A Positive Theory of Tax Reform*

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Abstract

The political impediments to tax reform and the political forces allowing its success are studied in a model where the tax base and the tax rate are policy instruments. The model predicts that large changes in the tax code are politically feasible even at times when marginal reforms would be rejected. This contrasts with a large literature that suggests that larger reforms face greater political difficulties. Politically feasible tax reform will tend to occur when revenue needs are large, but will nonetheless involve reductions in marginal tax rates. Adopting tax reform may involve large shifts in political platforms. 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.

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1 Introduction

Every decade or so, new proposals to overhaul the U.S. tax system come up for debate. Similar discussions are heard in other countries. Yet debates on tax reform are often politically divisive and the successful passage of significant reform is relatively rare. The ability of governments to raise revenues is an important nexus of economic development, by some accounts, and the very cost of civilization, according to others.\(^1\)

However, even in the most developed polities there are significant limits on the ability of the government to collect revenues from its citizens. Moreover, these limits are often self-imposed through complex legislation. The Congressional Budget Office (CBO, 2013) estimates that the United States Treasury forgoes over one third of potential individual income tax revenues (or a quarter of all Federal revenues) through “tax expenditures”. This forgone revenue would be more than sufficient to finance all U.S. defense spending. While some of these lost revenues were due to outright evasion or difficulties in tax administration, some were lost by the very design of the tax code. Many tax expenditures and other loopholes are not an oversight by governments or due to limited fiscal capacity. Rather, they are intentional measures passed through careful deliberation through the political process.

The purpose of this paper is to provide a tractable model that allows the study of the political and economic forces driving and constraining tax reform. In the economy studied, a government raising revenues chooses not only the tax rate, but also the tax base. This allows a study of the political trade-offs faced when utilizing each of these two tax instruments.

In the model, a broader tax base is always more efficient, as it removes a wedge between the prices of taxed and tax-exempt goods. I abstract from any social or economic justifications for exempting certain activities from taxation. In political equilibrium, certain goods may nevertheless be exempt from taxation. The benefits tax exemptions are large and concentrated, while their costs are diffuse. If a pivotal interest benefits from a tax preference, she will secure such a tax benefit despite its inefficiency. This phenomenon is familiar from our understanding of special interest politics.\(^2\)

The novelty in this paper is the study of the general equilibrium implications of the inefficient policies that result. While a tax preference increases

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\(^1\)See Besley and Persson (2011) and Sachs (2012), respectively.

\(^2\)See, for example, Grossman and Helpman (2002).
the relative demand for a producer’s product, the resulting inefficiencies reduce aggregate demand. The model presented here provides a simple expression to quantify the extent to which the beneficiaries of tax exemptions internalize these general equilibrium losses. When the tax code is sufficiently inefficient, even beneficiaries from tax preferences are willing to forgo their benefits for the sake of tax reform: the elimination of all tax exemptions.

Interestingly, no (small) special interest would ever forgo its tax break in isolation. The benefits of 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 collectively be willing to give up their tax preferences in favor of tax reform. Marginal tax reforms are therefore politically difficult, while “big bang” reforms become feasible via a grand bargain. I derive the size of a grand coalition that would collectively find tax reform desirable.

While the model lends itself to a variety of collective choice frameworks, I study a median voter framework for ease of exposition. In this setting, tax reform is adopted with probability one if the median voter is part of a grand coalition for reform. In an extension, lobbying for tax benefits interacts with voting, yielding similar results.

The model has a number of predictions on the politics of tax reform. First, tax reform is more likely when revenue requirements are high. With high revenue needs, the efficiency costs of a porous tax base are greater; this broadens the support for eliminating tax preferences. Second, there is a tipping point that triggers tax reform. Above a critical revenue threshold, tax reform is adopted with probability one. 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 for a decrease in marginal rates, necessary as compensation to the losers from tax reform. Finally, tax reform may involve a political “grand bargain” and obtain bipartisan support. The model provides conditions when both political parties coalesce in favor of tax reform. These predictions are generally consistent with the political experience of tax reform in the US and other countries. I provide examples and further discussion in Section 4.

While tax reform is synonymous with a broadening of the tax base in this paper, the notion of tax reform studied here is generic enough to incorporate other notions of this concept. Auerbach and Slemrod (1997) identify the triad of equity, simplicity and efficiency as the main objectives (and trade-
offs) in a tax reform. Tax reform in this paper will improve policy on all three dimensions.3

The economic structure of the model draws on the public finance literature on the optimal choice of the tax base. Yitzhaki (1979), Wilson (1989) and more recently Slemrod and Kopczuk (2002) use a similar framework to study the economic trade-off between expanding the tax base and increasing the marginal tax rate to raise revenues. The focus of this literature is on the trade-off between the costs of tax administration and the efficiency of a broader tax base. To my knowledge, this is the first paper to study the political economy of tax policy using this framework. The novelty is the focus on the political, as opposed to administrative, costs of more efficient tax policy.

There is, of course, a large public finance literature on tax reform: See Dixit (1975), Feldstein (1976) and more recently Golosov, Tsyvinski and Werquin (2013). These studies are mostly normative and draw a distinction between tax reform—a marginal movement from an existing tax code to a better one—and optimal tax policy, where the tax code is designed from scratch. This paper differs in providing a positive framework to analyze the political factors driving tax reform. In doing so, the analysis highlights that large reforms may in fact be more feasible, due to political factors, than marginal changes in the tax code.

While the economic application studied here is that of tax policy, this paper provides broader insights on the political economy of reform more broadly. There is a large literature studying why distributive conflict may delay or impede the adoption of reforms that increase aggregate welfare.4 The impediments to tax reform in this paper are most similar to the barriers to trade reform in Grossman and Helpman (2002). There, as in this paper, the benefits of reform are diffuse, while it costs are concentrated. If a special interest is pivotal to policy determination, either due to lobbying in Grossman and Helpman (2002), or due to their electoral power in this paper, it may

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3 Tax reform in this paper improves horizontal equity. The core model has households that are ex-ante identical and thus does not lend itself to a study of vertical equity. In an extension in Section 5, I study a scenario where tax reform improves vertical equity as well.

4 Alesina and Drazen (1991) show how asymmetric information about the relative costs of reform might delay its implementation. Fernandez and Rodrik (1991) describe how the uncertainty about the distributional implications of reform might prevent economically desirable policy to be enacted. Acemoglu and Robinson (2000) postulate that economic reform might be blocked if it also leads to a redistribution of political power. See also Jain and Mukand (2003).
block reform despite its overall efficiency gains.

In our framework, general equilibrium effects further refine Grossman and Helpman’s (2002) insights. The inefficiency of an unreformed tax system is higher under certain conditions—high tax revenue needs, for example. These efficiency losses feed back negatively into the payoffs (profits) of special interests. When the inefficiencies are sufficiently high, the special interests themselves prefer tax reform to their tax benefits. We provide the precise conditions for this to occur.

However, no individual special interest would be willing to forgo its tax benefit unilaterally. I highlight the political importance of a “big bang” reform or a “grand coalition” for reform. In this respect, the findings in this paper relate to Dewatripont and Roland (1992), who advocate gradualism in adopting reforms. Gradualism is optimal as a divide-and-conquer strategy—picking off one anti-reform group at a time—as it minimizes the total compensation required to allow the passage of reform. See also Lau et al (2000) for another argument against “big bang” reforms. Reform, as studied in this paper, does not allow for direct compensation of losers from reform. Instead, they are compensated through the general equilibrium efficiency gains from reform. As these efficiency gains are increasing in the magnitude of reform (while individual costs are decreasing), this provides an argument in favor of larger, rather than piecemeal reforms.

I also touch on the effects of uncertainty on the adoption of reform. Fernandez and Rodrik (1991) argue that uncertainty regarding the beneficiaries from reform may impede its adoption. In Section 5, similar uncertainty is introduced, but turns this logic on its head. In the application studied here, a reformed tax system is horizontally equitable. The distributional implications of reform are therefore more certain than those of a unreformed tax system, where the distribution of benefits may not be fully known in advance. Increased uncertainty thus aids tax reform rather than impeding its passage.

