A Positive Theory of Tax Reform*

Ethan Ilzetzki†

This Draft October 7, 2013.

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 in setting where marginal reforms would be rejected. This contrasts with a large literature that postulates or concludes that larger reforms face greater political difficulties. 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, discrete shifts in political platforms. Forces that might make tax reform sustainable are also considered. 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.

* I thank Tim Besley, Gilat Levi and Ronny Razin for useful comments.
†Department of Economics, Centre for Macroeconomics, and Centre for Economic Performance, London School of Economics.
1 Introduction

Every decade or so, new proposals to overhaul the U.S. tax system come up for debate. Similar patterns are observed 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 the government to raise revenue is an important nexus of economic development, by some accounts, and the very cost of civilization, according to others.\footnote{See Besley and Persson (2011) and Sachs (2012), respectively.} Why are some governments able to extract a significant share of income from their economies while others find it difficult to raise the revenues for the functioning of even the most rudimentary state? A recent literature begins to explore these questions (see Besley and Persson, 2011, for example).

Even in the most developed polities there are significant limits on the ability of the government to collect revenues from their citizens. Moreover, these limits are typically 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 so called “tax expenditures”. This forgone revenue would be more than sufficient to finance all U.S. defense spending. A similar picture can be drawn in other countries. Prior to the tax reform of 2000, the corporation tax in Germany raised less than two percent of GDP in revenues. While some of these lost revenues were due to outright evasion, or difficulties in tax administration, the majority were lost due to the nature of the tax code itself. 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.

Why would governments impose limits on their ability to raise revenues for their own operations? Why would they not choose to raise tax revenues in the most efficient way? Brennan and Buchanan (1980) argue that inefficient taxation is a way for citizens to limit a leviathan state’s ability to extract resources. This does not appear to accord with the actual factors leading to the erosion of the tax base in advanced democracies. Tax reform is popular in abstract (Boskin, 1996) and both U.S. political parties currently advocate tax reform that would eliminate some tax preferences.\footnote{See http://www.whitehouse.gov/economy/reform/tax-reform and} But each recipient

\[\text{...}\]
of a specific tax exclusion—be it homeowners or corporations—is resistant to forgoing her own benefit. It is this “don’t tax you, don’t tax me, tax the fellow behind the tree” paradigm that entrenches the existing tax system in the U.S. and elsewhere. Nevertheless, once in a generation, some significant improvements in the efficiency of taxation become politically feasible. What makes such political moments possible?

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. I do not wish to engage in the important debate on what constitutes “tax reform.” The notion of tax reform studied here is generic enough to involve a significant change in the tax code that simultaneously broadens the tax base, simplifies the tax code, eliminates tax preferences, reduces the average elasticity of the tax base, and improves both horizontal and vertical equity. It is therefore general enough to encompass the majority of tax-reform proposals that have been considered in the political arena. Instead, we will consider the political forces that allow the passage of such legislation in certain circumstances, but make it impossible in others.

The model, presented in Section 2, contains a continuum of citizens. Each citizen earns wage income from labor that is elastically supplied in a competitive labor market. In addition, each citizen is the sole owner of a firm, from which she derives profit income. Each firm produces a unique variety of consumption good and firms compete via monopolistic competition. All goods have identical demand elasticities.

The government must tax all income—from labor or profits—at a flat rate, but is also able to choose the tax base, by allowing a subset of consumption goods to be deductible from taxable income. The tax base is chosen freely—there are no economic costs to tax enforcement, only political constraints. Fiscal policy is a choice of a tax base and a tax rate to raise a given revenue requirement. The most efficient way to raise revenues is by eliminating all tax exemptions. I show, in fact, that given dictatorial powers, any individual citizen would want to tax all goods, with the exception of the one produced by her own firm. In their roles as consumers and workers, citizens prefer a broader tax base, because it reduces deadweight losses. As a firm-owner, each citizen also prefers a broadening of the tax base, as long as the product

---

3 See Feldstein (1976) for a detailed discussion.

4 Considerations of vertical equity will not be a central focus of this paper, however.
produced by her own firm is unaffected. Broadening the tax base increases the effective price of competing goods, and thus increases the firm’s profits. However, a firm’s profits drop discretely if broadening of the tax base eliminates the deduction from the good it produces.

Herein lies the political challenge: While each citizen agrees that the tax base should include virtually all goods, her own profits face a discrete negative jump once the tax base is marginally expanded to eliminate the tax exclusion benefiting her firm. In contrast, a marginal increase in the tax rate, although less efficient in aggregate, affects her profits marginally and positively through general equilibrium effects. Thus citizens may be very resistant to broadening the tax base, if their own product loses its exemption in the process.

Each citizen favors tax reform that eliminates exemptions in principle, but resists such reform if her own benefits are affected—the classical political common pool problem. A citizen will always oppose increases in the tax base if hers is the only exemption to be affected; she will therefore oppose tax reform on the margin. But individual citizens may support reform that broadens the base significantly, so that the efficiency gains from the broader base compensate for the discrete loss in income due to the forgone exemption. I identify a cutoff measure of citizens who are exactly indifferent between retaining their own exemptions and the enactment of a comprehensive tax reform that broadens the base to eliminate all exemptions.

Policy is determined via competitive elections, where two political candidates propose policies to maximize their vote share. When revenue requirements are moderate, taxation with a limited base is feasible and the deadweight losses from taxation are small, despite the narrow base. The median voter then coalesces with other beneficiaries from exemptions and retains her tax preference, at the cost of the moderate efficiency losses that result. When revenue needs are greater, however, the median voter is willing to forgo her firm’s tax benefit, as part of a broader reform that eliminates all tax preferences.

The model has a number of predictions on the politics of tax reform. First, tax reform is more likely when revenue requirements are high. Second, there is a tipping point that triggers tax reform. Small fluctuations in revenue needs will lead to small changes in tax rates and minor tweaks in the tax code. But above a certain revenue threshold, a significant change in the tax code may come about. 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 in a politically-feasible tax reform, allowing a decrease in marginal rates. Finally, tax reform may involve a political “grand-bargain” and obtain bipartisan support. Our model shows a discrete shift in political platforms as tax reform is enacted. These predictions are generally consistent with the political experience of tax reform in the US and other countries. I provide a examples and further discussion in Section 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. To my knowledge, this paper is the first to study political economy factors in this setting. It contributes to this literature along several dimensions. First, the existing literature is normative and the tax base is chosen optimally as a trade-off between enforcement costs and revenue or efficiency gains. There is no positive assessment of what may bring about a suboptimal tax base. It is therefore hard to frame “reform” in this setting. In the model presented in this paper I assume no enforcement, so that any tax exemption is suboptimal, highlighting the political, as opposed to the administrative, factors leading to a narrower tax base. Second, in the existing literature, any increase in revenue needs will be satisfied by a marginal increase in tax rates and the tax base. As I show in Section 3, many tax reforms mix a broadening of the tax base with a reduction of tax rates. This is not an equilibrium outcome in the Wilson-Yitzhaki framework, but does arise due to the political frictions modeled here. Third, the main constraint on broadening the base in the public finance literature is the cost of enforcing the tax code. But one might argue that some tax deductions are more costly to enforce than a simpler tax code that eliminated these deductions (see for example Kaplow, 1996). The existing literature would predict that no such deductions would exist in equilibrium. The political economy factors modeled here provide a possible explanation.

