will stimulate further interest in formal analysis of the political economy of tax reform. Social choice in this model is through a simple voting model. Some extensions including special interests and more general political preferences are explored in the online appendix. But this is admittedly not the final word on the rich legislative processes involved in the passage of tax reform. I have no doubt that more could be said on the role of special interests in determining the tax code. Of particular interest is the collective action problem involved in "big bang" reforms studied here. Much has been written about the collective action problem *within* special interest groups (see Olsen, 1971, for example), but a large reform may require coordination *across* special interests as well. This paper illustrates why all special interests might agree to forgo their tax benefits collectively, but not

individually. This obviously creates a free-rider problem that may be worthy of further inquiry. Agenda setting and framing of policy choices may give politicians a central role in coordinating special interests towards the common good.

I have assumed that changes in the tax base come about only through policy. In addition, in this setting, a tax reform induced by a shock (to revenues, for example) is reversed once the shock subsides. Casual observation suggests that erosion of the tax base occurs through a qualitatively different process than its expansion. The private sector devotes much energy to minimize payments under a given tax code, and much of the depreciation of the tax base occurs due to individual, rather than collective decisions. It may be interesting to consider private responses to tax reform, and how they feed back into the political process that determines tax policy.

A narrow tax base causes labor misallocation, with excessive production of tax-exempt goods. The model highlights that this affects the labor wedge, but has no effect on aggregate productivity, as firms are homogeneous in their productivity. The impacts of misallocation on total factor productivity is a growing field of macroeconomic inquiry.²³ The framework studied here may help shed light on the political determinants of misallocation and thus indirectly on questions of economic development. The online appendix introduces firms with heterogeneous productivities as a step in that direction. Introducing capital as a factor of production may also be of interest.

In a world increasingly open to trade and capital flows, there may be international implications as well. The importance of the aggregate demand channel favoring tax reform might be diminished in a small open economy. The demand for an open economy's goods is determined partly by tax policy elsewhere. In addition "tax competitiveness" may be a separate pressure for tax reform in such a setting, particularly with respect to corporate taxation.

Finally, I have ignored considerations of vertical equity in this analysis. This omission was intentional, to emphasize political forces, rather than equity considerations, driving redistribution. A study of the interaction between vertical and horizontal equity may also prove fruitful.

²³See Restuccia and Rogerson (2013) for a literature review.

References

- [1] Acemoglu, Daron and James A. Robinson, 2000. "Political Losers as a Barrier to Economic Development," *American Economic Review*, vol. 90(2), pages 126-130, May.
- [2] Ahnert, Toni, Richard Hughes, and Keiko Takahashi, 2011. "United Kingdom: Four Chancellors Facing Challenges," In *Chipping Away at Public Debt*, ed. Paolo Mauro. Hoboken, New Jersey: John Wiley & Sons.
- [3] Alesina, Alberto and Allan Drazen, 1991. "Why Are Stabilizations Delayed?," *American Economic Review*, vol. 81(5), pages 1170-88, December.
- [4] Alt, James, Ian Preston and Luke Sibieta, 2009. "The Political Economy of Tax Policy." In: *Dimensions of Tax Design: The Mirrlees Review*. Oxford, UK: Oxford University Press.
- [5] Auerbach, Alan J., 1985. "The theory of excess burden and optimal taxation," in: Alan J. Auerbach and Martin Feldstein (ed.), *Handbook of Public Economics*, edition 1, volume 1, chapter 2, pages 61-127 Elsevier.
- [6] Birnbaum, Jeffery H. and Alan S. Murray, 1987. *Showdown at Gucci Gulch*. New York: Random House.
- [7] Breuer, Christian, Jan Gottschalk, and Anna Ivanova, 2011. "Germany: Fiscal Adjustment Attempts With and Without Reform," In *Chipping Away at Public Debt*, ed. Paolo Mauro. Hoboken, New Jersey: John Wiley & Sons.
- [8] Besley, Timothy and Stephen Coate, 1998. "Sources of Inefficiency in a Representative Democracy: A Dynamic Analysis," *American Economic Review*, vol. 88(1), pages 139-56, March.
- [9] Besley, Timothy and Torsten Persson, 2011. *Pillars of Prosperity* Princeton, NJ: Princeton University Press.
- [10] Broda, Christian and David E. Weinstein. 2006. "Globalization and the Gains from Variety" *The Quarterly Journal of Economics*, Vol. 121, No. 2, pp. 541-585.