The remainder of the paper is organized as follows. Section 2 describes the economic environment and citizens’ preferences. Section 3 describes the political model and the political equilibrium; the main predictions of the model are summarized in this section. Section 4 outlines a number of examples of tax reform in high-income countries from recent history and compares these experiences with the model’s predictions. Section 5 extends the benchmark model to allow for heterogeneous productivity and lobbying for tax benefits. This allows a discussion of the role of uncertainty in the adoption
of tax reform and of the ratchet effect. Section 6 concludes and discusses avenues for future research.

2 The Model

This section outlines the model. I begin by describing the features of the economy, taking public policy as given. The study of the political determination of public policy follows in Section 3.

2.1 Model Setup

Agents and Preferences The economy under consideration 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 the following utility function

\[
w^j = x^j - \frac{(h^j)^{1+\frac{1}{\eta}}}{1 + \eta}.
\]

Citizens’ Income Each hour worked is compensated at a wage rate of \( w \) units of the consumption good. In addition to labor income, consumer \( j \) earns profits \( \pi^j \) 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, so that firm \( i \) is owned by citizen \( j \).

Consumption Goods Each firm produces a single variety of a consumption good. There is therefore a unit measure \( i \in [0, 1] \) of consumption good varieties. Each variety is sold at a consumer price of \( p(i) \) and let \( x^j(i) \) denote consumer \( j \)’s consumption of variety \( i \). The individual varieties are bundled through a CES aggregate to give aggregate consumption \( x^j \) of

\[
x^j = \left[ \int_{i=0}^{1} \left( x^j(i) \right)^{\frac{\varepsilon}{\varepsilon+1}} \, di \right]^{\frac{\varepsilon+1}{\varepsilon}}.
\]
**Tax Policy**  Tax policy consists of two instruments: the tax rate $\tau$ and the tax base $f$. Personal income $w h_j + \pi^j$ is taxed at a uniform rate $\tau$. However, varieties of consumption 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 $\tau$ applies to the entire tax base. Setting $f = 0$ means that all consumer purchases are deductible so that tax revenues are zero. It is therefore natural to think of a higher value of $f$ as a broader tax base. A similar framework has been used in Yitzhaki (1979), Wilson (1989) and more recently Slemrod and Kopczuk (2002), among others. Given that the consumer 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, we will see below that a social welfare maximizer would set $f = 1$ always.

The government uses tax revenues to finance an exogenously given public good need $g$. The public good is assumed to be a specific variety; without loss of generality, we will assume that the variety is $i = 1$. 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 its price, nor can the firm exploit its position as a 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.

Reducing the choice of the tax base and rate to the two instruments $\tau$ and $f$ requires two implicit assumptions. First, the policy maker chooses the measure $f$ of goods receiving the tax deduction, but not their identity. This assumption helps reduce the dimensionality of tax policy. In section 5, I introduce a lobbying model whereby these tax deductions are auctioned out to firms and the identity of tax-exempt firms is an equilibrium outcome. For the time being, it might be useful to think of goods with higher indexes as those that are less “taxable”, leading to a tax base of $f$ to fall on goods $i \in [0, f)$.

Second, tax deductible goods qualify for a 100% tax refund. Full deductibility simplifies analysis but is not critical for its conclusions. It is crucial, however, 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 might limit the number of existing tax brackets: see Hettich and Winer (1984) for a discussion.
Budget Constraint and Consumer Choice  Given tax policy \(\{\tau, f\}\), the consumer’s budget constraint is given by

\[
\int_{i=0}^{1} p(i) x^i(i) \, di \leq (1 - \tau) \left( wh^j + \pi^j \right) + \tau \int_{i=f}^{1} p(i) x^i(i) \, di \tag{3}
\]

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

Consumption Bundle and Demand for Varieties  Let \(p^c(i)\) denote the effective consumer price of good \(i\), defined as \(p^c(i) \equiv \frac{p(i)}{1 - \tau(f,i)}\) where \(\tau(f,i)\) summarizes the tax wedge between leisure and the consumption of variety \(i\):

\[
\tau(f,i) \equiv \begin{cases} 
\tau & \forall i \in [0, f] \\
0 & \forall i \in (f, 1].
\end{cases}
\]

The effective consumer price index is then defined as

\[
p^c \equiv \left( \int_{i=0}^{1} \left[ (p^c(i))^{-\frac{\varepsilon}{\varepsilon+1}} \right] \, di \right)^{-\frac{1}{\varepsilon}}. \tag{4}
\]

The choice of varieties \(x^j(i)\) gives the optimality condition

\[
x^j(i) = \left( \frac{p^c}{p^c(i)} \right)^{\frac{\varepsilon+1}{\varepsilon}} x^j,
\]

with aggregate consumption of consumer \(j\) given by

\[
x^j = \frac{wh^j + \pi^j}{p^c}. \tag{6}
\]

Total consumer demand for variety \(i\) is then given by

\[
x(i) = \left( \frac{p^c}{p^c(i)} \right)^{\frac{\varepsilon+1}{\varepsilon}} \frac{wh + \pi}{p^c}, \tag{7}
\]

where

\[
\pi \equiv \int_{j=0}^{1} \pi^j \, dj,
\]

\[
h \equiv \int_{j=0}^{1} h^j \, dj,
\]

are total pre-tax profits and the aggregate supply of labor, respectively.
**Firms** Each firm $i$ has a monopoly over 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 introduced in an extension in Section 5. Each firm faces a fully competitive labor market, but a monopolistically competitive (Dixit and Stiglitz, 1977) goods market.

Each firm hires workers at the market wage $w$ and sells its differentiated good at the price $p(i)$. Profit maximization for any firm $i < 1$ is then

$$\pi(i) = \max_{p(i), x(i), h(i)} p(i) x(i) - wh(i),$$

subject to

$$x(i) \leq zh(i),$$

and (7) and where $h(i)$ is the labor demand of firm $i$. These give

$$p(i) = \mu \frac{w}{z} = p,$$

so that all goods have the same producer price, which is at a constant markup $\mu \equiv \frac{\varepsilon + 1}{\varepsilon}$ over marginal costs. We normalize the producer price to $p = 1$, giving a consumer price index (4) of

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

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

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

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 $\tau$ will always increase the effective tax rate by less than raising the unit of revenues via an expansion of the tax base. Thus increases in tax rates are always less efficient that broadening the tax base.

The profits of firm $i$, given by (8), are then directly proportional to the demand for their variety

$$\pi(i) = \frac{x(i)}{\varepsilon + 1}.$$

Given the fixed price $p(1) = 1$ of the public good, firm $i = 1$ obtains similar profits from sales to consumers and its demand for labor for the production of consumer goods is as in (9). The firm hires an additional mass of $h(1) = \frac{g}{\varepsilon}$ workers for the production of public goods and obtains an additional mass of profits of $\pi(1) = \frac{\varepsilon}{\varepsilon + 1}$ from their sale.
**Government**  The government collects tax revenues

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

which are revenues from income taxation net of deductions. The government uses these revenues to supply the public good, which it purchases at a price of 1. If the government faces no costs to tax administration and runs a balanced budget, its budget constraint is simply

\[
\rho = g.
\]

**Consumer Demand**  Given the price normalization \( p = 1 \), (2) and (5) now give

\[
x^j = (1 - \hat{\tau}) \left( wh^j + \pi^j \right),
\]

yielding aggregate consumer demand of

\[
x \equiv \int_{j=0}^{1} x^j d\hat{j} = (1 - \hat{\tau}) \left( wh + \pi \right).
\]

Aggregate consumer demand for variety \( i \) is therefore

\[
x(i) = \left( \frac{1 - \tau (f, i)}{1 - \hat{\tau}} \right)^{\epsilon+1} x.
\]

**Labor Market and Aggregate Income**  Workers’ first order condition for the supply of labor gives

\[
h = h^j = \left( \frac{\eta \tau (1 - \hat{\tau})}{\mu} \right)^{\eta}.
\]

Total profits are given by

\[
\pi = \int_{i=0}^{1} \pi(i) \, di + \bar{\pi}(1),
\]

and the total demand for labor by

\[
h = \int_{i=0}^{1} h(i) \, di + \bar{h}(1),
\]
Using (12), (9) and the values of $\tilde{\pi}(1)$ and $\tilde{h}(1)$ we then obtain
\[
\pi = \frac{z\tilde{h}}{\varepsilon + 1},
\]
giving the market clearing condition of
\[
w = \pi = zh.
\]

**Profits**  The profit income of household $j < 1$ is given by the profits of firm $j$, which is
\[
\pi^j = \pi(j) = \frac{1}{\varepsilon + 1} \left( \frac{1 - \tau(f,j)}{1 - \tilde{\tau}} \right)^{\varepsilon+1} x.
\]
(16) in (12) were used in obtaining this result.