A growing literature sheds light on the long-run political incentives to accumulate fiscal capacity—the ability of governments to tax their citizens. Besley and Persson (2011) is a prominent example and provides a comprehensive review of this literature. They show how cohesive and stable institutions provide leaders with the incentives to accumulate tax capacity, while weaker institutions may lead to Pareto-inefficient outcomes in the long run. The
model presented here is different in its economic and political setting. Policy is determined through electoral competition and I provide microfoundations for the reduced-form limits on fiscal capacity in the existing political economy literature. In addition, this paper makes a number of contributions to the political economy study of fiscal capacity accumulation.

First, the focus in the existing literature is on the long-run development of fiscal capacity, and does not address the political impediments to further improvements in the tax code in high-income countries. My focus on tax reform sheds light on the factors that might limit fiscal capacity accumulation even in developed countries.

Second, the process of fiscal capacity accumulation tends to occur in leaps and bounds, followed by long periods of inaction, rather than continuously. The model presented in this paper explains why this may be the case and studies the factors that might lead to critical tipping points in favor of tax reform.

Third, the existing literature too relies on the costliness of fiscal capacity accumulation. While enforcement costs are plausibly binding constraints on tax collection in developing countries, many of the tax preferences in high-income countries are themselves costly to enforce.

Fourth, the existing literature does not explain the ratchet effect—shocks to revenue needs, e.g. war, lead to increases in tax collection, but the tax base rarely shrinks after these shocks have subsided. As I argue in Section 3, the present framework may help explain the ratchet effect.

Finally, taxation in this strand of the literature is typically non-distortionary (see the appendix of Besley, Ilzetzki and Persson, 2013, for an exception). While possibly innocuous for the questions addressed in the existing literature, this assumption may not be without loss of generality for other questions. Specifically, developing countries with low fiscal capacity typically have tax rates that are similar, but tax bases that are much narrower, than those of more developed economies. Such tax systems not only raise lower revenues, but also entail larger deadweight losses. Base-broadening may indeed entail larger enforcement costs, but also lowers deadweight losses. It is unclear without further scrutiny that the efficiency benefits of broadening the tax base do not compensate for the enforcement costs, in which case fiscal capacity accumulation would be unanimously desirable. In this paper, I incorporate distortionary taxation and abstract from tax enforcement, so that any failure to accumulate fiscal capacity is truly due to political, rather than economic, factors.
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 draw a distinction between tax reform—a movement from an existing tax code to a better one—and optimal tax policy, where the tax code is designed from scratch. In this paper, I provide a positive framework to analyze the political factors driving tax reform, aside from its normative desirability. I draw on the public finance literature on tax reform and contrast politically feasible tax reform with politically feasible tax policy. Indeed, in the model presented here, tax reform may be infeasible given the current tax code in contexts where the first-best policy would be adopted if the tax code were designed from scratch. But I also show that the prevailing assumption that marginal reforms are more politically feasible than a major redesign of tax policy may be misguided. A marginal reform may pose large losses to a small but pivotal fraction of the population that would nevertheless accede to a full re-design of the tax code.

There is a rich existing literature on the political economy of fiscal policy. See Drazen (2000) Persson and Tabellini (2002) for comprehensive literature reviews. This literature focuses on the political forces that would lead to the design of certain tax systems de-novo, but not on the specifics of tax reform. A separate literature discusses the political impediments to reform more broadly or in other contexts. Alesina and Drazen (1991) show how reform might be delayed because of political conflict over the distributional implications of reform and asymmetric information about the personal costs of delay to different groups in society. 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 as well. Finally, Grossman and Helpman (2002) study the role of special interest groups in preventing trade reforms.

In addition to the particular focus on tax reforms, the mechanism studied here is distinct from the existing literature. There is no uncertainty about the distributional costs and benefits of tax reform. In fact, as I discuss in Section 3, the distributional implications of tax reform might be more certain than those of a reversal of tax reform, so that the Fernandez-Rodrik logic is turned on its head. Reform also does not affect the distribution of political power in this model. Instead two main forces may delay reform in this setting. First, there are shifting coalitions in the model, with the median voter’s interests aligned with those seeking tax exemptions when revenue needs are
low, but with those seeking tax reform when revenue needs are high. Second, there is a discrete tipping point towards reform because of a discontinuity of policy preferences of each individual citizen. The discontinuity is at the point where the tax status of the individual voter is altered. Thus small policy shifts that improve efficiency are insufficient to compensate for the individual losses of pivotal interests. It is only when a larger reform is possible that reform becomes feasible. This is in stark contrast with the existing literature on delayed reforms. Marginal reforms have more certain distributional implications, are less likely to cause a shift in political power and are unlikely to be worth the fixed costs of lobbying or the costs of distributional conflict. The existing literature would help explain why large reforms, rather than small are politically challenging to adopt. The mechanism studied here gives the opposite prediction.

2 The Model

Economic Structure 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 firm-owner—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

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

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 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 \( i \). The consumption good \( x^j \) (consumed by consumer \( j \)) is comprised of a continuum of unit measure \( i \in [0, 1] \) of consumer goods \( x^j (i) \), each of which is sold at a consumer market price of \( p(i) \). The overall consumption of consumer \( j \), \( x^j \), is a CES aggregate of the individual varieties

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

Personal income \( w h^j + \pi^j \) is taxed at a uniform rate \( \tau \), but varieties of consumption goods such that \( i \in [f, 1] \) are sheltered from taxation. Con-
sumer choice is then to maximize (1) through a choice of varieties \( \{x^j(i)\}_{i=0}^1 \) and labor supply \( h^j \), subject to the budget constraint

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

Each firm \( i \) has a monopoly over a technology that transforms \( h(i) \) units of labor into \( zh(i) \) units of good \( i \). Each firm faces a fully competitive labor market, but a monopolistically competitive (Dixit and Stiglitz, 1977) goods market.

The government uses tax revenues to finance a public good \( g \). 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.

**Consumption Bundle and Demand for Varieties** Let \( p^c(i) \) is the effective consumer price of good \( i \), defined as \( p^c(i) \equiv p(i) / T(f,i) \), where \( T \equiv 1 - \tau \) is the net-of-tax rate and \( T(f,i) \) is

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

The consumer price index is then defined as

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

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

\[
x^j(i) = \left( \frac{p^c}{p^c(i)} \right)^{\varepsilon+1} x^j, \tag{5}
\]

with overall 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

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

where

$$\pi = \int_{j=0}^{1} \pi^j dj,$$

$$h = \int_{j=0}^{1} h^j dj,$$

are total pre-tax profits and the aggregate supply of labor, respectively.