- [11] Castanheira, Micael, Gaetan Nicodème, and Paloa Profeta, 2012. “On the Political Economics of Tax Reforms: Survey and Empirical Assessment.” Working paper.
- [12] Congressional Budget Office, 2013. “The Distribution of Major Tax Expenditures in the Individual Income Tax System,” Congressional Budget Office report, May.
- [13] Dewatripont, Mathias and Gerard Roland. 2002. “Economic Reform and Dynamic Political Constraints,” *The Review of Economic Studies*, Vol. 59, No. 4, pp. 703-730
- [14] Dixit, Avinash K., 1975. “Welfare effects of tax and price changes,” *Journal of Public Economics*, vol. 4(2), pages 103-123, February.
- [15] Dixit, Avinash K., and Joseph E. Stiglitz , 1977. “Monopolistic Competition and Optimum Product Diversity,” *American Economic Review*, vol. 67(3), pages 297-308, June.
- [16] Feldstein, Martin, 1976. “On the theory of tax reform,” *Journal of Public Economics*, Elsevier, vol. 6(1-2), pages 77-104.
- [17] Fernandez, Raquel and Dani Rodrik, 1991. “Resistance to Reform: Status Quo Bias in the Presence of Individual-Specific Uncertainty,” *American Economic Review*, vol. 81(5), pages 1146-55, December.
- [18] Focanti, Diego, Mark Hallerberg and Carlos Scartascini, 2013. “Tax Reforms in Latin America in an Era of Democracy,” *IDB Working paper* IDB-WP-457.
- [19] Golosov, Michael, Aleh Tsyvinski and Nicolas Werquin, 2013. “Dynamic Tax Reforms,” Mimeo: Yale University.
- [20] Grossman, Gene M. and Elhanan Helpman, 2002. “Special Interest Politics,” Cambridge, MA: The MIT Press.
- [21] Hettich, Walter and Stanley Winer. 1984. “A Positive Analysis of Tax Structure,” *Journal of Public Economics*
- [22] International Monetary Fund, 1999. “Germany: Staff Report for the 1999 Article IV Consultation.” *IMF Staff Country Report* No. 99/129. International Monetary Fund.

- [23] International Monetary Fund, 2000. "Germany: Selected Issues." *IMF Staff Country Report* No. 00/142. International Monetary Fund.
- [24] Jain, Sanjay and Sharun W. Mukand, 2003. "Redistributive Promises and the Adoption of Economic Reform," *American Economic Review* 93(1), pages 256-264, March.
- [25] Lau, Lawrence J., Yingyi Qian and Gerard Roland. 2000. "Reform without Losers: An Interpretation of China's Dual-Track Approach to Transition," *Journal of Political Economy*, Vol. 108, No. 1, pp. 120-143
- [26] Lizzeri, Alessandro and Nicola Persico, 2001. "The Provision of Public Goods under Alternative Electoral Incentives" *The American Economic Review*, Vol. 91, No. 1, pp. 225-239.
- [27] Mahon, James .E., Jr., 2004. "Causes of Tax Reform in Latin America, 1977-95." *Latin American Research Review* 39(1): 3-30
- [28] Olsen, Macur. 1971. *The Logic of Collective Action: Public Goods and the Theory of Groups*, 2nd edition, Harvard University Press: Cambridge, MA.
- [29] Persson, Torsten and Guido Tabellini, 2002. *Political Economics: Explaining Economic Policy* Cambridge, MA: The MIT Press.
- [30] Restuccia, Diego and Richard Rogerson (2013). "Misallocation and Productivity," *Review of Economic Dynamics*, 16(1).
- [31] Romer, David H. and Romer, Christina D., 2009. "A Narrative Analysis of Postwar Tax Changes." Mimeo: University of California.
- [32] Sancak, Cemile, Lucy Quian Liu, and Taisuke Nakata, 2011. "Canada: a Success Story," In *Chipping Away at Public Debt*, ed. Paolo Mauro. Hoboken, New Jersey: John Wiley & Sons.
- [33] Sanchez, Omar, 2006. "Tax System Reform in Latin America: Domestic and International Causes," *Review of International Political Economy*, 13 (5), pages 772 - 801.
- [34] Slemrod, Joel and Wojciech Kopczuk, 2002. "The optimal elasticity of taxable income," *Journal of Public Economics*, vol. 84(1), pages 91-112, April.