### 2.2 Indirect Utility

The utility of citizen $j$ is given by (1). $h^j = h$ is given by (17) and $x^j$ is given by (15), so that the indirect utility of a household $j < 1$ can be described by
\[
u^j = \eta \left( \frac{z(1 - \tilde{\tau})}{\mu} \right)^{\eta+1} \left( \frac{1}{1 + \eta} + \frac{1}{\varepsilon} \frac{1 - \tau(f,j)}{(1 - \tilde{\tau})^\varepsilon} \right).
\]
(18)

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 relaxed as can be the assumption that workers derive no share of the monopoly rents of their employers.

The first term,
\[
u^W = \frac{\eta}{1 + \eta} \left( \frac{z(1 - \tilde{\tau})}{\mu} \right)^{\eta+1}
\]
is the utility of citizen $j$ as a worker-consumer. This term gives the utility of consumption from labor income net of the dis-utility of suppling this labor $\psi - \frac{\eta}{1 + \eta} \tilde{h}^{1 + \frac{1}{\eta}}$. 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 (11), and is therefore decreasing in both the tax rate $\tau$ 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. But as raising a unit of revenues through increases in the statutory tax rate increase the effective tax rate by less than raising the revenues through a broadening of the tax base, workers always prefer the broadest possible tax base.

The second term

$$\pi^j = \frac{\eta^j}{\varepsilon} \left( z (1 - \hat{\tau}) \right)^{\eta+1} \frac{(1 - \tau (f,j))^{\varepsilon+1}}{(1 - \hat{\tau})^\varepsilon}$$ (19)

gives the utility of citizen $j$ as in her role as an entrepreneur, namely profits. Profits from the total sales of good $j$ are affected by both aggregate and relative demand. The term noted as aggregate demand should 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 that is 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 $\tau$ increases the relative price of and lowers the relative demand for goods that are in the tax base. It thus lowers the profits of “taxed” firms: those that do not have a tax preference. The tax base $f$ determines whether an individual firm 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 $f = j$. 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 thus have a strong incentive to secure a tax benefit.

For a given revenue need, the effective tax rate is minimized, however, by relying on the broadest possible tax base. Aggregate demand is there-
fore harmed by a narrow tax base. The aggregate demand term in (19) demonstrates that entrepreneurs internalize, to some extent, the costs of their demands for tax exemptions. However, the aggregate demand cost of any single tax benefit is infinitesimal, while the benefits to its recipient may be large. 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 \( \eta + 1 > \varepsilon \), as can be seen in (19).\(^5\) This is because high effective tax rates have an aggregate demand cost, but also a relative demand benefit to entrepreneurs. The benefit derives from the fact that a higher effective tax rate gives a higher average price level. Holding the price of an individual firm’s good fixed (as would be the case of sheltered firms), the higher price level benefits the firm’s relative demand. The relative magnitude of the Frisch elasticity of labor supply \( \eta \) and the elasticity of substitution across goods \( \varepsilon \) 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 aggregate prices induces substitution towards tax-exempt goods and the greater is the relative demand impact of a higher effective tax rate.

We summarize the impact of tax policy on citizens’ utility in the following proposition.

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

\[
(1 - \hat{\tau})^\varepsilon > \frac{\varepsilon - (\eta + 1)}{\varepsilon}.
\]

**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

\(^5\)This echoes the result in Auerbach (1985) that the relative magnitude of own- and cross-elasticities are critical in determining the excess burden of taxation.
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. As noted above, this is because higher tax rates distort prices in favor of sheltered firms. 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 one must recall 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 might prefer higher taxes is neither new nor uninteresting, but needlessly complicates the analysis that follows. In what follows, we therefore restrict attention to effective tax rates that are sufficiently low that all citizens, including those that are sheltered from taxation, dislike higher taxes. We define this region of the state space as one where citizens are tax averse. Formally, we assume

**Assumption 1.** Citizens are tax averse: \((20)\) holds.

To get a sense of the realism of this assumption, let us assign some parameter values. I do not intend a fully realistic calibration—and there is certainly a debate as to how to calibrate the relevant parameters in this model. Instead, the purpose of this exercise is to show that \((20)\) holds in all but extreme cases. \((20)\) is less likely to hold the lower is \( \eta \). To consider the possibility that \((20)\) is violated, let us set \( \eta \) to the lower-end of its estimated range \( \eta = 0.3 \). The parameter \( \varepsilon \) 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 Borda and Weinstein (2006).\(^6\)

With these parameters, the effective tax rate \( \hat{\tau} \) would need to exceed 41% to violate \((20)\). 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 statutory tax rates \( \tau \) 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

\(^6\)Due to notational differences \( \varepsilon = 2 \) reflects an elasticity of substitution of 3.
values and tax base.\footnote{In this model, the revenue-maximizing statutory tax rate solves}

If the Frisch elasticity of labor supply \( \eta \) is even slightly larger, the elasticity of substitution \( \varepsilon \) is even slightly smaller, or the tax base is narrower, violating (20) becomes an even less likely proposition.

## 2.3 Marginal and Big Changes to the Tax Base

It is illustrative to explore the utility 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 \( \eta = \varepsilon = 1 \) for graphical convenience, but the insights are not sensitive to this parameterization. The statutory tax rate \( \tau \) 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 \( f = 1 \) towards the bottom.

Proposition 1 states that with \( \eta + 1 > \varepsilon \), utility is strictly decreasing in both \( \tau \) and \( f \), as is evident in the figure. But while utility is continuously decreasing 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 50\%, the point marked in a black dot in the figure. Now imagine that the government faces small shock to government spending and is forced to raise revenues. It could do so by increasing statutory tax rates, broadening the tax base, or a combination of the two. Now imagine that the government wishes to satisfy the new revenue needs through marginal changes in the two tax instruments and let us consider the median voter’s views 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 18 and thus a negligible loss of utility to the median voter. A marginal increase in the tax base, in contrast, would

\[
\frac{1 - \tau - \varepsilon \tau}{\tau} + (\varepsilon - \eta)f \left(\frac{1 - \tau}{1 - \tau}\right)^\varepsilon = 0, \tag{19}
\]

with \( f = 0.8 \) and the chosen parameter values this gives a revenue-maximizing tax rate of 35\%. Obtaining a lower revenue maximizing rate requires less substitutability between varieties, but this would make (20) even more likely to hold.
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 non-marginal reforms. Let us now relax the restriction that the policy maker 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 also leaves the utility of the median voter roughly unchanged. 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 (18) 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. 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 is more feasible than a marginal or piecemeal one.

To summarize, we have the following results. First, a large reform that eliminates many tax benefits is more feasible, politically, than one that attempts to eliminate a single tax preference. Second, tax reform takes the form of a 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, a lowering of the effective tax rate requires lower statutory rates.

### 2.4 Policy Preferences

Thus far, we have focused on indirect utility rather than preferences over policy. Policy preferences must take the government’s budget constraint into account. We begin by considering tax revenues.