**Firms** Firms have access to a technology that converts one hour of work into $z$ units of a variety of the consumption good. 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

$$\pi(i) = \max_{p(i),x(i),h(i)} p(i) x(i) - wh(i), \quad (8)$$

subject to

$$x(i) \leq zh(i), \quad (9)$$

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

$$p(i) = \mu \frac{w}{z} = p, \quad (10)$$

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

$$p^c = \frac{1}{\tilde{T}},$$

where

$$\tilde{T} \equiv [fT^e + (1 - f)]^{\frac{1}{e}}, \quad (11)$$

is the effective net-of-tax rate. Naturally, if producer prices are all equal and normalized to 1, the CPI is simply the inverse of the effective net-of-tax
rate. It will be useful in later exposition to refer to the effective tax rate as \( \hat{\tau} \equiv 1 - \hat{T} \).

The profits of firm \( i \) given by (8) are then directly proportional to the demand for their good

\[
\pi(i) = \frac{x(i)}{\varepsilon + 1}.
\]  
(12)

Given the fixed price of the public good, firm \( i = 1 \) has a similar maximization problem and sets a price of \( p(1) = 1 \). The profits of firm 1 from consumer purchases are as in (12), and its demand for labor for the production of consumer goods is as in (9). The firm hires an additional mass of \( \dot{h}(1) = \frac{g}{\varepsilon} \) workers for the production of public goods and obtains an additional mass of profits of \( \ddot{\pi}(1) = \frac{g}{\varepsilon + 1} \) from their sale.

**Government** The government collects tax revenues

\[
\rho = \tau \left( w h + \pi - \int_{i=f}^{1} p(i) x(i) di \right)
\]  
(13)

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 enforcement and runs a balanced budget, its budget constraint reads simply

\[
\rho = g.
\]

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

\[
x^j = \hat{T} \left( w h^j + \pi^j \right),
\]  
(14)
yielding aggregate consumer demand of

\[
x = \int_{j=0}^{1} x^j dj = \hat{T} (w h + \pi).
\]

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

\[
x(i) = \left( \frac{T(f, i)}{\hat{T}} \right)^{\varepsilon+1} x.
\]  
(15)
**Labor market and Aggregate Income**  Workers’ first order condition for the supply of labor gives

\[ h = h^j = \left( \frac{\eta z \hat{T}}{\mu} \right)^{\eta}. \]  \tag{16}

Total profits are given by

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

and the total demand for labor by

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

Using (12), (9) and the values of \( \pi (1) \) and \( \tilde{h} (1) \) we then obtain

\[ \pi = \frac{zh}{\varepsilon + 1}, \]

giving the market clearing condition of

\[ wh + \pi = zh. \]

**Profits**  The profit income of household \( j \) is given by the profits of firm \( j \), which is

\[ \pi^j = \pi (j) = \frac{1}{\varepsilon + 1} \left( \frac{T (f, j)}{T} \right)^{\varepsilon+1} x, \]

for any \( j < 1 \). We have used (??) and (15) in (12) to obtain this result.

**Indirect Utility**  The utility of citizen \( j \) is given by (1). \( h^j = h \) is given by (16) and \( x^j \) is given by (14), so that the indirect utility of a household \( j < 1 \) can be described by

\[ u^j = \eta^n \left( \frac{z \hat{T}}{\mu} \right)^{\eta+1} \left( \frac{1}{1 + \eta} + \frac{T (f, j)^{\varepsilon+1}}{\varepsilon T^{\varepsilon}} \right). \]  \tag{17}

This indirect utility function has two easily-interpretable terms. First, \( \frac{\eta^n}{1+\eta} \left( \frac{z \hat{T}}{\mu} \right)^{\eta+1} \) is the utility of citizen \( j \) as a worker-consumer. This term gives the utility of
consumption from labor income net of the disutility of supplying this labor. Absent wealth effects, the supply of labor is independent of profits and therefore uniform across citizens. This component of utility is increasing in the effective net-of-tax rate \( T \) given in (11) and is therefore decreasing in both the tax rate \( \tau \) and the breadth of the tax base \( \varepsilon \)–as consumers, all citizens wish fewer goods to be taxed and for taxed goods to be taxed at a low rate. Utility is affected by changes in the net-of-tax rate with an elasticity that is related to the elasticity of the supply of labor.

Second, the term \( \frac{\varepsilon}{\bar{e}} \left( \frac{\bar{T}}{\mu} \right)^{\eta+1} \frac{T(f,j)^{\eta+1}}{\bar{T}} \) gives the utility of citizen \( j \) as a firm-owner-consumer, equaling profits. Profits from the total sales of good \( j \) are affected by both aggregate and relative demand. The term \( \frac{\varepsilon}{\bar{e}} \frac{1}{\bar{p}} \left( \frac{\bar{T}}{\mu} \right)^{\eta+1} \) is proportional to aggregate consumption and gives the effects of aggregate consumer demand on the consumption of good \( j \) and therefore the profits of firm \( j \). Aggregate demand is increasing in the net-of-tax rate, again with an elasticity that is related to the elasticity of labor supply.

\[ \frac{T(f,j)}{\bar{T}} = \frac{\bar{p}}{p(j)} \] is the (inverse of) the relative price of good \( j \), so that \( \left( \frac{T(f,j)}{\bar{T}} \right)^{\varepsilon+1} \) gives the relative demand for good \( j \). This term is decreasing in the net-of-tax rate \( \bar{T} \). The intuition is simple: holding the price of good \( j \) constant, an increase in the overall level of taxation increases the average price level, thus lowering the relative price of good \( j \). This increases demand for this product and the profits of firm \( j \). The crucial elasticity here is \( \varepsilon \)–the elasticity of substitution across varieties. The more substitutable are varieties, the more a drop in the relative price of a good increases its relative demand. For similar reasons a reduction in the price of good \( j \) increases the relative demand for good \( j \). This price reduction could come about either because \( j \) obtains tax-deductible status, or because \( j \) is taxed and the overall tax rate \( \tau \) is lowered.

Owners of firms whose goods are taxed (we will refer to such firms as “taxed firms” for short) always prefer lower tax rates. They benefit from lower rates as workers/consumers, but also as firms, as a decrease in the tax rate \( \tau \) lowers the relative price of their good \( \frac{\bar{T}}{\bar{T}} \).

Things are more ambiguous for owners of firms whose goods are sheltered from taxation (we will refer to such firms as “sheltered firms” for short). As workers/consumers they prefer lower rates. As firm-owners, the relative demand for their goods is increasing in the tax rate as higher taxes shift
demand towards tax-deductible products. However, aggregate demand is deceasing in the tax rate, so that sheltered firms face a trade-off. Specifically, aggregate demand dominates relative demand in the overall demand for tax-sheltered goods if and only if $\eta + 1 > \varepsilon$.