- [35] Tyson, Justin, 2014. “Reforming Tax Expenditures in Italy: What, Why, and How?” IMF Working Paper WP/14/7.
- [36] Wilson, John Douglas, 1989. “On the Optimal Tax Base for Commodity Taxation,” *American Economic Review*, vol. 79(5), pages 1196-1206, December.
- [37] Yitzhaki, Shlomo, 1979. “A Note on Optimal Taxation and Administrative Costs,” *American Economic Review*, vol. 69(3), pages 475-80, June.

A Appendix: Proofs

Throughout, let

$$T \equiv 1 - \tau; \quad \hat{T} \equiv 1 - \hat{\tau}; \quad \theta \equiv \frac{1 - \tau}{1 - \hat{\tau}}.$$

A.1 Proposition 1

For an owner of a taxed firm $j \leq f$, we have

$$\frac{\partial u^j}{\partial \tau} = -\eta^\eta \left(\frac{z\hat{T}}{\mu} \right)^{\eta+1} \left[\frac{f\theta^{\varepsilon-1}}{\hat{T}} + \frac{\theta^\varepsilon}{\varepsilon} [(\eta+1)f\theta^\varepsilon + \varepsilon(1-f\theta^\varepsilon) + 1] \right] < 0$$

and

$$\frac{\partial u^j}{\partial f} = \eta^\eta \left(\frac{z\hat{T}}{\mu} \right)^{\eta+1} \frac{1}{\hat{T}} \left[1 - \hat{T}\theta^{\varepsilon+1} + \frac{\eta+1}{\varepsilon} \hat{T}\theta^{\varepsilon+1} \right] \frac{\partial \hat{T}}{\partial f} \leq 0,$$

as $\theta < 1$ and $\hat{T} < 1$ and

$$\frac{\partial \hat{T}}{\partial f} = -\frac{1}{\varepsilon} \frac{1 - T^\varepsilon}{\hat{T}^{\varepsilon-1}} \leq 0.$$

For any owner of a sheltered firm $j > f$, we have

$$\frac{\partial u^j}{\partial y} = \eta^\eta \left(\frac{z\hat{T}}{\mu} \right)^{\eta+1} \frac{1}{\hat{T}} \left(1 + \frac{\eta+1-\varepsilon}{\varepsilon} \frac{1}{\hat{T}^\varepsilon} \right) \frac{\partial \hat{T}}{\partial y}, \quad (17)$$

for $y \in \{f, \tau\}$. Noting that $\frac{\partial \hat{T}}{\partial f} < 0$ and $\frac{\partial \hat{T}}{\partial \tau} = -f\theta^{\varepsilon-1} < 0$, then $\frac{\partial w^j}{\partial \tau} < 0$ and $\frac{\partial w^j}{\partial f} < 0$ iff

$$\hat{T}^\varepsilon > \frac{\varepsilon - (\eta + 1)}{\varepsilon}.$$

A.2 Proposition 2

Using (14), we have

$$\begin{aligned} \frac{\partial \log \rho}{\partial \tau} &= \frac{1}{\tau} + \frac{\eta - \varepsilon}{\hat{T}} \frac{\partial \hat{T}}{\partial \tau} - \frac{\varepsilon}{T} \quad \text{and} \\ \frac{\partial \log \rho}{\partial f} &= \frac{1}{f} + \frac{\eta - \varepsilon}{\hat{T}} \frac{\partial \hat{T}}{\partial f}. \end{aligned}$$