**Revenues** The logarithm of tax revenues \( \rho (\tau, f) \) in (13) is given by

\[
\log (\rho (\tau, f)) = \log \tau + \log f + \eta \log (1 - \hat{\tau}) + \varepsilon \log \left( \frac{1 - \tau}{1 - \hat{\tau}} \right) + \zeta (z, \eta, \varepsilon), \tag{21}
\]
where $\zeta(z, \eta, \varepsilon)$ is a term that does not contain the tax instruments $f$ and $\tau$. 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 (21). The remaining terms reflect changes in taxable income due to household incentives. First, an increase in the effective tax rate decreases revenues proportionally with an elasticity $\eta$—the elasticity of labor supply. This is the standard disincentive effect of taxes, 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 $\theta \equiv \frac{1}{1+\tau}$: 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 increases avoidance incentives (substitution into consumption of tax-free goods). This provides an additional distortion to incentives due to higher statutory tax rates: higher statutory tax rates cause a larger substitution from taxable to non-taxable activities, thus lowering tax revenues through an additional channel. The value $\theta$ 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. We consider an exogenously-determined need.
for revenues $g$ and abstract from any economic costs to enforcing the tax code. The choice of $\{f, \tau\}$ subject to the government’s budget constraint is then one-dimensional.

The optimal policy for citizen $j$ is given by

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

s.t.

$$
\rho (\tau, f) \geq g.
$$

The term $\tau (f, j)$ introduces a discrete jump in the utility function at $f = j$. The maximization problem in (22) and (23) is therefore solved in three steps. First, solve the maximization problem with citizen $j$’s firm sheltered from taxation: $j \geq f$. Second, solve the maximization problem when the firm is taxed: $j < f$. Finally, compare the citizen’s utility under the two scenarios and chose the policy that provides the citizen with the higher utility.

In the first two steps, an interior policy choice (so that the $f \leq j$ or $f > j$ constraints are not binding) satisfies the following optimality condition:

$$
MCPF^\tau (j) = MCPF^f (j),
$$

where

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

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

are the marginal costs of public funds when a unit of tax revenues is raised through increasing the tax rate and broadening the tax base, respectively. This optimality condition is intuitive: the citizen wishes both policy instruments to be used up to the point that the private marginal costs of raising an additional unit of revenues using the two 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 tax status. They resist increases in the tax base only insofar as their own tax preference is in question. A corollary
is that a social welfare planner—putting an equal and infinitesimal weight on the discrete tax preferences of all citizens, would always set $f = 1$.

We obviously assume that the value of $g$ is feasible, i.e. that there exists a tax policy $\{f, \tau\}$ that can raise sufficient revenues to finance these government purchases.

**Proposition 2** Consider values of $\{f, \tau\}$ for which Assumption 1 holds and a value of $g$ that is feasible. The marginal cost of increasing revenues through an increase in the tax rate exceeds the marginal cost of increasing revenues through a broadening of the tax base $MCP^\tau(j) > MCP^f (j)$, for any $j \neq f$. The optimal tax base for citizen $j$ is therefore either $f = j$ or $f = 1$.

**Proof.** Appendix A. ■

**Corollary.** A social welfare planner will always set $f = 1$.

**Discussion of Tax Enforcement Costs** The proposition 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 three reasons. First, it allows us to highlight more sharply the political constraints, 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, 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, increases in the tax base should always be associated with increases in statutory tax rates. When the tax base is chosen optimally subject to administrative costs, both tax instruments would be used to increase tax revenues. Our theory will help 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

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8Imputed rent of owner-occupied housing is one such example.
the possible exception of those citizens whose firms are brought into the fold of the tax base.

**The Marginal Reformer** $j^R$ In searching for the preferred policy for citizen $j$, we have narrowed the search to two possible tax bases $f \in \{j, 1\}$. We will refer to the 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 a step in that direction. It identifies a cutoff citizen $j^R$ that partitions citizens between supporters of tax reform and those that wish to preserve their tax preferences. Such a cutoff citizen exists if the following assumption holds.

**Assumption 2.** $\varepsilon \geq \eta$.  

Note that this is a necessary, rather than a sufficient condition for the existence of the cutoff citizen $j^R$. Numerical solutions indicated that the assumption may be relaxed somewhat and a cutoff citizen exists even for some values such that $\eta > \varepsilon$. Recalling the discussion of reasonable parameter values in Section 2.2, Assumption 2 would hold for the most commonly estimated values of $\eta$ and $\varepsilon$ estimated in the empirical literature. Recall also that $\varepsilon \geq \eta$ implies that citizens are tax averse, so that Assumption 2 implies Assumption 1.

**Proposition 3** Assume that Assumption 1 holds. 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. □

The intuition for this proposition is as follows. Revenues at the revenue-maximizing tax rate $\tau$ are increasing in the tax base $f$. If the revenue requirement $g$ cannot be satisfied at $f = j$, it cannot be satisfied at $f = \tilde{j} < j$.

If the revenue need $g$ can be satisfied, Proposition 2 implies that satisfying the revenue need $g$ with a base of $f = j$ gives higher utility to all owners of sheltered firms than does satisfying the same revenue need at a smaller tax base $f = \tilde{j}$. Thus the utility of citizen $j$ at $f = j$ is greater than the utility of citizen $\tilde{j} < j$ at $f = \tilde{j}$. As the utilities of both these citizens would be the
same under tax reform, citizen \( j \) is more resistant to reform than is citizen \( \tilde{j} \).

Proposition 3 delineates two clear constituencies. All citizens \( j < j^R \) prefer \( f = 1 \) to any other tax base. All citizens \( j > j^R \) have \( f = j \) as their preferred policy, 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 a comparative static with respect to tax revenue needs. Figure 2 plots \( j^R \), the index of the citizen exactly indifferent between reform and \( f = j^R \), as a function of the revenue requirement \( g \). Three lines are plotted. The first gives a “microeconomic calibration” with a low elasticity of labor supply \( \eta = 0.3 \) and with \( \varepsilon = 2 \). As noted, the relative magnitude of \( \varepsilon \) and \( \eta \) is critical in determining preferences, this first line is illustrative of the case \( \varepsilon > \eta + 1 \). The second line gives a “macroeconomic” calibration, with a high elasticity of labor supply \( \eta = 2 \). A low elasticity of substitution across varieties \( \varepsilon = 1 \) was chosen, to represent the \( \eta > \varepsilon \) case, rather than for the sake of realism. Finally, the case \( \varepsilon = \eta (= 2) \) is illustrated in a third line. In all three cases the cutoff \( j^R \) is monotonically increasing in \( g \). Experimentation with a wider set of parameters, I was unable to find parameters such that \( j^R \) was not increasing in revenues.

To summarize, computational solutions of the model show that \( j^R \) is monotonically increasing in tax revenue needs, so that the constituency favoring tax reform increases steadily as tax revenue needs increase. This is intuitive. First, if higher tax revenues are needed it may be infeasible to raise the required revenues on a narrow tax base. Citizens realizing that they will be taxed under any feasible policy support tax reform. Second, as tax revenue needs increase, the statutory tax rate required to raise revenues increases. The higher statutory rate decreases revenue efficiency when the base is narrow and increases the efficiency gains from tax reform.

3 **Politics**

Armed with the preferences of all citizens and the ranking of their reform preferences in Proposition 3, we now turn to positive predictions of political
outcomes. There is a wide range of modeling strategies to aggregate citizens’ preferences and to obtain positive implications. The model is sufficiently flexible to explore a variety of political mechanisms. Here, I consider a simple Downsian setting. This illustrates in the simplest form the main positive predictions of the paper.

In studying Downsian electoral competition, a natural starting point is to inquire whether there exists a policy that is a Condorcet winner. Throughout this section, let us maintain the assumption \( \varepsilon \geq \eta \), so that a cutoff citizen \( j^R \) exists.