We summarize these insights 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

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

**Proof.** Appendix A. ■

Note that the discussion here regards ranking of utilities, not policy preferences in general, which would incorporate the trade-off between the need to raise public revenues and the costs of taxation. Proposition 1 shows, however, that even in the absence of greater revenue needs, tax-sheltered firms may prefer higher effective tax rates. 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.$^{5}$

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.

Figure 1 illustrates the points made in Proposition 1 for a parametrization for which $\varepsilon > \eta + 1$. The left-hand panel shows the utility of firms conditional on being taxed, as a function of the tax rate. Each curve represents a different

---

$^{5}$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. See also Ilzetzki (2013).

$^{6}$Parameter values were chosen to illustrate the nature of preferences, rather than for realism. The elasticity of labor supply was set to $\eta = 0.3$, consistent with numerous microeconomic studies. The elasticity of substitution across varieties was set in the range $\varepsilon \in [2, 3]$. 
Figure 1: Agents’ Utilities, Conditional on the Tax Status of their Firm’s Product

tax base, with broader tax bases represented in lower curves. As shown in Proposition 1, the utility of a taxed firm decreases monotonically in both the tax rate and the tax base. This is not the case for a firm, conditional on being sheltered, as shown in the right-hand panel. For low effective tax rates (low tax rates or narrow tax bases) utility is decreasing in both the tax rate and the tax base. But for high effective tax rates, both tax rates and the tax base increase the utility of sheltered firms.

This figure also illustrates an important distinction between changes of the tax base on the intensive and extensive margin. The y-axis in the charts are in units of utils. Note the large gap that opens up between the utility of
owners of sheltered and taxed firms, as tax rates increase and the tax base broadens. As revenue needs increase, firms that are sheltered from taxation may support broadening the tax base conditional on remaining sheltered from taxation (the intensive margin), but very resistant to a broadening of the base that includes their firm’s product.

As we noted, all citizens prefer lower taxes in their role as workers. The differences in preference come from firm profits. These are illustrated in Figure 2, which shows the profits of firms as a function of the tax rate (x-axis) and the tax base (higher curves reflecting broader tax bases). The left-hand panel presents profits for firms conditional on being taxed and the right-hand panel presents profits conditional on being sheltered. As can be seen, all firms prefer a broader base on the intensive margin, i.e. if their tax status does not change. A broader base increases the effective tax rate, and thus lowers the price, of some competitors’ products, to the benefit of all other firms. Naturally, no firm’s profits would increase if a marginal broadening of the base changed the tax status of their own product. Increases in the statutory tax rate cuts into the profits of taxed firms, whose product price increases as a result, but increases the profits of taxed firms, as this increases the profits of their competitors. Thus while increased taxation always harms the taxed, it increases the profits of the sheltered firms, and thus has ambiguous effects on the utility of their owners.

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

\[
\log(\rho(\tau, f)) = \log \tau + \log f + \eta \log \hat{T} + \epsilon \log \left( \frac{T}{\hat{T}} \right) + \zeta(z, \eta, \epsilon),
\]

where \( \zeta(z, \eta, \epsilon) \) is a term that does not contain the tax instruments \( f \) and \( \tau \) and \( \frac{T}{\hat{T}} \). An increase in either the tax base or the tax rate has an immediate effect of increasing tax revenues proportionally, as captured by the first two terms in (19). 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 should be noted that in this case, an increase in the effective tax rate could come about due to an increase in either the tax rate or the tax base.

Beyond the substitution between leisure and consumption existent in models abstracting from the tax base, tax revenues are further affected by
Figure 2: Firms’ Profits, Conditional on the Tax Status of their Product
revenue efficiency, captured by the term $\theta \equiv \frac{T}{T^2}$: the wedge between the statutory and the effective net-of-tax rate. Tax efficiency is decreasing in the tax rate, as a higher rate on the existing tax base increases avoidance incentives. $\theta$ is increasing in the tax base as it reduces the range of tax-sheltered products and thus reduces tax avoidance, which becomes more costly to consumers in utility terms. This provides an additional distortion to incentives due to higher tax rates that is mostly ignored in the existing literature: higher tax rates cause a larger substitution from taxable to non-taxable activities, thus lowering tax revenues through an additional channel.

The relative magnitude of two elasticities—the elasticity of labor supply $\eta$ and the elasticity of substitution across varieties $\varepsilon$—then becomes important in the analysis of taxation with imperfect enforcement of the statutory tax code. First, the larger is $\varepsilon$ relative to $\eta$, the more important is the former in determining the overall elasticity of taxable income. Even if the elasticity of labor supply is small—as commonly found in microeconomic studies—the elasticity of taxable income could still be high if the elasticity of substitution between taxable and non-taxable activities is high.

Second, if $\varepsilon > \eta$, tax revenues are strictly increasing in the tax base: the revenue efficiency incentive effects are larger than the labor-supply disincentive effects and the effects of the tax base are unambiguous. If $\eta > \varepsilon$, in contrast, there may be a revenue-maximizing tax base, not only a revenue-maximizing tax rate.

Third, as shown in Ilzetzki (2013), the revenue-maximizing tax rate is increasing in the breadth of the tax base $f$ if and only if $\varepsilon > \eta$. The tax base thus complements the effects of tax-rate increases if $\varepsilon > \eta$, but there is a trade-off between the two if this inequality is reversed.

### 2.1 Policy Preferences

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

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

18
The term $T(f,j)$ introduces a discrete jump in the utility function at $f = j$. This discrete jump draws the distinction between the effects of tax-base broadening on the intensive margin and the extensive margin. The former is a broadening of the tax base that does not affect the tax status of the product produced by citizen $j$’s firm. On the intensive margin, a marginal change in the tax base has a marginal effect on citizen $j$ as a consumer; as a producer she is affected only indirectly through general equilibrium changes in prices. A broadening of the tax base on the extensive margin, i.e. one that moves from $f < j$ to $f > j$, has a discrete negative effect on the citizen’s utility. Even a marginal increase in the tax base has a non-marginal effect on the utility of the magnitude $\frac{1 - T^x_{\tau} + 1}{\varepsilon T^x_{\tau}} \left( \frac{z^j}{\mu} \right)^{\eta+1}$. The change in the tax status of citizen $j$ has a discrete impact on her profits as a firm owner.

For expositional purposes, throughout the paper, it will be useful to think of citizens $j \in [0,1]$ as though they were ordered in terms of taxability of the product their firms produce. That is, a tax base of $f$ will always tax the goods indexed $i \in [0,f)$, not an arbitrary set of good of measure $f$.