Then for sheltered firms,

$$MCPF^\tau(j) > MCPF^f(j) \Leftrightarrow \quad (18)$$

$$\frac{f\theta^{\varepsilon-1} \left(1 + \frac{(\eta+1-\varepsilon)}{\varepsilon} \frac{1}{\hat{T}^\varepsilon}\right)}{\frac{1}{\tau} - \frac{\eta}{T} f\theta^\varepsilon - \varepsilon \frac{1-f\theta^\varepsilon}{T}} > \frac{\frac{1}{\varepsilon} \frac{1-T^\varepsilon}{\hat{T}^{\varepsilon-1}} \left(1 + \frac{(\eta+1-\varepsilon)}{\varepsilon} \frac{1}{\hat{T}^\varepsilon}\right)}{\frac{1}{f} + \left(1 - \frac{\eta}{\varepsilon}\right) \frac{1-T^\varepsilon}{\hat{T}^\varepsilon}},$$

using (17). If citizens are tax averse, then this is equivalent to

$$1 - \tau - \varepsilon\tau - (1 - \tau)^{\varepsilon+1} < 0.$$

This inequality thus holds for all $\tau > 0$, so that sheltered firms always prefer tax base increases to tax rate increases, as long as this does not change their tax status.

Turning to taxed firms, it is easy to show that

$$\frac{\partial w^j}{\partial \tau} / \frac{\partial w^j}{\partial f} > \frac{\partial \hat{T}}{\partial \tau} / \frac{\partial \hat{T}}{\partial f}$$

The former is the ratio $MCPF^\tau(j)/MCPF^f(j)$ for taxed firms, while the latter is equal to the same ratio for sheltered firms. Thus the former prefer broadening the tax base to increasing the tax rate if the latter do. We have seen above that the latter always prefer raising revenues through increases in f rather than through increases in τ .

The corollary to this proposition is simple to demonstrate. The social welfare planner faces the same constrained maximization problem as does the individual citizen does, but does not face the same discrete jump in the welfare function at any j , so that the solution to the problem is the corner solution $f = 1$.

A.3 Proposition 3

Citizen j prefers reform to $f = j$ if one of two conditions hold. First, if the revenue requirement g cannot be satisfied at $f = j$. Or second, if her utility is higher at $f = 1$ is greater than it is at $f = j$ (and the corresponding tax rates required to satisfy the budget constraint).

If the revenue requirement g cannot be provided at the tax base $f = j$, it can also not be provided at any $f = \tilde{j} < j$. To see this, note that, given the tax base, revenues are maximized at a tax rate $\bar{\tau}$ satisfying

$$\begin{aligned} \frac{1 - \bar{\tau}}{\bar{\tau}} &= (\eta - \varepsilon) f \bar{\theta}^\varepsilon + \varepsilon, \quad \text{where} \\ \bar{\theta} &= \frac{1 - \bar{\tau}}{f(1 - \bar{\tau}) + 1 - f}. \end{aligned} \tag{19}$$

Revenues at this revenue-maximizing tax rate are increasing in the tax base if $\varepsilon > \eta$. If $\eta > \varepsilon$, $\frac{\partial \log \rho(\bar{\tau}, f)}{\partial f} > 0$ is equivalent to

$$(\eta - \varepsilon) f \bar{\theta}^\varepsilon < \varepsilon \frac{(1 - \bar{\tau})^\varepsilon}{1 - (1 - \bar{\tau})^\varepsilon}.$$

Using (19) this holds if and only if

$$1 - \bar{\tau} - \varepsilon \bar{\tau} - (1 - \bar{\tau})^\varepsilon < 0,$$

which holds for all $\tau > 0$. Feasible tax revenues are always increasing in the tax base. We will revisit this result, so summarize it in the following Lemma.

Lemma 8 *At the revenue maximizing statutory tax rate, tax revenues are strictly increasing in the tax base for all $f \in (0, 1)$*

Thus if g cannot be provided at the tax base $f = j$, it can also not be provided at any $f = \tilde{j}$ with $\tilde{j} < j$.