**Condorcet Winner** We 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 4** 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 follows directly from Proposition 3: If $j^R > \frac{1}{2}$, a majority of citizens prefer $f = 1$ to any other policy. However, if $j^R \leq \frac{1}{2}$ it is possible find a policy that would defeat any other policy in a bilateral vote. Proposition 2 states that all citizens prefer a broader base, as long as their own tax status is unaffected by this change. Thus 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 $j^R$; this coalition would have 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 solve for equilibrium in mixed strategies under a winner-take-all electoral system, where candidates maximize their probability of obtaining a majority of votes. In an online appendix I analyze proportional representation (PR), approximated as in Lizzier and Persico (2001), with vote-share maximization. In both cases, 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 $j^R < \frac{1}{2}$.

**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.\(^9\)

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 the distributions $\phi^A (f^A)$ and $\phi^B (f^B)$. The platform consists of a tax base $f^A$ or $f^B$. The corresponding statutory tax rate is uniquely determined by the budget constraint (14). 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 re-

\(^9\)Similar conclusions are reached if the candidates attempt to maximize their vote share. Analysis available upon request.
ceives a majority of votes implements her proposed policy $f^A$ or $f^B$, and sets the tax rate $\tau$ to satisfy the revenue need $g$. 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, under the tax policy set in the first stage.

**Political Equilibrium** We now outline the solution to the political game. 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 any equilibrium there is a negligible probability that comprehensive tax reform $f = 1$ is implemented. There is a 50% probability that a narrow base in the $\left[ j^R, \frac{1}{2} \right]$ range is implemented and a 50% chance that a broader base in the $\left[ j^R + \frac{1}{2}, 1 \right]$ range is implemented. The following proposition summarizes the characteristics of equilibrium. We focus on symmetrical equilibria where both candidates draw platforms from the same distribution $(f^A) = (f^B)$ with CDF $\Phi(f)$.

**Proposition 5** Political Equilibrium. If $j^R > \frac{1}{2}$, both candidates propose $f^A = f^B = 1$ with probability 1 and obtain a vote share of $\frac{1}{2}$. The unique equilibrium policy is $f = 1$.

If $j^R \leq \frac{1}{2}$, a function $\phi(.)$ constitutes a political equilibrium if and only if it has the following characteristics.

1) $\Phi\left( j^R \right) = 0$.
2) $\Phi\left( \frac{1}{2} \right) = \frac{1}{2}$.
3) $\phi\left( f + \frac{1}{2} \right) = \phi\left( f \right) \forall f \leq \frac{1}{2}$.
4) The function $\phi(.)$ 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 that they are also necessary is relegated to the online appendix. ■

The intuition of the first part of the proposition is simple. If $j^R > \frac{1}{2}$, the policy $f = 1$ is the preferred policy of a measure $j^R$ of the population. 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 \( j^R \leq \frac{1}{2} \) (\( j^R = \frac{1}{4} \) in the figure). The proposition states that the function \( \phi(.) \) looks identical in the ranges \([0, \frac{1}{2}]\) and \([\frac{1}{2}, 1]\), with a cumulative 50% probability of drawing a policy in either of these ranges. There is a zero probability of drawing a tax base from \( f < j^R \) (and equivalently from \([\frac{1}{2}, \frac{1}{2} + j^R]\)). Within the remaining range \( F^L \equiv [j^R, \frac{1}{2}] \) any probability distribution constitutes an equilibrium, as long as the same function is used to draw policies from the \( F^H \equiv [\frac{1}{2} + j^R, 1] \) range.

To see why this is an equilibrium, it is first useful to note that any proposal in the range \( f^A \in F^H \) defeats another proposal \( f^B \) in the same range if and only if it proposes the broader base. \( f^A \) removes tax preferences from less than half the population (relative to the alternative \( f^B \)) and benefits more than half of the population, who prefer a broader base (see Proposition 2), but whose tax status is the same under both proposals.

A proposal \( f^A \in F^H \) defeats another proposal \( f^B \in F^L \) if and only if \( f^A < f^B + \frac{1}{2} \), i.e. if \( f^A \) exceeds \( f^B \) by less than one half. The logic is the same: \( f^A \) removes tax preferences from less than half the population (relative to the alternative \( f^B \)) and benefits more than half of the population, who prefer a broader base. If, in contrast, the proposal \( f^A \) offers a broader base but removes tax preferences from more than half the population, it will lose the election. Citizens losing their tax preferences do not benefit from the broader base. Given that their indices are greater than \( j^R \), they prefer their tax preference even relative to \( f = 1 \) (see Proposition 3).

Tallying up the probability that \( f^A \in F^H \) defeats a proposal \( f^B \) drawn from the distribution \( \phi(f^B) \), \( f^A \) defeats policies \( f^B \) that are smaller than \( f^A \) within \( F^H \) and those that are smaller than \( f^A - \frac{1}{2} \) in the \( F^L \). Together, these provide a probability of exactly \( \frac{1}{2} \) for any distribution \( \phi(f) \) that has identical distributions in these two ranges. A similar analysis can be conducted for proposals drawn in the range \( f^A \in F^L \).

No other proposal provides a profitable deviation. Any proposal \( f^A < j^R \) would certainly lose against all proposals in the \( F^L \) (and possibly some in \( F^H \)) and thus cannot give a vote share of more than 50%. Any proposal in the \([\frac{1}{2}, \frac{1}{2} + j^R]\) loses to proposals in \( F^H \) and thus gets 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 Proposition 5.
Characteristics of Political Equilibrium A number of implications follow from the nature of the political equilibrium. First, the probability of “comprehensive” tax reform \( f = 1 \) is one for \( j^R > \frac{1}{2} \), but this is a measure zero event if \( j^R \leq \frac{1}{2} \). 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 100%). Nevertheless, when \( j^R \leq \frac{1}{2} \), there is always a 50% probability that a narrow base is chosen within \( f \in F^L \). This probability is eliminated discontinuously at \( j^R = \frac{1}{2} \).

It is also worth noting that the probability of disagreement among political candidates also changes discontinuity 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, with the other opposing such measures. In contrast, when tax revenue needs increase to the tipping point where \( j^R \) exceeds \( \frac{1}{2} \), the nature of political competition is likely to change. Tax reform becomes political consensus, and both political parties put forth comprehensive tax reform proposals.
Summary of Findings  Before turning to a discussion of recent examples of tax reforms, it is useful to summarize the theory’s main predictions.

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 (Figure 2).

4. A threshold level of revenues triggers a “reform moment”, where the probability of reform increases discretely (Proposition 5).

5. At such a reform moment, broad political consensus emerges for tax reform (Proposition 5).

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. 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).

Nevertheless, the ultimate design of tax reform was 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. 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.

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), where the tax rate and the tax base moves in the same direction. Alongside in 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, intended 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.

10The 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.
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 the 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.

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 from 52% to 35%, financed by base-broadening measures.

Germany The German tax reform of 2000—passed after a decade of debates—was discussed in the context of fiscal consolidation.\(^{11}\) (See IMF, 1999; IMF, 2000; and Breuer, Gottschalk, and Anna Ivanova, 2011.) 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 also highlights the broader applicability of the

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\(^{11}\) Chancellor Gerhard Shroeder’s initial proposals were for fiscal consolidation and tax cuts. The theory in this paper provides a rationalization for these seemingly contradictory aims.
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 merely one element of the broader Agenda 2010 reform plan of
the Schroeder administration. Rather than taking a piecemeal approach to
reform, as would be advocated by a gradualist approach to reform, Chancellor
Gerhard Schroeder announced in advance his intention to reform several
aspects of economic policy simultaneously.\footnote{The Agenda 2010 reform program was first announced in March 2003. See http://germanhistorydocs.ghi-dc.org/sub_document.cfm?document_id=3973} The reform package included la-
bor market reforms, social benefit reform and tax reform. A gradualist view
to reform might suggest that such an ambitious agenda would be doomed
to failure. Our theory provides some insights as to 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 a sufficient number of losers. The
bundling of reforms may have been a recipe for success rather than a formula
for failure.

**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 exempted, as well as the elimination of tax
loopholes. Consistent with the model, tax reform passed in the midst 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.