Figure 3 illustrates the utility function of citizen $j = 0.3$ as a function of the tax rate on the x-axis and with each curve representing a different breadth of the tax base $f$. The top lines are for $f < 0.3$ and the lines below the gap are for $f > 0.3$. In both cases, utility is decreasing in both the tax rate and the tax base, but notice the large downward jump at $f = 0.3$. The figure also gives a sense of the orders of magnitude: it is very difficult to compensate the citizen with policy changes on the intensive margin (i.e. changes in tax policy that do not affect her tax status) for the large discrete loss in utility caused by the inclusion of her firm’s product in the tax base. This point has important political implications, to which we turn shortly.

In the parameterization chosen for Figure 3, preferences are monotonic in both $f$ and $\tau$, but this is not a general point. As noted in Proposition 1, the utility of owners of sheltered firms may be increasing in part of the

\[ \rho(\tau, f) \geq g. \]
Figure 3: Utility of Agent $j = 0.3$
policy space, but utility would then drop discretely as the $f = j$ threshold is crossed.

The maximization problem in (20) and (21) can be solved in three steps. First, solve the maximization problem subject to the constraint that citizen $j$’s firm remains sheltered: $f \leq j$. Second, solve the maximization problem subject to the constraint that the firm is taxed: $f > j$. Finally, compare the citizen’s utility under the two scenarios and chose the policy that provides the citizen with the higher utility.

Solving the first step of this problem is further complicated by the fact that Proposition 1 shows that the utility of sheltered firms may be increasing in both tax instruments over part of the choice set. If the optimal policy is in this region, the constraint (21) will not be binding and the policy choice (conditional on the citizen’s firm being sheltered) will be at the corner $f = j$ and $\tau = 1$.

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:

$$MCPF^\tau (j) = MCPF^f (j), \quad (22)$$

where

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

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

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 her 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 $f = 1$, for any positive revenue needs. 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 they are affected on the extensive margin. A corollary is that a social welfare planner would always set $f = 1$. 

21
Proposition 2  Assuming no enforcement costs to increases in the tax base, 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 \( \text{MCPF}^r(j) > \text{MCPF}^f(j) \), for any \( j \) outside a neighborhood of \( j = f \). 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 \( f = 1 \).

The proposition relies on the extreme assumption that the enforcement of a broader base entails no additional costs. This departs from the existing 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, this allows us to highlight more sharply the political constraints, as opposed to economic constraints to tax reform. Absent any economic rationale to restrict tax collection to a limited set of goods, any limitations to tax enforcement in equilibrium will be due to political, rather than economic constraints. Second, as noted in the introduction, some base-broadening measures would arguably reduce enforcement costs, rather than increase them. Proposition 2 highlights the difficulty to explain failures to expand the tax base in such cases absent political frictions. Finally, the extreme result in this proposition highlights the distinction between the effects of broadening the base on the intensive margin an on the extensive margin—a distinction that is of lesser importance in a discussion of tax rates. A base-broadening tax reform makes every citizen in the economy better off (the intensive margin), with the possible exception of those citizens whose firms are brought into the fold of the tax base (the extensive margin).

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 have tax reform as their most preferred policy. The following proposition is a step in that direction.

Proposition 3  Let \( \varepsilon \geq \eta \) and assume a given revenue need \( g > 0 \). If the preferred tax base of citizen \( j \) is \( f = 1 \) then for any citizen \( \tilde{j} < j \), the preferred tax base is also \( f = 1 \). 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 simple. If \( \varepsilon \geq \eta \), the revenue maximizing tax rate is increasing in \( f \). Thus if the revenue requirement \( g \) cannot be satisfied at \( f = j \), it cannot be satisfied at \( f = \tilde{j} \). Moreover, 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 \( \tilde{j} \) 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 \( \tilde{j} \).

We note that \( \varepsilon \geq \eta \) is a sufficient, not a necessary condition for Proposition 3. Experimentation with a large range of parameter values indicates that the result is more general, but it does not hold for all parameter values.

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.

Before turning to the question of preference aggregation, it is worthwhile outlining a first comparative static: the effects of increased revenue need. An experimentation with a wide set of parameter values shows that \( j^R \) is increasing in revenue needs \( g \). This illustrated in Figure 4, which 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 \( \varepsilon = 3 \). As I have 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, and is also indicative of the case \( \eta > \varepsilon \). Finally, the case \( \varepsilon = \eta(= 2) \) is illustrated in a third line. In all three cases the cutoff \( j^R \) is monotonically increasing in \( g \). This was true for other values of \( \varepsilon \) and \( \eta \) as well.
2.2 Politics

Armed with the preferences of all citizens, and their ranking 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. A natural starting point is to inquire whether there exists a policy that is a Condorcet winner. Throughout this section, we will 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 \( j^R < \frac{1}{2} \), as outlined in the following proposition.

**Proposition 4** If \( j^R \geq \frac{1}{2} \) there exists a Condorcet winning policy at \( f = 1 \). If \( j^R < \frac{1}{2} \), 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 $j^R < \frac{1}{2}$ 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 not affected 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 a number of political models, for example the classical Downsian median voter model. We now describe a model in which a unique equilibrium exists for any value of $j^R$.

**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 expected vote share in an election. The political game consists of three stages. In the first stage, the two candidates observe the revenue requirement $g$ and propose political platforms, $f^A$ and $f^B$. These are the tax bases they intend to (and are fully committed to) implement in the second stage if elected. The proposals are constrained to be feasible, i.e. there must be a tax rate $\tau$ that would generate the revenue requirement $g$, given the proposed tax base. They propose their platforms sequentially, with candidate $A$ proposing first and candidate $B$ proposing second, after observing candidate $A$’s proposal.

In the second stage, all citizens observe the platforms $f^A$ and $f^B$ and vote for their preferred candidate. Each citizen has one vote. Indifferent voters randomize between the two candidates with equal probability. The candidates receive payoffs proportional to their vote shares. The candidate who receives 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 third stage, the economy proceeds as in the description of the beginning of this section. Citizens choose labor supply and consumption, firms maximize profits, and citizens’ payoffs are realized, all subject to the tax policy set in the second 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. When \( j^R < \frac{1}{2} \), the unique equilibrium is \( f = j^R \). We summarize this result in the following proposition.

**Proposition 5 Political Equilibrium.** If \( j^R > \frac{1}{2} \), both candidates propose \( f^A = f^B = 1 \) and obtain a vote share of \( \frac{1}{2} \). The equilibrium policy is \( f = 1 \). If \( j^R < \frac{1}{2} \), candidate A proposes \( f^A = 1 \) and and candidate B proposes \( f^B = j^R \). The candidates obtain vote shares of \( 1 - j^R \) and \( j^R \), respectively. The implemented policy is \( f = j^R \).