Turning now to the utility comparison between $f = j$ and $f = 1$, let $T(f, g)$ denote the net-of-tax statutory rate that provides revenues of g if the tax base is f and $\hat{T}(f, g)$ denote the corresponding effective net-of-tax rate. Consider a citizen j that prefers tax reform $f = 1$ to the policy $f = j$. I now show that all citizens $\tilde{j} < j$ also prefer tax reform to their tax benefit. Given that all citizens are treated equally under tax reform, it is sufficient to show that \tilde{j} derives lower utility under the policy $f = \tilde{j}$ than citizen j does under $f = j$. This is true if

$$\hat{T}(\tilde{j}, g)^{\eta+1} \left(\frac{1}{1+\eta} + \frac{1}{\varepsilon \hat{T}(\tilde{j}, g)^\varepsilon} \right) < \hat{T}(j, g)^{\eta+1} \left(\frac{1}{1+\eta} + \frac{1}{\varepsilon \hat{T}(j, g)^\varepsilon} \right).$$

Proposition 2 states that $MCPF^\tau > MCPF^f$ for all citizens owning sheltered firms. $MCPF^\tau > MCPF^f$ implies that a revenue neutral broadening of the base (and lowering of rates) increases the utility of a sheltered firm, which is equivalent to this last inequality if $\tilde{j} < j$.

The choice $f = 0$ delivers no revenues and thus violates the budget constraint (15). Citizen $j = 0$ has reform as her ideal policy. For $j = 1$, on the other hand, choosing f slightly below 1 is feasible, as reform provides a measure zero of revenues. Her utility clearly increases discretely by lowering f on the margin to give her (but no-one else) a tax exemption. So $f = j$ is ideal for citizens with indexes sufficiently close to 1. With $j = 0$ preferring reform and $j = 1$ preferring $f = j$, and with citizens ordered in decreasing preference towards tax reform, there must be a cutoff level of j , which we may call $j^R \in (0, 1)$, below which all citizens prefer reform and above which all citizens prefer $f = j$.

A.4 Proposition 4

First consider the case $g \rightarrow 0$. At $g = 0$, tax rates are zero and the utility of taxed and sheltered citizens is equal. If raising the first unit of revenues at a tax base of 1 is less costly to the taxed than raising the first unit of revenues at the narrowest base possible is to the sheltered, then all but a measure zero of citizens prefer a tax benefit to tax reform when revenues are sufficiently small: $j^R \rightarrow 0$ as $g \rightarrow 0$. This is indeed the case as

$$\lim_{\tau \rightarrow 0} MCPF^\tau(j, f = 1) = \frac{\varepsilon + \eta + 2}{\varepsilon + 1} > \frac{\eta + 1}{\varepsilon + 1} = \lim_{\{f, \tau\} \rightarrow \{0, 0\}} MCPF^\tau(j \geq f),$$

where $MCPF^\tau(j, f = 1)$ is the marginal cost of public funds associated with the statutory tax rate, for any citizen j when $f = 1$. $MCPF^\tau(j \geq f)$ is the same marginal cost, for all $j \geq f$ (the sheletered).

Now consider the case as $g \rightarrow \bar{g}$, where \bar{g} is the maximum of feasible revenues.

Lemma 8 implies that revenues are maximized at some $\tau = \bar{\tau} \in (0, 1)$ and $f = 1$. As $\{f, \tau\} \rightarrow \{1, \bar{\tau}\}$, $\frac{\partial \rho}{\partial f} > 0$, but $\frac{\partial \rho}{\partial \tau} = 0$. Thus for all j $MCPF^\tau(j) \rightarrow \infty$, but $MCPF^f(j)$ remains finite. In addition raising revenues by broading the base is feasible, but increasing the statutory rate become counterproductive. Thus at some revenue need below \bar{g} , all citizens prefer $f = 1$ to $f = j$ and $j^R = 1$.

A.5 Proposition 5

When $j^R > 0.5$, all voters $j < j^R$ prefer $f = 1$ to any other policy, and this is the Condorcet winner. If $j^R < 0.5$, no Condorcet winner exists. Any policy proposal $f < 1$ is be dominated by a slightly broader base: all citizens vote for such a measure except (possibly) the small number of citizens whose tax exemption was eliminated. But $f = 1$ is dominated by any $f \in [j^R, \frac{1}{2})$ as this is supported by a measure $1 - f > \frac{1}{2}$ of citizens, who prefer a tax exemption to $f = 1$, by the defition of j^R .