**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 increased revenues should come through increases in marginal tax
rates or through 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 once again. This would be predicted by the theory, where large
revenue needs trigger tax reform. While it is still early to predict whether
any significant reform will be enacted, nor what for 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 corpo-
rate tax. The headline reductions will be balanced by steps to
broaden the tax base, mostly by eliminating some of the exemp-
tions 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 our model.

5 Extensions

This section provides a number of extensions to the benchmark model. These
examine the robustness of the theory’s main insights to such extensions, but
also further illuminate some of the economic forces that might push towards
or militate against tax reform.

5.1 Heterogeneous Productivities

In the analysis thus far, all households and firms were identical ex-ante. Any
difference in outcomes was solely due to horizontal discrimination created
through the political process. This section explores how the introduction
of differences in firms’ productivity affects the model’s predictions. This
analysis is a stepping stone towards an endogenous determination of the distribution of tax benefits, introduced in Section 5.2.

Consider a model that differs from the one introduced in Section 2 only in that each firm has an individual productivity \( z(i) > 0 \). Citizens remain identical in their preferences and productivity as workers, but now differ in the productivity of the firm they own. Let

\[
z \equiv \left[ \int_{i=0}^{1} z(i)^{\varepsilon} \, di \right]^{\frac{1}{\varepsilon}},
\]

(25)
denote average productivity.

Let us retain the assumption that products (and thus citizens) are indexed in order of “taxability”, i.e. a tax base of \( f \) applies to the goods \( i \in [0, f) \) and leaves \([f, 1] \) tax-exempt. At this point, no assumption is made about the distribution of productivities \( z(i) \) and how it relates to the distribution of taxability. The following section allows an endogenous relation between the two.

Firms’ profit maximization problem is roughly as before. Firms maximize profits, subject to the market wage \( w \), but their production frontier is now

\[ x(i) \leq z(i) h(i). \]

Given monopolistic competition, firms set prices at a constant markup over marginal costs,

\[ p(i) = \mu \frac{w}{z(i)} = \frac{z}{z(i)}. \]

The second of the equalities follows from a normalization of the price of the average good to 1:

\[ \mu \frac{w}{z} = 1. \]

Define

\[ Z(f) \equiv \int_{i=0}^{f} \left( \frac{z(i)}{z} \right)^{\varepsilon} \, di. \]

\( Z(f) \) is a measure of the tax base when the measure of taxable goods is \( f \). \( Z(f) \) is strictly increasing in \( f \), with a slope that is increasing in the productivity of the marginal firm introduced into the tax base:

\[ Z_f(f) = \left( \frac{z(f)}{z} \right)^{\varepsilon}. \]
Using the definition of $z$ in (25), $Z(1) = 1$ and $Z(f) \in [0,1] \forall f$.

Calculating the CPI via (4), we now obtain

$$p^{c} \equiv \left( \int_{i=0}^{1} \left[ (p^{c}(i))^{-\frac{1}{z}} \right] ^{z} \right) ^{-\frac{1}{z}} = \frac{1}{1 - \tau},$$

where

$$1 - \hat{\tau} = \left( (1 - \tau)^{\xi} Z(f) + 1 - Z(f) \right)^{\frac{1}{\xi}}.$$

Notice that if $z(i) = z \forall i$, as was the analysis in the benchmark model, then $Z(f) = f$ and the effective tax rate $\hat{\tau}$ is as in the homogeneous-productivity case. In the more general specification introduced here, the effective tax rate is as before, except that the tax base $Z(f)$ is not longer equal to the measure of goods in the tax base $f$.

Pursuing the remainder of the analysis as before, the indirect utility of citizen $j$ is now slightly modified as:

$$u^{j} = \eta^{i} \left( \frac{z(1 - \hat{\tau})}{\mu} \right)^{\eta+1} \left( \frac{1}{1 + \eta} + \frac{1}{\varepsilon} \left( \frac{z(j)}{z} \right)^{\xi} \frac{1 - \tau(f,j)^{\xi+1}}{(1 - \hat{\tau})^{\xi}} \right) \quad (26)$$

Indirect utility differs from that of the benchmark analysis in two ways. First, the effective tax rate $\hat{\tau}$ is a function of the tax base $Z(f)$, which is not necessarily equal to the measure of taxable goods $f$, as in the benchmark case. Second, the second term in the indirect utility function, giving the utility of the “entrepreneur” side of the household, is multiplied by $\left( \frac{z(j)}{z} \right)^{\xi}$. With monopolistic competition in goods markets, higher productivity translates into higher profits.

A glance at this more general indirect utility function highlights that much of the factors affecting citizen’s preferences remain the same, even with heterogeneity in productivity. The “worker” side of the household is interested only in setting tax policy so as to minimize the effective tax rate $\hat{\tau}$. The entrepreneur side of the household again has conflicting interests: she too is concerned about the effective tax rate, due to its effects on aggregate demand, but gains a discrete benefit from securing a tax preference, i.e. from having $f < j$. The new $z(j)$ factor reflects the fact that owners of more productive firms derive more income from profits and therefore gain more from securing tax preferences than do less productive firms.

33
The logarithm of revenues is now given by

\[
\log (\rho (\tau, f)) = \log \tau + \log Z (f) + \eta \log (1 - \hat{\tau}) + \varepsilon \log \left( \frac{1 - \tau}{1 - \hat{\tau}} \right) + \zeta (z, \eta, \varepsilon).
\]

(27)

This differs from the homogeneous productivity benchmark only in that the tax base \( Z (f) \) is no longer equal to the measure of taxable goods \( f \).

Citizens producing taxed goods prefer lower tax rates and a narrower tax base, as in Proposition 1. The condition (20), which is necessary and sufficient for sheltered citizens to be tax averse, is now complicated by the heterogeneous productivity term \( z (i) \) and now reads

\[
(1 - \hat{\tau})^\varepsilon > \left( \frac{z (j)}{z} \right)^\varepsilon (\eta + 1)^\varepsilon - (\eta + 1)\varepsilon.
\]

(28)

This is now a citizen-specific condition, delineating the part of the state space, in which citizen \( j \) is tax averse, conditional on having a tax-preference. If Assumption 1 holds, all citizens with below-average productivity would like lower tax rates and a lower tax base, but citizens with above-average productivity may prefer higher tax rates and a narrower tax base. To abstract from this case, let us modify Assumption 1 so that all citizens are tax averse.

**Assumption 1b.** Citizens are tax averse: (28) holds for all \( j \).

As in the homogeneous productivity case, \( \eta + 1 > \varepsilon \) is sufficient for (28) to hold for all \( j \). In contrast, if \( \varepsilon > \eta + 1 \) and the distribution of \( z (j) \) is unbounded, there is necessarily some citizen that likes higher taxes. Assumption 1b is thus a stronger assumption than Assumption 1 and implies a restriction on the upper tail of the \( z (j) \) distribution.

With Assumption 1b replacing the weaker Assumption 1, Proposition 2 remains intact: all citizens’ ideal points are either at \( f = j \) or at \( f = 1 \). Matters become more complicated when attempting to partition citizens between supporters of a narrow base and those that prefer tax reform. A high-productivity citizen whose product is highly taxable (high \( z (j) \) but low \( j \)) might be resistant to tax reform because she puts a higher weight on profits and therefore potentially on her individual tax break. Similarly, even the least taxable citizen \( j = 1 \) will prefer tax reform if her productivity is sufficiently low. Notice that as \( z (j) \to 0 \), the entrepreneur side of the household drops out of the equation and the citizen is essentially a worker, who always prefers the broadest possible tax base.
It is therefore difficult to analyze the outcome of a political game with no further information on how citizens are distributed along the two dimensions of productivity and taxability. The following section aids us by endogenizing this relationship.

5.2 Lobbying for Tax Benefits

In this section, the benchmark model is further extended by allowing the distribution of tax benefits across citizens to be determined in equilibrium. Firms have heterogeneous productivities \( z(j) \) as in the previous section. Let us order citizens in increasing rank of productivity, so that \( z(j) \) is monotonically increasing in \( j \). There is no longer any difference in citizens’ degree of taxability. Which citizens receive tax exemptions given the tax base \( f \) will be an equilibrium outcome, rather than an assumption.