If \( j^R = \frac{1}{2} \), a continuum of equilibria exists. In all equilibria candidate A proposes \( f^A = 1 \). The equilibria differ in the proposal of candidate B who may propose \( f^B = 1 \), \( f^B = \frac{1}{2} \), or randomize between the two with any probabilities \( q \) and \( 1 - q \), respectively, with any \( q \in (0, 1) \). In all equilibria both candidates obtain a vote share of \( \frac{1}{2} \). The policy \( f = 1 \) is implemented with probability \( \frac{1+q}{2} \) and the policy \( f = \frac{1}{2} \) is implemented with probability \( \frac{1-q}{2} \).

**Proof.** Appendix A.

Tax Reform The two types of equilibria \( f = j^R \) and \( f = 1 \) lend themselves naturally to an interpretation in the light of tax reform. The former can be viewed as a unreformed or pre-reform tax code; one that is economically inefficient, distorts prices to create rents and features horizontal inequity.\(^9\) We refer to tax reform as a transition from the former to the latter, as it simplifies the tax code, removes tax preferences, increases efficiency, eliminates rents and improves on horizontal equity. Figure 5 presents an example of a tax reform as described by the model. It shows the political equilibrium of the model directly to the left and to the right of the critical value \( j^R = \frac{1}{2} \). A few salient predictions of political economy of tax reform stand out.

First, tax reform is more likely when revenue needs are greater. We have noted that \( j^R \) is increasing in revenue needs \( g \). Tax reform occurs when \( j^R \) is sufficiently large, and thus when revenue needs are sufficiently high.

Second, there is a discrete political tipping point that triggers tax reform. A marginal change in revenue needs that brings \( j^R \) from just under \( \frac{1}{2} \) to just over \( \frac{1}{2} \) will trigger a discrete change in the tax code. Away from the

---

\(^9\)The code also introduces vertical inequity. Given that all agents are identical ex-ante, however, this model is not suited to study questions of vertical equity.
Figure 5: Equilibrium Tax Base and Tax Rate in pre- and post- Tax Reform
Figure 6: Equilibrium Tax Base and Tax Rate pre- and post- Shock to Revenues, Without Reform

\[ j^R = \frac{1}{2} \]
cutoff, discrete changes in revenue needs either induce marginal changes (when \( j^R < \frac{1}{2} \)) or no changes (when \( j^R > \frac{1}{2} \)) in the tax base.

Third, tax reform features a broadening of the base and a reduction in rates. This is in contrast to marginal changes in the tax code away from the \( j^R = \frac{1}{2} \) cutoff, which always feature increases in rates. Figure 6 shows an example of such a marginal change in tax revenues.

Fourth, tax reform may involve shifting coalitions, political re-alignment, or bipartisan coalitions. Although the model does not feature a legislative setting, Proposition 5 lends itself to some interpretation in the context of shifting coalitions in support of tax reform. While the two political parties propose competing platforms in the “pre-reform equilibrium”, the “reform equilibrium” has both political parties propose the same reform platform. A shift from the former equilibrium to the latter gives a discrete jump in the platform of the party that opposed reform in the pre-reform equilibrium.

In the following section, we give some suggestive evidence that these features do indeed correspond with historical experiences of tax reform.
3 Discussion

In this section I contextualize the model in light of historical experiences of tax reform and discuss some implications of the model.

Historical Context The landmark tax reform of the past several decades in the United States was the Tax Reform Act of 1986. Its main objective was to simplify the tax code and broaden the tax base. 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 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 such 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 with a vote of 97 to 3 and included 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). Our theory suggests that such tinkering on the margin of the tax code would have the tax rate and the tax base move in the same direction, consistent with Yitzhaki (1979) and Wilson (1989). Indeed, 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.

Recent discussions of tax reform 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/.)

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 simplified the tax code (reduced the number of brackets), broadened the personal and corporate tax base, eliminated deductions, and lowered 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.

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.

The German tax reform of 2000—passed after a decade of debates—was discussed in the context of fiscal consolidation. (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 on depreciation allowances, and lowering top marginal tax rates. Personal income tax rates were also decreased, although without substantial changes in the tax base.

In summary, several of the largest successful efforts to reform the tax code in the U.S. and other G7 countries in the past few decades seem to conform with the general features of our model.

**Piecemeal vs. De-novo Tax Design** Feldstein (1976) draws the distinction between de-novo tax design and the reform of existing tax laws. The study of optimal tax design, following Ramsey (1927), searches for the most efficient way to raise given revenue needs through taxation. Later, the literature following Mirrlees (1971) extended the analysis to the optimal trade-off between efficiency and (vertical) equity. Feldstein (1976) critiques this approach because “Everything we know about the theory of economic policy... reminds us that optimal piecemeal policies cannot be made by haphazard steps in the direction of the global optimum.” The underlying presumption is that policymakers face constraints—presumably political—that make large policy changes unfeasible. This critique advocates the study of the welfare impact of marginal changes in the tax code, rather than of a discrete shift towards the first-best tax policy. However, the nature of the political constraints on tax reform have been assumed, rather than derived, in previous research; the model presented here shows that the assumption that marginal reforms are easier to enact than large reforms are should not be taken for granted.

Consider reform attempts in the neighborhood of $f = j^R = \frac{1}{2}$ in our model, for example a shock to $g$ that increases $j^R$ from just below to just above $\frac{1}{2}$. A marginal tax reform that broadens the tax base is not an equilibrium response to a marginal increase in revenue needs. This is although the
reform is more efficient and thus welfare improving in the utilitarian sense, more horizontally (and vertically) equitable and benefits all but a measure zero of citizens.\(^\text{10}\) This proposal would moreover win a majority of close to 100\% in a bilateral referendum if the alternative were the status quo. But this is nevertheless not a politically feasible outcome in equilibrium. Any political proposal that broadens the base marginally would be countered with a proposal by a competing political candidate that broadens the base slightly further. This political competition between the two candidates leads to a reform that is not marginal, but discrete. The median voter (who is pivotal to reform) would not accept a marginal increase in the tax base, but would accept a grand bargain that significantly broadens the base, but also substantially lowers the tax rate. Thus the assessment in the public finance literature on tax reform that politicians are constrained to enact small reforms does appear to be generally correct.

It is worth briefly digressing to the topic of horizontal equity. The traditional view of horizontal equity is that a policy is horizontally equitable if it gives equal treatment to all identical citizens. As all citizens in our model are ex-ante identical, tax preferences in the pre-reform equilibrium are inequitable, and tax reform increases horizontal equity. The failure to enact tax reform when \(j^R < \frac{1}{2}\) leads not only to an inefficient outcome, but also to horizontal inequity.

However, Feldstein (1976) has a different, more dynamic, view of horizontal equity. There, a tax reform measure is horizontally equitable only if its treatment of citizens who had identical status in the pre-reform tax code are treated equally by the tax change. A different formulation of this notion of equity is that tax reform should preserve the ranking of citizens in terms of net earnings. Delayed implementation of reform would reduce the net present value of any distributional implications and is therefore desirable on equity grounds if the tax reform creates horizontal equity.

By this measure, tax reform is (weakly) horizontally equitable in our model: the income of the taxed increases and the income of the sheltered decreases, but their ordering is not reversed (only equalized). There is no horizontal-equity rationale to postpone such a reform. In fact, it is the small changes in the tax code when \(j^R < \frac{1}{2}\) that are inequitable by this notion. A

\(^{10}\)It is this measure zero of citizens that makes the failure to enact tax reform a political inefficiency, but not a political failure in the Besley-Coate (1989) sense. This reform would also not be horizontally equitable in the sense that Feldstein (1976) defines the term—more on this below.
broadening of the tax base to any $f < 1$ alters the tax status of some, but not all, owners of sheltered firms. Tax reform in our model does not violate Feldstein’s (1976) constraint that tax reform must be horizontally equitable. In contrast to the public finance literature on tax reform, this constraint would enable large reforms, but not marginal ones.

**Ratchet Effect** As noted in the introduction, an existing economic and historical literature explores governments’ incentives to accumulate fiscal capacity. As in our model, wars and other large shocks to revenues are predicted and shown to lead to the accumulation of fiscal capacity (see Tilly 2003 and Besley and Persson, 2011, for example). This paper contributes in showing why large shocks (that push $j^R$ over the $\frac{1}{2}$ threshold) may be necessary for significant investments in fiscal capacity. The existing literature leaves another question unanswered, however. Large fiscal shocks tend to lead to fiscal capacity accumulation. But following these shocks, fiscal capacity is rarely scrapped, as the post-World War II experience of Western Europe and the United States demonstrates. Increases in fiscal capacity tend to be permanent, the so-called ratchet effect. But should not the same political forces that led to low levels of pre-war tax capacity bring a decumulation of fiscal capacity as the clouds of war dissipate?

As in the existing literature, our model does not feature a ratchet effect. A fiscal shock that drives $j^R$ above the $\frac{1}{2}$ threshold will lead to tax reform and a broadening of the tax base. But a reversal of this fiscal shock that brings $j^R$ back below $\frac{1}{2}$ will cause a reversal of the tax reform and a narrowing of the tax base. Nevertheless, our model provides a way to think about the ratchet effect in fiscal capacity accumulation. In our model, citizens are risk neutral with respect to consumption. Imagine a slightly richer model, with concave returns to consumption. Now consider an economy beginning from $f = \frac{1}{2}$. Prior to tax reform, the pivotal citizen $j = \frac{1}{2}$ prefers $f = \frac{1}{2}$ to $f = 1$ by an infinitesimal margin. In other words, $j^R$ is slightly below $\frac{1}{2}$. The existing tax code is inequitable, but known: the pivotal citizen $j = \frac{1}{2}$ knows that she benefits from an exclusion under the existing tax code. She also knows that she would be taxed following tax reform.

Now consider a marginal shock to revenues so that $j^R > \frac{1}{2}$. $j = \frac{1}{2}$ now prefers tax reform to the status quo and tax reform would be enacted. However, a reversal of this fiscal shock would not necessarily lead to a reversal of the tax reform. A reversal of the tax reform would introduce tax benefits to
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.

While minor increases in tax revenue will typically be funded (at least partially) by increases in tax rates, politically-feasible tax reform may require reductions in tax rates alongside a broadening of the tax base. The political process through which such tax reform is enacted may involve bipartisan agreements and shifting coalitions.

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. I have abstracted from the interesting and rich legislative process typically involved in the passage of tax reform. Special interest groups and lobbying play an important role in determining the tax code, the process of tax reform, and the gradual erosion of the tax base between reform efforts. A further investigation into the role of special interests may lead to further insights.

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.

Changes in marginal rates affect all taxpayers, and through general equilibrium affect all economic agents, on the intensive margin. In contrast, even marginal changes in the tax base cause a discrete decline in the income of the affected citizens. The discrete jump in the utility of citizens affected on the extensive margin by changes in the tax base is a main driver of the political inefficiency in our model. Discontinuities in tax payments (e.g. notches in the tax code) are commonly exploited for empirical analysis in public finance, but little has been written on the causes for these inefficiencies in the tax code. The framework proposed in this paper may help shed light on the political forces driving the persistence of these peculiarities.

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 the interaction between vertical equity and horizontal equity in a political economy setting may also prove fruitful.

References


37


A Appendix: Proofs

A.1 Proposition 1

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

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

and

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

recalling that $\theta < 1$, $\hat{T} < 1$ and

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

For any owner of a sheltered firm $j > f$ we have $T(j) = 1$ and

$$\frac{\partial u^j}{\partial y} = \eta^n \left( \frac{z^T}{\mu} \right)^{\eta+1} \frac{1}{T} \left[ 1 + \frac{\eta + 1 - \varepsilon}{\varepsilon} \frac{1}{T^\varepsilon} \right] \frac{\partial \hat{T}}{\partial y} \quad (23)$$
for \( y = f \) or \( y = \tau \). Noting that \( \frac{\partial f}{\partial y} < 0 \) and

\[
\frac{\partial \hat{T}}{\partial \tau} = -f \theta^{\varepsilon-1} < 0,
\]

then \( \frac{\partial u^j}{\partial \tau} < 0 \) and \( \frac{\partial u^j}{\partial f} < 0 \) iff

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

### A.2 Proposition 2

Beginning from owners of sheltered firms, \( j > f \), it follows from (23) that

\[
\frac{\partial u^j}{\partial \tau} / \frac{\partial u^j}{\partial f} = \frac{\partial \hat{T}}{\partial \tau} / \frac{\partial \hat{T}}{\partial f} = \varepsilon f \frac{T^{\varepsilon-1}}{1 - T^\varepsilon}.
\]

Using (19), we have

\[
\frac{\partial \log \rho}{\partial \tau} = \frac{1}{\tau} + \frac{\eta - \varepsilon \frac{\partial \hat{T}}{\partial \tau}}{\hat{T} \frac{\partial \hat{T}}{\partial \tau}} - \frac{\varepsilon}{T}
\]

and

\[
\frac{\partial \log \rho}{\partial f} = \frac{1}{f} + \frac{\eta - \varepsilon \frac{\partial \hat{T}}{\partial f}}{T \frac{\partial \hat{T}}{\partial f}}.
\]

Noting that

\[
MCPF^\tau (j) > MCPF^f (j)
\]

if and only if

\[
\frac{\partial \tau}{\partial \tau} < \frac{\partial \log \rho}{\partial f},
\]

several steps of algebra show that broadening the base is preferred to increasing the tax rate in raising marginal revenues if and only if

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

As \( \frac{\partial H(\tau, \varepsilon)}{\partial \tau} = (\varepsilon + 1) (T^\varepsilon - 1) < 0 \), 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
\[
\frac{\partial u^j}{\partial \tau} \frac{\partial u^j}{\partial f} = \frac{\partial \hat{T}}{\partial \tau} \frac{\partial \hat{T}}{\partial f} - \frac{\mu \theta^\varepsilon}{\tau} \left(1 - \hat{T} \theta^\varepsilon + 1 + \eta^{\varepsilon+1} \hat{T} \theta^\varepsilon + 1 \right) \frac{\partial \hat{T}}{\partial f} > \frac{\partial \hat{T}}{\partial \tau} \frac{\partial \hat{T}}{\partial f},
\]
where the inequality follows from $\frac{\partial \hat{T}}{\partial f} < 0$. 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 $\tau$.