In addition, the political game is modified and is now a three stage process. The first stage—the voting stage—remains as before. Two candidates devise a mixed strategy and simultaneously propose a feasible tax code \( \{f, \tau\} \). Citizens vote sincerely for their preferred candidate and the candidate with the majority of votes takes power. Taking the revenue needs \( g \) and the feasibility constraint into account, voting is over a unidimensional object, which can be summarized as the proposed tax base \( f \). Unlike the model of Section 3, citizens do not know at this stage how tax benefits will be distributed among products. Citizens can, however, rationally anticipate whether they will receive a tax benefit in the sub-game equilibrium of the second stage.

In the second stage—the lobbying stage—the elected politician is fully committed to providing tax benefits to a measure \( 1 - f \) of varieties. These tax exemptions are allocated by an all-pay auction. In other words, each citizen-firm offers a lump-sum contribution \( C(j) \) to the policymaker, payable in the third stage. The contribution \( C(j) \) is committed regardless of whether the citizen wins the auction, i.e., regardless of whether she receives a tax benefit. The policymaker provides tax benefits to the \( 1 - f \) highest bidders, and randomizes across identical proposals, if necessary. These contributions go directly into the coffers of the politician: they cannot be used to finance public spending. A discussion of other allocation mechanisms that would lead to similar results follows below.

Lobbying over the legislative details once the broad outline of legislation has been determined is not merely of analytical appeal. Recent empirical
evidence shows that much lobbying occurs late in the legislative process or even after legislation is approved (see You, 2014).

Finally, in the third, economic, stage, the policy \( \{ \tau, f \} \) is implemented, with tax benefits going to those products as determined in the lobbying stage. Citizens make economic choices, make the promised contribution to the policymaker, and realize payoffs.

Working backward from the third stage, the analysis is identical to that of Section 5.1, with the exception that citizen \( j \)'s consumption and utility are both decreased by \( C(j) \). Given the lump-sum nature of the contribution and the quasilinearity of utility in consumption, no other incentives are altered. The total utility cost of the campaign contribution is \( C(j) \) and its marginal cost is one.

Returning to the second stage, we can now assess citizen \( j \)'s maximal willingness to pay for a tax exemption for the product produced by her firm. This is simply the overall utility value of a tax exemption, which can be easily elicited from (26):

\[
\Delta u^j = \frac{\eta^n}{\varepsilon} \left( \frac{z (1 - \tau)}{\mu} \right)^{\eta+1} \left( \frac{z(j)}{z} \right)^{\varepsilon} \frac{1 - (1 - \tau)^{\varepsilon+1}}{(1 - \tau)^{\varepsilon}}.
\]

Ability to pay (the requirement that consumption not be negative) is not a binding constraint, as willingness to pay \( \Delta u^j \) is less than the firm's total profits. An analysis of the equilibrium of the lobbying subgame is provided in Appendix A. It should be apparent, though, that citizens with the highest willingness to pay will secure tax benefits in equilibrium. The term \( \Delta u^j \) is increasing in \( z(j) \), so that the \( 1 - f \) most productive firms receive tax benefits in equilibrium. In equilibrium \( j \) therefore serves both as an index of productivity and of taxability, as assumed in earlier sections. This would rise as an equilibrium outcome for any auction mechanism or any lobbying game that would similarly allocate tax benefits to those citizens most willing to pay for them.

Finally, moving to the voting stage, we can once again identify a citizen \( j^R \) such that all citizens with \( j > j^R \) prefer \( f = 1 \) to \( f = j \) and all citizens with \( j < j^R \) prefer \( f = j \) to \( f = 1 \). This result is summarized in the following proposition.

**Proposition 6** Assume that Assumption 1b holds in the three-stage political game with the allocation of tax benefits determined by lobbying. 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.

Having identified the marginal citizen \( j^R \) who is indifferent between tax reform and securing a tax exemption, the analysis of the voting game is identical to that summarized in Proposition 5. If \( j^R > \frac{1}{2} \), the unique equilibrium arising with probability 1 is tax reform: a tax base of \( f = 1 \). If \( j^R \leq \frac{1}{2} \), there is no equilibrium in pure strategies, the probability of \( f = 1 \) is of zero measure, and there is a 50% probability that the tax base is narrower than \( f = \frac{1}{2} \).

To summarize, this section shows that the main results of the benchmark model are robust to the introduction of heterogeneity in firm productivity and to the endogenous determination of the distribution of tax benefits through a lobbying stage.

6 Concluding Remarks

The enactment of tax reform is a highly political process. Reformers’ desire to bring about a simpler, more efficient, and possibly “fairer” tax system is often stonewalled because such reform always has distributional consequences. This paper proposes a simple tractable model of the political economy of tax reforms. It helps understand how these forces are likely to compete in the political marketplace. When revenue needs are low, they can more easily be met with narrow tax bases. Voters will 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 require a broader tax base and are more costly to fund using a narrow tax base. Voters will then become increasingly willing to forgo their own tax preference in favor of efficiency. A tipping point is reached 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 costs than big ones do. This paper gives a counterpoint to this notion. When direct compensation for lost benefits are 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 are targeted simultaneously may bring sufficient general equilibrium gains to compensate all losers.

Tax reform is on the agenda again in the American political debate. A number of European countries, facing a new age of austerity, have also been considering the most efficient and politically palatable ways to raise new revenues. The analysis in this paper suggests that the increasing debt burdens faced by many governments may be conducive to the enactment of tax reform.

I hope this study will stimulate further interest in formal analysis of the political economy of tax reform. Social choice in this model is via a simple voting model, with an extension related to the role of special interests. There is admittedly much more that could be done to study the rich legislative and other political processes typically 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 the “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 worthy of further inquiry.

I have assumed throughout that changes in the tax base may only come about through the policy process. 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 through which tax reform is enacted, in the framework provided here.

In a world increasingly open to trade and capital flows, there may be international implications to the analysis conducted here as well. The importance of the aggregate demand channel favoring tax reform may be diminished in a small open economy. The demand for a small country’s goods may be determined by tax policy elsewhere. However, “tax competitiveness” may be a separate pressure for tax reform in such a setting.

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

References


A Appendix: Proofs

A.1 Proposition 1

Let

\[ T \equiv 1 - \tau, \]
\[ \hat{T} \equiv 1 - \hat{\tau}, \]
\[ \theta \equiv \frac{1 - \tau}{1 - \hat{\tau}}. \]

For any owner of a taxed firm \( j \leq f \), we have

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

43
and
\[ \frac{\partial u^j}{\partial f} = \eta^n \left( \frac{z^T}{\mu} \right)^{\eta+1} \frac{1}{\tilde{T}} \left[ 1 - \tilde{T} \theta^{t+1} + \frac{\eta+1}{\varepsilon} \tilde{T} \theta^{t+1} \right] \frac{\partial \tilde{T}}{\partial f} \leq 0, \]
as \( \theta < 1 \) and \( \tilde{T} < 1 \) and
\[ \frac{\partial \tilde{T}}{\partial f} = -\frac{1}{\varepsilon} \frac{1 - T^\varepsilon}{T^{\varepsilon-1}} \leq 0. \]

For any owner of a sheltered firm \( j > f \) we have \( \tau(j) = 0 \). Then for \( y \in \{f, \tau\} \), we have
\[ \frac{\partial u^j}{\partial y} = \eta^n \left( \frac{z^T}{\mu} \right)^{\eta+1} \frac{1}{\tilde{T}} \left( 1 + \frac{\eta+1 - \varepsilon}{\varepsilon} \right) \frac{\partial \tilde{T}}{\partial y}. \] (29)

Noting that \( \frac{\partial \tilde{T}}{\partial f} < 0 \) and
\[ \frac{\partial \tilde{T}}{\partial \tau} = -f \theta^{t-1} < 0, \]
then \( \frac{\partial u^j}{\partial \tau} < 0 \) and \( \frac{\partial u^j}{\partial \tau} < 0 \) iff
\[ \tilde{T}^\varepsilon > \frac{\varepsilon - (\eta + 1)}{\varepsilon}. \]