Turning to the optimal policy for a given citizen $j$, it is clear that conditional on her tax status, the solution is a corner solution with either $f = j$ or $f = 1$. The tax rate is set to raise the required revenues, i.e. to solve (21). The citizen will prefer to be taxed than sheltered in one of two cases. First, if $g$ is sufficiently high, it may be unfeasible to raise the needed revenues at $f = j$, even at the revenue maximizing tax rate. Choosing $f = j$ is not feasible and $f = 1$ is the optimal policy within the set of feasible options. Second, it may be the case that even if $f = j$ is feasible, utility under $f = 1$ is higher.

The corollary to this proposition is simple to demonstrate. The social welfare planner maximizes faces the same constrained maximization problem as the individual citizen in (20) and (21). The planner does not face the same discrete jump in the welfare function at any $j$, so that the solution to the problem is the corner solution $f = 1$.

### A.3 Proposition 3

Citizen $j$ prefers reform 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 that it is at $f = j$ and the corresponding tax rate.

Beginning from the former condition, we note that the revenue-maximizing tax rate is given implicitly by
\[
\tau = \frac{1}{1 + (\eta - \varepsilon) f \theta^\varepsilon + \varepsilon}.
\]
Noting that $\theta$ is decreasing in $\tau$ and increasing in $f$, the revenue-maximizing tax rate is increasing in the tax base if and only if $\varepsilon > \eta$, which we assume for the purpose of this proposition. Thus 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 $\tilde{j} < j$.

Turning now to the utility comparison in the second condition, let $T (f, g)$ denote the net-of-tax rate that provides revenues of $g$ if the tax base is $f$. Then the utility of $j$ is higher under reform than under $f = j$ iff

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

following directly from comparing the two scenarios in the utility function (17). We now argue that

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

if and only if $\tilde{j} < j$ and therefore $\tilde{j}$ prefers reform to $f = \tilde{j}$ if $j$ prefers reform to $f = j$. This last inequality follows from the the fact that $MCPF^x > MCPF^y$ for all citizens owning sheltered firms and for all $\{f, \tau\}$. $MCPF^x > MCPF^y$ implies that a revenue neutral broadening of the base (and lowering of rates) increases utility, giving this last inequality.

Noting that the choice $f = 0$ delivers no revenues and thus violates the budget constraint (21), citizen $j = 0$ has reform as her ideal policy. For $j = 1$, on the other hand, abstaining from reform is feasible, as reform provides a measure zero of revenues. Setting $j = 1$ in (25) violates the inequality (noting that $T (1, g) = T (1, g)$) so that reform is not desirable for $j = 1$.

With $j = 0$ preferring reform and $j = 1$ preferring $f = j$, 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. If, in contrast, $j^R < 0.5$ no Condorcet winner exists. Any policy $f < 0.5$ would be dominated by, for example, $f = 0.5$, 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 $\bar{f} > f$. 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, $\bar{f}$. These citizens constitute 
more than 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 
with 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.

\section*{A.5 Proposition 5}

We begin by solving for the case $j^{R} > \frac{1}{2}$ and proceed via backward induction. 
First, we solve for candidate $B$’s optimal reaction function to proposals by 
candidate $A$. For any proposal $f^{A} < 1$, candidate $B$ can obtain virtually 
100\% of the vote share by proposing $f^{B}$ to be infinitesimally larger than $f^{A}$. 
To see this note that all voters prefer a higher level of $f$ if their tax status 
does not change as a result. The tax status of only a zero-measure of voters 
is altered by choosing $f^{B}$ over $f^{A}$, and thus all voters other than that zero 
measure would vote for candidate $B$. It is easy to see that any other proposal, 
including $f^{B} = 1$ would lead to a lower vote share for candidate $B$.

If candidate $A$ proposes $f^{A} = 1$, it is impossible to propose $f^{B} > f^{A}$. The 
opimal reaction of candidate $B$ is then to propose $f^{B} = 1$. This strategy 
offers $B$ a vote share of $\frac{1}{2}$. The highest vote share that $B$ could receive by 
proposing $f^{B} < 1$ is $1 - \bar{j}^{R} < \frac{1}{2}$ (obtained by proposing $f = j^{R}$).

In the first stage, candidate $A$ is obviously better off choosing $f^{A} = 1$, 
obtaining a vote share of $\frac{1}{2}$. Any other proposal would provide her with a 
vote share of measure zero.

Now consider the case $j^{R} < \frac{1}{2}$, again via backward induction, beginning 
with candidate $B$’s to $A$’s proposal $f^{A}$. As before, if $f^{A} < 1$, $B$ can obtain 
almost 100\% of the vote share by proposing a slightly higher $f$ than did 
candidate $A$. If, however, $f^{A} = 1$, candidate $B$’s best reaction is to choose 
$f^{B} < j^{R}$, providing her with a vote share of $1 - j^{R} > \frac{1}{2}$. To see this note
that \( f^B = 1 \) would provide her with a vote share of \( \frac{1}{2} \). Any \( f^B > j^R \) would provide her with a vote share of \( 1 - f^B < 1 - j^R \), as voters in the range \( j \in [0, j^R] \) always prefer \( f = 1 \), those in the range \( j \in [j^R, f^B) \) would be taxed under both candidates’ plans and therefore prefer the plan with the broader base. Only candidates in the range \( j \in [f^B, 1] \) obtain a lower tax burden under candidate B’s plan. Any \( f^B < j^R \) would provide candidate B with a vote share of zero, as with \( f^B < j^R \) even sheltered voters prefer \( f = 1 \), by the definition of \( j^R \). Thus \( f^B = j^R \) is candidate B’s best reaction to \( f^A = 1 \).

Returning to the first stage, candidate A obtains a vote share of zero if she proposes \( f^A < 1 \), but a vote share of \( j^R \) if she proposes \( f^A = 1 \). Clearly she chooses the latter and the unique equilibrium is \( f^A = 1 \) and \( f^B = j^R \).

Finally, in the case \( j^R = \frac{1}{2} \), candidate A again chooses \( f^A = 1 \), as any choice \( f^A < 1 \) gives B the opportunity to take 100% of the vote. Given \( f^A = 1 \) is now indifferent between choosing \( f^B = 1 \) or \( f^B = j^R = \frac{1}{2} \) as either gives her 50% of the vote. Any randomization between these two strategies offers her a similar payoff.