### A.2 Proposition 2

Using (21), we have
\[ \frac{\partial \log \rho}{\partial \tau} = \frac{1}{\tau} + \frac{\eta - \varepsilon}{\theta^t} - \frac{\varepsilon}{\theta^t} \]
and
\[ \frac{\partial \log \rho}{\partial f} = \frac{1}{f} + \frac{\eta - \varepsilon}{\theta^t} \frac{\partial \tilde{T}}{\partial f}. \]

Then for sheltered firms,
\[ \text{MCPF}^\tau(j) > \text{MCPF}^f(j) \] (30)
is equivalent to
\[ \frac{1}{\tau} - \frac{\eta}{f} \theta^t - \varepsilon \frac{\theta^t}{\hat{t}} > \frac{1}{f} + \left( 1 - \frac{\eta}{\varepsilon} \right) \frac{\tilde{T}^\varepsilon}{\varepsilon}. \]
using (29). Under Assumption 1,

\[ 1 + \frac{(\eta + 1 - \varepsilon)}{\varepsilon} \frac{1}{T^\varepsilon} > 0, \]

so that (30) is equivalent to

\[ \frac{f^{\theta^\varepsilon - 1}}{1 - \frac{\eta}{\varepsilon} f^{\theta^\varepsilon} - \varepsilon \frac{1 - \theta^\varepsilon}{T}} > \frac{1}{\varepsilon} \frac{1 - T^\varepsilon}{T^\varepsilon - 1}. \]

A few steps of algebra then show that broadening the base is preferred to increasing the tax rate in if and only if

\[ H(\tau, \varepsilon) \equiv 1 - \tau - \varepsilon \tau - (1 - \tau)^{\varepsilon + 1} < 0. \]

As \( \frac{\partial H(\varepsilon, \varepsilon)}{\partial \tau} = (\varepsilon + 1) (T^\varepsilon - 1) < 0 \), this function is decreasing and takes on a value of zero at \( \tau = 0 \). The inequality thus holds for all \( \tau > 0 \). 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, \( j \leq f \), note that

\[ \frac{\partial u^j}{\partial \tau} / \frac{\partial u^j}{\partial f} = \frac{\partial \hat{T}}{\partial \tau} / \frac{\partial \hat{T}}{\partial f} - \frac{\mu \theta^\varepsilon}{\frac{1}{\tau} \left( 1 - \hat{T} \theta^{\varepsilon + 1} + \frac{\eta + 1}{\varepsilon} \hat{T} \theta^{\varepsilon + 1} \right) \frac{\partial \hat{T}}{\partial f} > \frac{\partial \hat{T}}{\partial \tau} / \frac{\partial \hat{T}}{\partial f}, \]

where the inequality follows from \( \mu \theta^\varepsilon / \frac{\partial \hat{T}}{\partial f} < 0 \). Then the ratio \( MCPF^\tau (j) / MCPF^f (j) \) is larger for owners of taxed firms than it is for owners of sheltered firms and 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 \( \tau \).

The corollary to this proposition is simple to demonstrate. The social welfare planner faces the same constrained maximization problem as does the individual citizen in (22) and (23). The planner does not, however, 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 if one of two conditions hold:
1. The revenue requirement \( g \) cannot be satisfied at \( f = j \), or

2. Her utility is higher at \( f = 1 \) (and the corresponding tax rate required to satisfy the revenue need) than it is at \( f = j \) (and the corresponding tax rate).

Beginning from the former condition, we now show that if the revenue requirement \( g \) cannot be provided at the tax base \( f = j \), it can also not be provided at any \( f = \tilde{j} \) with \( \tilde{j} < j \). To see this, note that, given the tax base, revenues are maximized at a tax rate \( \tilde{\tau} \) satisfying

\[
\frac{1 - \tilde{\tau}}{\tilde{\tau}} = (\eta - \varepsilon) f \tilde{\theta}^\varepsilon + \varepsilon,
\]

where

\[
\tilde{\theta} = \frac{1 - \tilde{\tau}}{f (1 - \tilde{\tau}) + 1 - f}.
\]

Maximized revenues (revenues at the revenue-maximizing tax rate) are increasing in the tax base if and only if

\[
\frac{\partial \log \rho (\tilde{\tau}, f)}{\partial f} > 0.
\]

This holds for \( \varepsilon > \eta \). If \( \eta > \varepsilon \) this is equivalent to

\[
(\eta - \varepsilon) f \tilde{\theta}^\varepsilon < \varepsilon \frac{(1 - \tilde{\tau})^\varepsilon}{1 - (1 - \tilde{\tau})^\varepsilon}.
\]

Using (31) this holds if and only if

\[
H (\tilde{\tau}, \varepsilon) = 1 - \tilde{\tau} - \varepsilon \tilde{\tau} - (1 - \tilde{\tau})^\varepsilon < 0.
\]

But \( H (\tau, \varepsilon) < 0 \) for all \( \tau \in (0, 1) \): this inequality always holds and the highest feasible level of tax revenues is always increasing in the tax base. 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 \( f \). Then the utility of \( j \) is higher at \( f = 1 \) than at \( f = j \) iff

\[
\hat{T} (j, g)^{\eta+1} \left( \frac{1}{1 + \eta} + \frac{1}{\varepsilon \hat{T} (j, g)^\varepsilon} \right) < T (1, g)^{\eta+1} \left( \frac{1}{1 + \eta} + \frac{T (1, g)^\varepsilon}{\varepsilon T (1, g)^\varepsilon} \right),
\]

(32)
following directly from comparing the two scenarios in the utility function (18). The right hand side of this inequality gives the value of tax reform, but is not dependent on $j$. Thus if

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

and $j$ prefers reform to $f = j$, it must be the case that $\tilde{j}$ prefers reform to $f = \tilde{j}$.

This last inequality holds if and only if $j > \tilde{j}$, following from the fact that $MCPF^r > MCPF^f$ for all citizens owning sheltered firms and for all $\{f, r\}$, as noted in Proposition 2. $MCPF^r > MCPF^f$ implies that a revenue neutral broadening of the base (and lowering of rates), which is equivalent to this last inequality if $j > \tilde{j}$.

Noting that the choice $f = 0$ delivers no revenues and thus violates the budget constraint (23), 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. Setting $j = 1$ in (32) violates the inequality (noting that $\hat{T}(1, g) = T(1, g)$) so that reform is not desirable for $j = 1$.

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

The case $j^R > 0.5$ is simple. All voters $j < j^R$ prefer $f = 1$ to any other policy, and this is the Condorcet winner.

The remainder of the proof shows that if $j^R < 0.5$ no Condorcet winner exists. Any policy $f < 0.5$ would be dominated by $f = 0.5$, for example, as Proposition 2 shows that all citizens prefer a broader tax base as long as their own tax status remains unchanged. The tax status of all voters $j \geq 0.5$ would be the same under $f = 0.5$ as under any $f < 0.5$, so that they prefer $f = 0.5$. Thus no policy $f < 0.5$ is a Condorcet winner.

No policy $f \in [0.5, 1)$ is a Condorcet winner either because a majority of citizens would prefer any policy $\tilde{f} > f$. The tax status of all citizens in the ranges $j \in [0, f]$ and $j > f$ is the same under both these proposals, so that
they prefer the proposal with the broader base, $\tilde{f}$. These citizens constitute more than half the populace, so that no policy $f < 1$ is a Condorcet winner.

Finally, $f = 1$ is not a Condorcet winner because it would lose in a bilateral referendum against the policy $f = 0.5$, among others. The policy $f = 0.5$ shelters the firms of $j \geq 0.5$ from taxation and gives all these citizens the same utility. As $j^R < 0.5$, citizen $j = 0.5$ obtains higher utility at $f = 0.5$ than at $f = 1$, by the definition of $j^R$. Thus all citizens $j > 0.5$ prefer $f = 0.5$ to $f = 1$. No policy $f$ is a Condorcet winner in this case.